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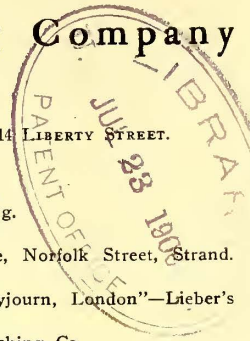
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Efficient Line Cars

We recently heard a party of managers of high-speed inter-urban roads discussing the subject of the most desirable type of line car for a long road. One manager of a 50-mile road said he had three small single-truck cars and used two men on a car. A manager of a 300-mile system said he had eight line cars which were all old obsolete passenger or express cars unfit for regular train service and had been fitted up for line work. Others spoke along the same strain, and the usual practice seemed to be to have one line car for about every 25 to 35 miles and keep two men on a car. A manager of a progressive line in Western Ohio said that he had tried this plan, had finally relegated his old line cars to the scrap heap,

and had built a car especially designed for the service. He made it the fastest car on his system and placed in it four good men, higher priced men than he had formerly employed. He kept these men in this service exclusively, ready for any emergency, and the car takes care of 100 miles of road without any assistance. He found that his lines were kept in better repair, that repairs were made more quickly and cheaply than before, in spite of the longer distances which the car has to travel, and that the scheme was in every way more satisfactory than the plan of using slow-moving, obsolete equipment. He pointed out that steam roads pay a great deal of attention to their wrecking equipment. They employ plenty of men to do the work quickly, and when a wreck occurs they use on the wrecking train the fastest locomotive that is available. In fact, many roads have trains made up and ready at all times for such emergency work.

Transfers and Transfer Systems

We wonder whether the general public will ever come to realize the amount of thought and money expended in any large traction system upon the matter of transfers. To the passenger it seems very simple. Granted that he is entitled to transfers at all, a universal transfer given whenever and wherever he wants it seems about the right thing, and if he does not get it there is a kick coming. From the standpoint of the company there are two distinct classes of transfers—those that represent the proper continuation of a five-cent ride and those which are in the nature of a discount to the public, by extending the five-cent limit far beyond the customary limits. It would be a very instructive thing if these two classes could be separated, and we fancy that in many cities the proportion of the class last mentioned would be surprisingly large. It very often happens that by taking full advantage of a transfer system the passenger gets his ride on the basis of a third of a cent per mile or even less, a figure far below anything that could reasonably be expected. Of course such cases are in the minority or no road could stay in business at all. On the other hand, many transfers are given for use within entirely reasonable limits and under circumstances which the road can well afford.

There is a frequent cry for universal transfers from any line to any other line. On some systems such transfers could be granted without serious loss, inasmuch as the only connections may be for relatively short runs. If, however, a city has a really well-developed rapid transit system, there will inevitably be crossings where long-distance connections are made which would extend the five-cent ride beyond all reason. The American single-fare system has been of immense benefit by helping the growth of suburbs. Do not ride a free horse to death by making unreasonable demands, for this exterior traffic is light and costs money to maintain. Almost every system has crossings forming long closed loops, and unless transfers are restricted there is no practicable way

of preventing circuit riding which would rise during the summer to formidable proportions, and even with existing transfer systems this is rather difficult to prevent.

Even in case of transfers to legitimately connecting lines there is good reason, quite apart from considerations of fare, for exercising discretion in the granting of transfers. It is of the utmost importance in reducing congestion to avoid massing traffic at a single point or on a single line. If transfers are unlimited it is exceedingly difficult so to control traffic as to distribute it along the lines of least resistance. Guiding it in definite directions may often improve the situation greatly, and thus be of profit to the city at large. Limitation of transfers often enables this to be done when it would be impracticable by any other means. A company should also be permitted to make reasonable regulations to protect itself against fraud, and where the number of short-distance riders is large a rule requiring the passenger to ask for his transfer when he pays his fare is certainly not unreasonable.

As to methods of transfer there seems to be a wide difference of opinion. Bodily transfer, as in the case of elevated roads and subways, is of course the simplest and most convenient when it can be accomplished. On surface lines it is generally out of the question, and the choice lies between transfer men stationed at definite points and the issuance of transfer slips by conductors. The latter gives perhaps the best control of transfers, but proves to be very troublesome on lines where there is a great demand for transference. The roads in large cities use a combination of the two, while those in smaller cities confine themselves to tickets. There are cases, too, where a coupon transfer can be advantageously used to check indiscriminate issuance of one transfer upon another. This would also have the advantage of keeping a certain check upon the whole system, and would enable some idea to be gained as to the distribution of traffic upon the longer and more troublesome routes. The whole subject is one that could be studied to advantage, and upon which valuable statistics could be gathered. The universal transfer idea has gained popularity with the public for obvious reasons, and street railway men should be able to meet it with the plain facts showing the necessities of the case. It may be true in a given instance that a certain scheme of transfers has resulted in the loss of many legitimate fares, but it is difficult to make good the contention without an analysis of the situation for which data are not at hand. We believe, therefore, that it would be good policy so to develop the transfer system as, if possible, to give a clear idea of the relative amounts of the two classes before referred to as a measure of self-defense and of education of the public. Time and money are well spent in doing this, for a single improper transfer point forced upon a company may mean a serious loss of revenue which might be avoided.

Corrugations in Rails

This subject has attracted some attention in this country but much more in England, and a considerable portion of the recent report on street railway conditions and practices in America by A. L. C. Fell, chief officer of the London County Council Tramways, was devoted to this subject. This report was digested in our issue of Feb. 3. Since that time the Tramways and Light Railways Association of London has continued the investigation, and in its June circular has pre-

sented a very interesting account of rail corrugation on the steam railways in India, where the evil seems to exist in an acute form. So much has been said and written upon the subject that it is merely necessary to call attention, here, to the salient features of the troubles. Rail corrugations, then, appear as vertical indentations on the head of the rail, of greater or less regularity, length and pitch, and of depths that range from a barely visible spot too shallow to be measured to cavities of a quarter of an inch in depth. The obstacle arising to the off-hand solution of the problem lies in the fact that observations have thus far been confined to the location and extent of the trouble, and a guess at the cause without any systematic investigation as to the action of the rails themselves and the cars at the point where corrugations occur. As in all cases where the whole story is not known, the evidence is conflicting, contradictory, and seems to show that there is no law governing the phenomenon. In other words, there may be a number of causes or natural laws which are suffering a perversion; the first of which is improbable and the second absurd.

The data at hand tell us that corrugations occur on steam lines of England and the United States to a slight extent; to such an extent in India as to be serious, and on electric roads in both England and the United States in a way to be common and troublesome. They occur on a wide range of rail section, weight and chemical analysis, and are confined to those of no one mill or method of manufacture, and on double and single-track lines; they appear in cuts or fills, on ascending and descending grades; they are said to be most pronounced in damp climates, but upon this point evidence is short and inconclusive; they are not limited to points where brakes are regularly applied, but do seem to develop most rapidly at those points, though many contradictions to this statement can be found.

In the way of contradictory observations, one man tells us that there is a difference in hardness of the high and low points of the corrugations, in that the former can be cut with a file and the latter cannot, while another says that there is no difference in the hardness of the two points; in reality, neither seems to have made an examination of sufficient thoroughness to entitle his statement to acceptance. Finally, so far as physical, chemical and microscopical examinations of the rails are concerned, there is nothing to indicate the cause.

Of course, theories on the subject have been propounded without end, and they are almost as numerous as the men who have thought and written upon the subject, each being supported by a part of the data at hand though not by all. It reminds one of the statement made by an engineer who was recently investigating the causes of sharp flanges on a certain road. When he had been at work for a few days and was asked as to how he was getting along, he said that he had accumulated such data that by a proper selection he could prove almost any theory that might be promulgated. So by a selection from among the observations on corrugated rails, it has been suggested that they were caused by rust, by irregular cooling or annealing after rolling, by the use of ingots too cool to permit of proper rolling, by the brakes, by skidding wheels, by excess of manganese, by alternate laminations of pearlite and ferrite, by rolling at improper temperatures, by some peculiarity of ballast, and by vertical vibrations set up by passing vehicles.

It hardly seems possible that variations in chemical composition or microscopic structure can be the responsible cause, nor yet the suggested variations in manufacture, else the phenomena would be more common. Nor is it probable that the use of brakes is the primal cause of the difficulty, because it has been found at points where the brakes are never applied, though it is quite probable that, given the real first cause, the brakes may lend material assistance in the development. The point is to find some possible cause that invariably accompanies the phenomenon, run it to earth, then remove it at the point where the trouble has occurred and note whether it disappears. Until this is done, either by a systematic investigation or by the tentative process of trial and error, we will continue to guess.

Possible Causes of Corrugation

From what has thus far been said it is evident that we are in the air as to the real cause, and while it may be the mere setting up of a man of straw for others to knock down, a suggestion can be made as to the most promising field for investigation, and that is along the lines of vertical vibration.

First let us consider the prevalence and the evidence as to location. As already stated, the corrugations occur to a much greater extent on electric than on steam roads. In India, where the steam roads have had much more difficulty than elsewhere, it is reported that it is almost invariably developed where the track is packed and boxed with brick or burnt clay ballast and on open girder bridges; it scarcely ever occurs where the ballast is of stone, and never where the track is packed or boxed with earth. On steam roads it is most apt to occur at stations. It apparently does not appear as frequently in the open country on electric roads as in towns and on elevated structures. From this it seems as though this condition of ballast and track laying might have an important or even controlling influence in the development of the corrugations.

Now let us consider the subject of vertical vibrations. In the adjustment of springs to the carrying of cars there is one recognized principle that should be borne in mind, but which is frequently overlooked. It is the cause of that peculiar rough riding that so frequently appears in all cars. They may be running with great smoothness when for no apparent reason they will commence a disagreeable vertical vibration. The cause for this is to be found in the fact that for every weight of car and combination of springs that may be placed beneath it there is a fixed natural rate of vibration like that of a pendulum. A blow at a joint may start it, and then, if the speed of the car is such that the blow at the next joint synchronizes with this rate, the amplitude of the vibration will be increased, and increased again at the next joint until the disagreeable results indicated are obtained.

Now as to the track. An observation of almost any double-track road will show a depression on the receiving rail at a distance of from eight to fifteen inches from the joint, showing that the yielding of the joint causes a blow of some sort to be delivered to the rail head on beyond in the rigid portion of the rail. This is especially true of high-speed service, the distance of the depression from the joint increasing with the average speed of the service. Such depressions are not common, however, on continuous, welded track, though the evidence is that corrugations are apt to start with a point of maximum depression at a joint and run

out as they leave it, only to start again at another joint.

As to what the actual conditions of car vibrations and rail deflections may be we do not know, but an inference at least can be drawn as to the former. We know what occurs in the case of the car body. At the wheels the pressures are the resultant of a number of composite forces. Experimental data have shown that the stresses put upon a truck bolster are from 25 per cent to 50 per cent in excess of the static load with applications of the same several times a second. On electric cars the motor usually rests directly upon the axle without the intervention of springs, and the nose is carried by stiff helical springs whose period of vibration is very short with a limited amplitude. If, then, these springs act in the same way as those beneath the car, and there is no reason why they should not, we will have a condition of excessive vibration whenever the rail joint, or other inequalities of the roadbed, set up a periodicity of blows that synchronizes with that of the springs carrying the motor. Whether or not this periodicity can be made to agree with the interval of passing the corrugations on the rails remains for some future investigator to determine. It can only be said by way of encouragement that it looks promising.

Reverting now for a moment to the experience of steam lines, and especially those of India, quoted in the pamphlet of the British Association, the spring suspension of the motor of course does not obtain, but it is possible that the short, light cars may have a correspondingly short period of vibration that will parallel it.

Finally, the question arises as to whether we have any data that will warrant the assumption that a periodic increase of wheel pressure will account for the depressions. Observations on the driving wheels of locomotives have shown that where there is a regular increase of pressure on the rail due to the action of the counterbalance there is an unequal wearing away of the tire, the greatest wear corresponding to the points of maximum pressure. It has also been shown that the load on the truck bolsters and inferentially the wheel pressure may be 50 per cent above that of the static load. A common weight of the present motor car and equipment is such that with a 50 per cent increase the weight on a single wheel may amount to from 10,000 lbs. to 12,000 lbs., while the torque of the motor may, at times, add 3000 lbs. to this. How much this may be increased at the wheel by the peculiar and stiff hanging of the motor is not known, but it seems quite within reason to guess that it will, at times, rise to more than 20,000 lbs. on a single wheel.

If this much be conceded then we know that a static load of 20,000 lbs. put upon a wheel is sufficient to put a distinct spot or depression on an ordinary rail. If the pressure is relieved before the wheel has moved the spot remains. If it is not removed but is continued, with the movement of the wheel, the spot is rolled out and a longitudinal crushing or wearing of the rail occurs. Hence it does appear as though the repetitions of the variations of vertical loading are quite sufficient to account for the depressions in rail corrugations, and as a consequence this is a line of investigation that is recommended to those who are financially interested in the removal of the trouble. Meanwhile, until this is done, and a demonstration as to the truth or falsity of the position has been made, the whole problem remains within the province of more or less probable guesswork in which we have found and left it.

IMPROVEMENTS AND OPERATING FEATURES OF THE SOUTHWEST MISSOURI ELECTRIC RAILWAY

The Southwest Missouri Electric Railway was one of the first interurban lines to be put into operation, and it enjoys, moreover, the distinction of not having had its organization changed since that time. The road has its origin in a mule line built in 1890, between Webb City and Carterville, by A. H. Rogers, who is now president of the system.

EXTENSIONS AND TRACK WORK

The recent development of the zinc and lead mines around Joplin, and the resulting increased traffic over the line, has necessitated quite a number of improvements and extensions. The whole region through which the line passes, that between Carthage, Mo., and Galena, Kan., is rather thickly populated, but that between Joplin and Carterville especially so. In fact, the territory is built up almost continuously, with the exception of those parts studded with zinc and lead mines. With single tracks, traffic has about reached the maximum limit. Half-hour schedules are now operated over the whole line. This necessitates passing cars every fifteen minutes, and it has been found by experiment that cars cannot be run to advantage over a single track interurban line at more fre-

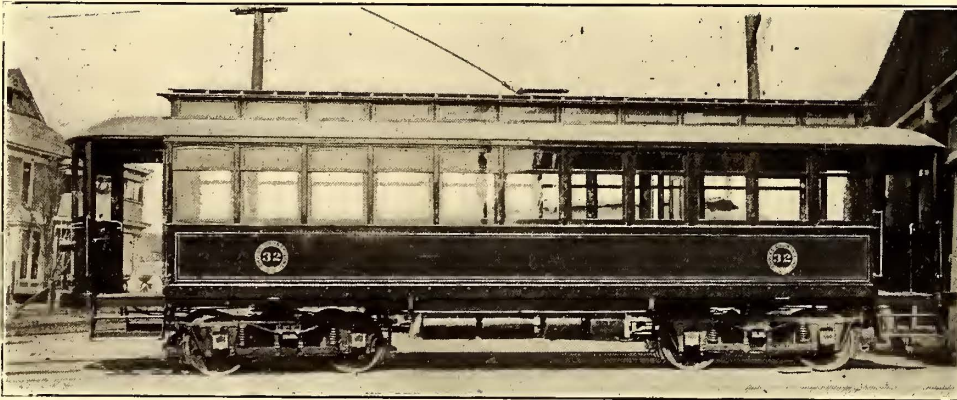


FIG. 3.—A CAR BUILT IN THE SHOPS OF THE SOUTHWEST MISSOURI ELECTRIC RAILWAY COMPANY

quent intervals than this. To handle the crowds, it is necessary during the morning and evening hours to run two cars, and often three cars together. Multiple-unit operation has not yet been put into practice and the cars are operated as separate sections of one train. Even with three cars every half hour, it is very difficult to handle the crowds on special occasions. These conditions have necessitated double tracking the system between Joplin and Lakeside Park, a distance of 12 miles, and this work is now practically completed between Joplin and Webb City. The track improvements involve considerable straightening and regrading of the line also. Between Carterville and Webb City the whole route will be changed, and a long viaduct built. From between Carterville and Lakeside Park much of the new track is being constructed north of the present location. The new route, while it avoids a long detour and eliminates several curves, necessitates some heavy grades in rock, which were regarded as too large to be cut down when the road was originally constructed. The grading being done at one point alone will, in fact, necessitate handling more earth than was removed in the original construction of the whole road. The expenditures for grading and changing the route between Joplin and Lakeside Park will amount to about \$300,000. This, however, is regarded as a good investment, since it will cut down the time to such an extent that the schedule now being operated can be run with one car less, a grade crossing with a steam road

will be avoided, and the necessity of employing watchmen will be removed.

THE NEW LINE

The new construction work includes the building of an extension north out of Webb City through a thickly populated



FIG. 1.—BREAK IN THE LEVEE NEAR CENTER CREEK FOR MISSOURI PACIFIC SWITCH

mining district. The new road, which will be 10 miles' long, will pass through a series of prosperous mining towns, Oronogo, Neck City, Purcell and Alba, varying in size from Oronogo, with 3000 people, to villages of a few hundred inhabitants. Even without railway facilities travel between the several towns is at present such that several hack lines are kept in operation. Work on the new line is well advanced. All the grading is finished and the track is practically completed from Webb City for almost the entire distance. The road is built for high-speed service. The usual handicap to speed on interurban lines, slow running through towns, has been avoided by building the line through the outskirts of the towns. Only one grade crossing with steam roads occurs, this being at Purcell. The track is laid with 70-lb. rails, using the Cambria Steel Company 100 per cent joint. With the exception of those places where the road passes over viaducts the maximum grade is $2\frac{1}{4}$ per cent, but at viaducts there

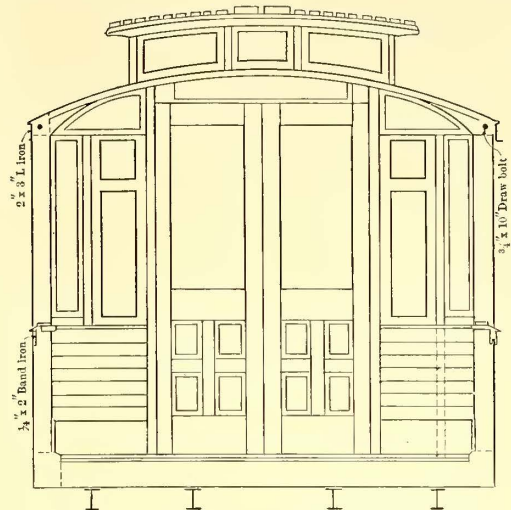


FIG. 2.—CONCRETE BUTTRESSES AND PIERS FOR STEEL STRUCTURES OVER CENTER CREEK

are some 4 per cent grades. Practically all of the road is laid on private right-of-way. In some places, because of heavy grades, it was necessary to purchase a right of way 400 ft. wide. For the greater portion of the distance the track has been laid on one side of the right of way, and poles have been set for a second track which will eventually be laid. Over

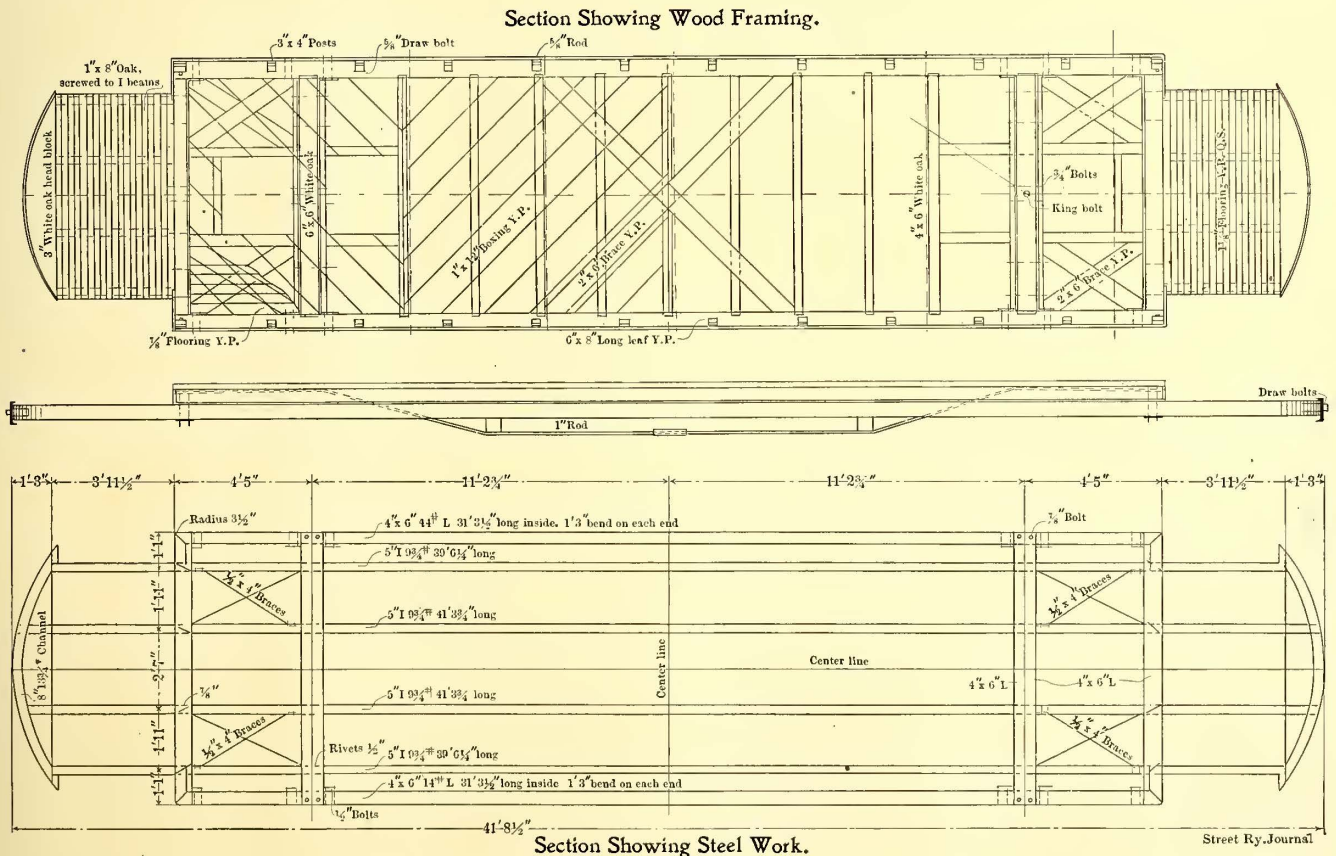
viaducts and heavy grades, however, no provision has been made for putting in the second track. Span-wire construction is used on all portions of the line. In ordinary work 35-ft. poles are employed. Telephone wires are carried on a cross arm near the top of one line of poles, while the poles on the opposite side of the track carry high tension wires as far as the sub-station located a few miles north of Oronogo, and at about the middle point of the line. An unusual amount of heavy construction work is involved in the building of the line. Some of the accompanying reproductions from photographs show the character of the work near Center Creek, which is approached on the south by a long levee. The break in the levee, shown in Fig. 1, and the heavy concrete work were necessitated by a switch from the Missouri Pacific Railroad. Another view, Fig. 2, shows the concrete buttresses and piers for the steel structure over Center Creek. It may be noted that the poles are not supported by the steel structure, but are set in the ground in the usual manner, extra long ones being employed. Both views show the rip-rap work which protects the foot of the embankment on either side. East of Oronogo the line passes above the tracks of the Frisco System on a 600-ft. viaduct. Beyond this point a bridge one-half mile in length carries the tracks over Spring River. The river rises far out of its banks at times, and in order to get above high-water mark the bridge was built high and very heavy grading was consequently necessary for the approaches

his direction. The car itself and several features of its construction are well shown in the accompanying illustrations. It is somewhat peculiar in design in that four steel I-beams



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FIG. 6.—END SECTION OF NEW CAR

extend the full length of the car, from bumper to bumper, and the body of the car proper rests on these beams. In the design of the car every little detail was given attention. The



FIGS. 4 AND 5.—SHOWING WOODEN AND STEEL FRAMING OF CARS BUILT BY THE SOUTHWEST MISSOURI ELECTRIC RAILWAY

to it. When the line is completed a half-hour schedule will be inaugurated. The cars for service on it are now being constructed in the shops of the company at Webb City.

THE NEW CARS

The cars which have been adopted as the standard for the system were designed by E. J. Pratt, mechanical and electrical engineer of the system, and are being built under

timber was personally selected by Mr. Pratt in southern yards and some of it has been on hand for five years. Each car measures 42 ft. over all in length and is 8 ft. 7 ins. wide over the sills. The four I-beams are riveted together by two 4-in. x 6-in. angle bars over each bumper. These bars, which are placed with the shorter flanges down against the I-beams and a few inches apart, form a pocket which is filled with three pieces of oak, between which are sandwiched steel plates

$\frac{5}{8}$ in. x $4\frac{1}{2}$ ins. placed vertical. At their outer ends these angle bars furnish support to the 4-in. x 6-in. angle bars forming the outside of the side sills. These latter angles at their ends are bent at right angles and are riveted to the outer of the four I-beams, running the full length of the car, and to the 4-in. x 6-in. angles forming the end sill. A chan-

purely mortised into the posts and the furring below this is wedged down tightly by wedges under the belt rail at each post. Additional bracing of the body is obtained by the inside iron truss, which may be observed in Fig. 8.

The outside sheathing below the belt rail is glued in the usual manner, and in addition a $\frac{1}{4}$ -in x 2-in. iron band is screwed just under the belt rail over the ends of the sheathing, while a half oval strip protects the bottom edges. The eave rail is of 2-in. x 3-in. angle iron.

The roof is of the canopy type. A feature out of the ordinary is that a roof mat extends over the whole of the upper deck. This mat was so placed as to protect the roof from blows from the trolley and from the shoes of the trainmen. The interior of the car is divided by a glass partition into a smoking and main passenger compartment. The finish in imitation of antique oak not only gives a very attractive appearance to the interior, but it does not show dirt as readily as a lighter finish. An objection to it, however, is that the lighting is not as effective as it would be with a lighter finish. The car is heated by electric heaters placed under the seats.

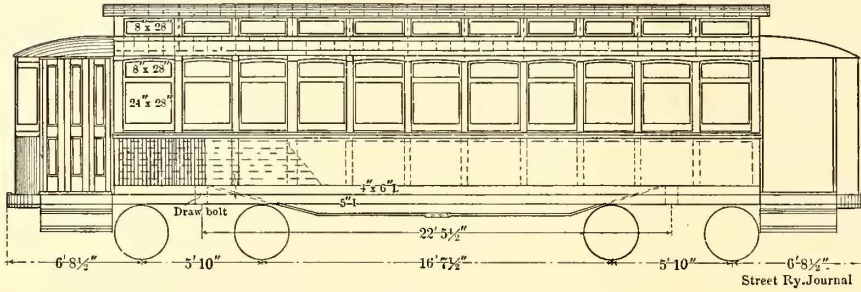


FIG. 7.—SIDE ELEVATION OF NEW CAR

nel bar forming the bumper iron is placed over the ends of the I-beams and is riveted to each of the beams by angle plates. To strengthen the channel bar at the extreme point where it would receive heavy blows in case of collision with another car, a 1-in. x 4-in. bar placed immediately behind the channel extends between the two center I-beams. The I-beams consequently are riveted together by cross bars at six separate places, at the bumpers, at the end sills, and at the bolsters, as shown in Fig. 5. All of the riveting is done hot in the shop by means of a portable forge.

The side angles are filled in with 6-in. x 8-in. yellow pine sills, while the end angles are similarly filled with beams to from the end sills. Cross sills of 4-in. x 6-in. oak, Fig. 4, extend at intervals of about 24 ins. between the two side sills. A $\frac{5}{8}$ -in. tie rod is placed alongside each alternate cross sill and terminates in bolts on the outside of the side angles. Cross braces of yellow pine at the center and at the ends of the car give additional strength to the framing.

The floor is double, and consists of a lower one of 1-in. x 12-in. yellow pine laid diagonally, and above this another of $\frac{1}{2}$ -in. yellow pine flooring laid lengthwise. Between the two



FIG. 8.—INTERIOR OF CAR UNDER CONSTRUCTION, SHOWING INSIDE TRUSSES

floors is a layer of asbestos. The platform floor is laid cross-wise, and each piece is screwed to each I-beam by screws passing through drilled holes in the webs of the beams. The 3-in. white oak head block, shown in Fig. 6, is also secured to the I-beams just behind the channel bar, forming the bumper. Each of the side posts is secured to the side sill and to the plate by a draw bolt extending through the sill and nutted on the opposite side. The belt rail under the windows is se-



FIG. 9.—END OF CAR, SHOWING I-BEAMS, UPON WHICH THE PLATFORM AND VESTIBULE ARE BUILT

Heat is required during a comparatively short period of the year in this climate, and this makes electric heating preferable to the employment of a hot-water system.

The car is mounted on Taylor trucks, and the fact that there are no dropping platform timbers permitted the trucks to be placed as near the end of the car as the clearance of the steps would allow. They are placed with their centers 22 ft. $5\frac{1}{2}$ ins. apart. Four G. E.-70 motors are mounted on

the trucks and General Electric type-M control, equipped for double end operation, is employed. Although multiple-unit operation is not being carried out at the present time, provision is being made for this in the future by placing control cable receptacles on the cars. The chief reason for the installation of the type-M system was the elimination of the heavy maintenance expenses of the direct controller and the avoidance of flashing and burning on the front platform.

CAR LIGHTNING PROTECTION

The repairs to direct controllers have been excessive, due largely to the burn-outs from lightning, which is usually

storms, and to pull the trolley down if a stop of any length is made during a storm.

THE DESPATCHING SYSTEM

The interior of the dispatcher's office, which is located over the veranda of the office building at Webb City, is shown in Fig. 12. The board is laid off with sidings and branch lines to correspond with those on the tracks of the system. Holes are drilled in at frequent intervals for the insertion of plugs bearing car numbers. Plugs for trains going west are inserted in the top holes, while those headed in the opposite direction are placed in the lower line of holes. When an



FIG. 10.—INTERIOR OF COMPLETED CAR

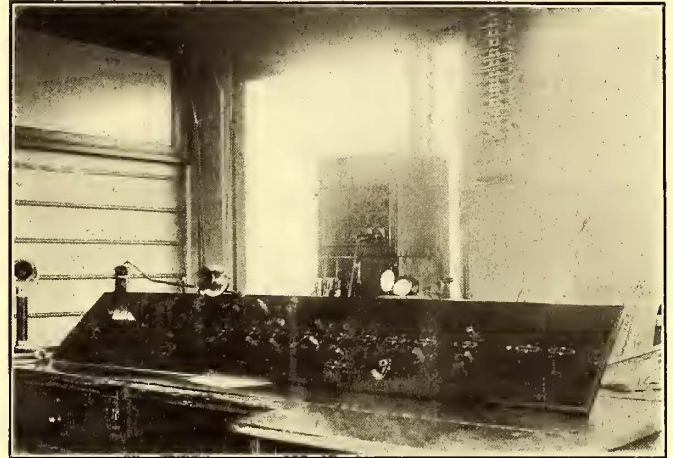


FIG. 12.—INTERIOR OF THE DESPATCHER'S OFFICE AT WEBB CITY

severe in this region. Lightning storms are not only of frequent occurrence but the discharges seem to consist of a greater volume of current than is usually encountered. Special means have been provided on the new cars to prevent lightning entering the car. A choke coil of forty-six turns is placed in the main circuit and four arresters are used in connection with it. Two of them placed in multiple are con-

order is given to a car the plug for that car is advanced to the hole corresponding to the next reporting and passing point. However, if a passing order is given a plug of different appearance is inserted in the hole corresponding to the passing point, while the plug bearing the car number is advanced to the next point from which the car will be reported. Orders are received by the conductors, and must be obtained at each

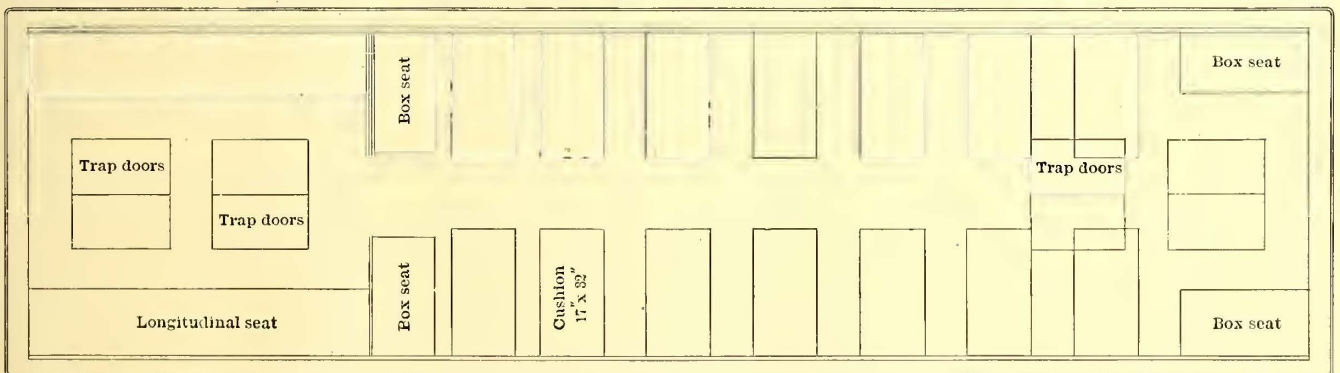


FIG. 11.—ARRANGEMENT OF SEATS AND LOCATION OF TRAP DOORS

nected on the trolley side of the choke coil, while two additional ones similarly connected are tapped in on the choke coil at about its middle point. To avoid damage to armatures should the discharge enter the motors, the fields are connected in the circuit first, which, of course, necessitates changing the direction of the current in the fields when the car is reversed. The fact that the fields can be better insulated and that if they become grounded less expense is entailed than when the armature is grounded were the chief reasons for so connecting the motors. In addition to the choke coil in the main circuit another is placed in the lighting and control circuit. Additional precaution is taken by instructing the conductor to keep the lights burning through thunder

meeting point unless special orders to the contrary have been obtained.

EMPLOYEES' CLUB

Practically all of the employees belong to the Electric Railway Club, which has quarters near the office. One room is fitted up as a library, while the other, Fig. 13, contains billiard and pool tables. A fee of 50 cents per month is charged, and a sick benefit is allowed members when ill. The badge of the association is in the form of a button which, when worn, serves as a pass over the line at any time.

TREATMENT OF EMPLOYEES

The company treats its men with consideration and respect

and as a result has been able to obtain a better class of men than is often found on railway systems. In all there are about 70 trainmen, the greater number of whom have been in the employ of the company for years. Every encouragement is given the employee to remain with the company. The fact that practically all of the officers of the road have been promoted to their present positions from that of motorman or conductor offers considerable encouragement to the employee to remain with the company. He is made to feel that if he proves capable other positions better than his present one are open to him. The company is rather lenient with regard to permitting free travel of its employees over the road. As previously mentioned, the badge of the Electric Railway Club serves as a pass at any time, whether or not the employee is in uniform. The families of employees are given a reduced rate.

In hiring new men usually only those living in the vicinity and whose habits and character are known are considered.



FIG. 13.—BILLIARD AND POOL TABLES IN THE CLUBROOMS

There is, however, very little occasion for the employment of new men, as it is very seldom that an employee leaves the company of his own accord.

The moral tone of the trainmen is kept at a high standard by the strict demands of the company, together with the system of inspection maintained to see that all rules are observed. The rules, a copy of which is furnished to every trainman, state that an employee must not smoke or use intoxicating liquors while on duty, and must not get under the influence of intoxicating liquors or enter gambling resorts at any time. To see that these rules and others relating to conduct are observed a secret inspector who frequents saloons and places of ill-repute is employed. Another inspector, known to the men, reports any violations observed, but his duty is to report particularly on violations of rules governing car service.

THE MERIT SYSTEM

Employees are disciplined by means of a merit system, which is in charge of S. W. Gunsalus, superintendent of transportation. An accumulation of 100 demerits is sufficient to cause a man's discharge. For many commendatory acts merits are allowed, and these counterbalance or cancel demerits already obtained. All merits and demerits are cleared off of an employee's record every six months. The accompanying lists show the violations for which demerits are given, as well as those actions for which merits are allowed. Both conductors and motormen are subjected to immediate discharge for disloyalty to the company, intoxication, gambling and similar offenses. The conductor is also subjected to demerits for offenses, such as failure to turn in reports, not

keeping his car clean, sitting down in the car and failure to report delays. Merits on the other hand are given for neatness in personal appearance, politeness and attention to passengers, for turning in complete reports of accidents and for display of good judgment in emergencies. Offenses for which the motorman receives demerits are largely those relating to the abuse of the car apparatus. Demerits are also given for untidy appearance, not obeying the conductor, not repeating orders to the despatcher, and like offenses. Good reports from car house men regarding the care of the equipment, economy in the use of power and making repairs on the car that avoided its being sent into the shop, and such other commendatory acts are rewarded with merits.

Southwest Missouri Electric Railway Company.

Webb City, Mo., 1906

MERIT MARKS.

Mr
 You have today been given Merit Marks on Charge
 No., contained in the merit system of discipline.
 Date
 Time S. W. GUNSALUS,
 Place Superintendent.

FIG. 14.—RECORD OF MERIT MARKS

Southwest Missouri Electric Railway Co.

Webb City, Mo., 1905.

NOTICE TO TRAINMEN.

A on line has this day been given
 Marks on Charge No. in the Merit System of Discipline.
 S. W. GUNSALUS, SUPT.
 By

FIG. 15.—NOTICE TO TRAINMEN IN REFERENCE TO MERIT MARKS

Its sheets specifying those violations for which demerits are given, as well as those commendatory actions for which merits are allowed, are posted on a bulletin board in the club room. The inspectors turn in reports of merits and demerits to the office of the superintendent of transportation. He in turn notifies the trainmen on a blank used, Fig. 14, especially for the purpose, that a certain number of merits or demerits have been given him for a specified cause. A notice, Fig. 15, is also publicly posted in the club room to the effect that a motorman or conductor, as the case may be, has been given demerits or merits for a specified violation or commendatory action. This public notice, however, does not specify the name of the motorman or conductor, but states simply that "a" motorman has received demerits. A list of merit and demerit values is present herewith:

DISCIPLINE OF EMPLOYEES BY THE MERIT SYSTEM.

IMMEDIATE DISCHARGE

1. Disobedience of rules governing railroad crossings.
2. Disloyalty to company.
3. False statements.
4. Intoxication.
5. Dishonesty.
6. Gross ungentlemanly conduct.
7. Gambling.

CONDUCTOR'S DEMERITS

8. Failure to report accidents. 10—100
9. Giving bells too quickly, and when not in proper position 5
10. Smoking on duty 20— 50
11. Error on trip sheet. 2— 5

12. Short or long on Ohmer register, .25-1D, .50-2D, .75-3D, 1.00	5
13. Failing to turn in daily receipts before 11 a. m.	5
14. Failure to cancel coupons when collecting same.	5
15. Failure to sign and date semi-monthly report.	5
16. For neglecting to punch half fares before issuing.	5
17. Neglecting to enclose ticket with conductor's name in turn-in	5
18. Neglecting to turn in semi-monthly report by 11 a. m., the third and eighteenth of each month.	5
19. Error punching transfers.	2
20. Deliberately punching transfers to permit lay-over	20
21. Register not turned at end of line when required.	10
22. Bunching fares	5
23. Missing fares	2—10
24. Incomplete and poor accident reports.	3—10
25. Inattention to passengers	2—10
26. Trouble with passenger when conductor is to blame	10
27. Missing or losing out.	10
28. Dirty car	5
29. Untidy condition of dress.	2—10
30. Tail light not burning after dark.	5
31. Reading on duty.	10
32. Sitting down in car when running, except when eating meals	5
33. Unnecessary talking to motormen, passengers or employees	5—10
34. Drinking or frequenting saloons at any time without good excuse	10—50
35. Letting boys change trolley.	5
36. Failure to announce streets.	2—5
37. Profanity in the presence of passengers.	5—25
38. Disobedience of orders whether verbal or by bulletin; if flagrant, discharge.	10—100
39. Running away from passengers.	10
40. Bad judgment or carelessness in regulating heat on car	5
41. Bad judgment on special occasions.	2—10
42. Criticising management of road in presence of passengers	5
43. Careless and indifferent operating of car.	5—10
44. Impolite remarks to passengers.	5—25
45. Garnishee of wages	5
46. Failure to report register when out of order.	5
47. Not going ahead and reporting in cases of breakdown or accident	5
48. Failure to report delays.	2—10
49. Acts detrimental to good service in opinion of superintendent	3—20
50. Not having rear destination sign properly displayed	5
51. Carrying passengers by their destination when notified beforehand.	5
52. Lamp globes not cleaned	5
53. Reporting for duty without regulation uniform, except new men.	5
54. Running beyond orders given by despatcher, foot extra list or	100
55. Failure to be supplied with half fares and use same properly	5
56. Failure to observe danger or precautionary signal.	5—50
57. Negligence in not closing and locking switch properly	2—100
58. Backing car without taking proper precautions.	5
59. Collecting fares on railroad crossings.	10
60. Error or misstatement of amount of cash in turn-in	3—5
61. Recommending unworthy men for employment.	5
62. Accident when avoidable in opinion of superintendent	10—100
63. Neglecting to get supplies at office.	3
64. Talking about accidents to others than proper officials	20
65. Not in proper place on car.	5
66. Carrying ex-employees or other passengers free.	5
67. Failure to account properly for all freight handled.	10
68. For not giving proper attention to packages or freight handled on car	5
69. For refusing to give freight receipts.	5
70. Running ahead of schedule time.	5—15
71. Loud and boisterous talking to fellow employees or passengers on passing cars.	3—10
72. Failure of extra car or local to flag Twentieth Street curve when signals are out of order, and main line cars when off time.	25

73. Drinking on duty	100
74. For acting as motorman unless absolutely necessary	5—20
75. For allowing motormen or others to collect fares.	5—50
76. For not giving orders to motorman before boarding car	5
77. Failure to keep left hand gate closed.	5
78. Failure to keep doors closed in cold weather.	5
79. For making overcharge on freight.	5
80. For violation of any part of any rule not above designated according to opinion of superintendent	1—100

CONDUCTOR'S MERITS

1. Warning persons when in the act of jumping, to to wait until the car stops.	5—20
2. Securing names and addresses of witnesses who saw accident, other than those on report, each.	5
3. Politeness and attention to passengers.	5
4. Assistance rendered in case of accident, such as to bring commendation from passengers	10—50
5. Adjusting window and shades to please passengers.	5
6. Informing company of matters in interest of good service	5—20
7. Reports as to defects in equipment while operating car	1—5
8. Complete and perfect accident reports.	5
9. Good judgment and work in handling layout and blockade	5—20
10. Special meritorious acts calling for recognition from the company	5—50
11. Turning in fare books or badges ordered up by the company	5
12. Exact account in daily turn-in on Ohmer register.	7
13. Accuracy in daily turn-in on Meaker register.	2
14. Notable economy in use of heaters.	5
15. Striving to keep car neat and clean, lamps, etc.	5
16. Neatness of semi-monthly report and trip sheets.	5
17. Promptly turning in all articles found in car.	2
18. Neatness in personal appearance	5—20
19. For driving stock out of right of way.	20
20. For sanding Fourth Street curve when rails are slippery	5
21. For keeping tail light in good condition.	5
22. For reporting cattle in the right of way.	5

SOUTHWEST MISSOURI ELECTRIC RAILWAY COMPANY

Discipline of employees by the merit system in effect Oct. 1, 1905.

IMMEDIATE DISCHARGE

1. Disobedience of rules governing railroad crossings.
2. Disloyalty to company.
3. False statements.
4. Intoxication.
5. Dishonesty.
6. Gross ungentlemanly conduct.
7. Gambling.

MOTORMAN'S DEMERITS

8. Failure to make safety stop at railroad crossings.	25—100
9. Failure to bring car to standstill at Joplin Street on the Chitwood and Smelterhill lines, or Fourth or Second on Main	25
10. Headlight not burning after dark without good cause	10
11. Feeding current too fast.	5
12. Not properly slowing down and ringing gong when passing another car on double-track or switch.	5
13. Not taking proper care of controllers.	10
14. Not properly oiling trolley and wheel or motor bearings	10
15. Not cleaning commutators and brushes.	10
16. Running circuit breakers without throwing off current	10
17. Stopping car or running down grade with current on	10
18. Injury to car equipment caused by improper handling	10—50
19. Careless and indifferent operating of car.	2—20
20. Reckless running	25
21. Reversing car when under headway, except to avoid accidents	10
22. Failure to see that sand-boxes are filled.	5
23. Not having proper tools.	5
24. Failure to report accidents	10—100

25. Missing or losing out.....	10
26. Smoking on duty	20— 50
27. Untidy condition of dress.....	2— 10
28. Allowing unauthorized persons on the front platform	10
29. Disobedience of orders, verbal or by bulletin (if flagrant, discharge)	10—100
30. Drinking or frequenting saloons at any time without good cause	10— 50
31. Profanity in presence of passengers.....	5— 25
32. Accidents when avoidable in opinion of superintendent	10—100
33. Unnecessary conversation with passengers or employees while operating car	5— 25
34. Failure to report trouble or known defects with car.	5— 25
35. Not answering signals promptly.....	2
36. Running away from or passing up passengers.....	10
37. Starting car without proper signal except to avoid accident	20
38. Following car in front too close.....	10—100
39. Running too close to vehicles or pedestrians upon track before getting car completely under control	10
40. Bad judgment on special occasions.....	1— 10
41. Leaving car without taking reverse lever.....	10
42. Leaving car when conductor is absent.....	10
43. Not obeying conductor's signal.....	5
44. Not looking back when conductor is flagging.....	10
45. Trouble with passengers when motorman is to blame	10
46. Garnishee of wages	5
47. Not having front destination sign properly displayed	5
48. Talking to others than proper officials of company about accident	20
49. Criticising management of road in presence of passengers	5
50. Failure to report delays.....	2
51. Reporting for duty without regulation uniform, new men excepted	5
52. Running into open switch.....	2— 20
53. Failure to see that switch is properly set after passing over same	10—100
54. Failure to observe and obey danger or precautionary signals of any kind whatever.....	10—100
55. Backing car without taking proper precaution.....	20
56. Running beyond orders given by despatcher, foot of extra list or	100
57. Failure of extra or local cars to flag Twentieth Street curve when the signals are out of order, and main line cars when off time.....	25
58. Running ahead of schedule time.....	5— 15
59. Drinking intoxicating liquor on duty.....	100
60. For starting car on one bell.....	5— 20
61. Flattening wheels when avoidable	1— 20
62. Acts detrimental to good service in opinion of superintendent	3— 20
63. Running into switches too fast	16
64. Running over switches too fast.....	10
65. Running out of switches too fast.....	10
66. For loud and boisterous talking to fellow employees or passengers on passing cars.....	3— 10
67. For starting car before the incoming car has entered switch and is in the clear.....	10
68. For sitting down at places otherwise than those designated	25
69. For allowing anyone except superintendent, inspector, or the regular conductor to operate car..	5— 50
70. For allowing conductor to operate car unless it is absolutely necessary	5— 20
71. Failure to stop front end of car at telephone when practicable	5
72. For not paying attention and repeating orders to conductor	5
73. Failure to have both front gates closed when car is moving. Main line or local	5
74. Failure to keep front doors closed in cold weather..	5
75. For collecting freight money.....	5
76. Applying air too severely	5— 20
77. Recommending unworthy men for employment.....	5
78. For not giving proper attention to packages or freight handled	5
79. For violation of any part of any rule not designated above, according to opinion of superintendent	1—100

MOTORMAN'S MERITS

1. Warning persons in act of jumping on or off car to wait until the car stops	5— 20
2. Securing names and addresses of witnesses who saw any accident other than those on report.....	5
3. Politeness and attention to passengers.....	5
4. Assistance rendered in case of accident, such as to bring commendation from passengers	10— 50
5. Informing company of matters in interest of good service	5— 20
6. Complete and perfect accident report	5
7. Good judgment or work in handling layout or blockade	5— 20
8. Good stop to avoid accident	5— 50
9. Special meritorious acts calling for recognition from company	5— 50
10. Promptly reporting any defects	3— 10
11. Careful handling of car	5
12. Good reports from house men or inspector as to the care of motors, bearings, controllers, etc.....	5— 20
13. Notable economy in the use of power.....	5— 25
14. For tying up hangers, fixing 'phones, etc., while on duty	5
15. For making repairs on car that will prevent it from having to be turned in to house.....	5— 25
16. Neatness in personal appearance	5— 20
17. For cleaning track and switches, closing right of way gates, etc.	3— 10
18. For driving stock out of right of way.....	20
19. For sanding Fourth Street curve when rails are in slippery condition	5
20. For cleaning vestibule windows.....	5
21. For keeping headlight in good shape.....	5
22. For reporting cattle in the right of way.....	5

CARE OF EQUIPMENT BY MOTORMEN

It was stated that demerits were given the motorman for inattention to the electrical apparatus. The motormen are, in fact, entirely responsible for the care of all the apparatus of the car, including the oiling of the bearings. They carry a wrench, pliers, sand paper, carbon brushes and other tools and material necessary to clean and make slight repairs. On the Galena-Carthage run, a lay-over of one-half hour is allowed in Carthage especially for the purpose of giving the trainmen time to go over the cars. These lay-overs come after a continuous run of three and one-half hours, and during each of them the motorman must oil his trolley wheel and inspect all bearings. The whole half hour, in fact, is spent in cleaning the controller and examining the motor bearings, motors and other parts. The rules state that commutators are to be cleaned with canvas three times a day, and the brushes are to be inspected once each day. In short, the motorman is required to take care of all the apparatus of the car. All repair work and adjustment of brakes, however, is done in the shop. Conductors on the other hand are required to spend the half-hour lay-over in a general sweeping and cleaning of their cars, they being entirely responsible for the condition of the cars.

CONDUCTOR'S REPORTS

At the end of each day the conductor is required to fill out and turn in the trip sheet shown in Fig. 16. Blank spaces on it make provision for changes of motormen and of cars. The conductor makes a summary of the day's business, indicating the number of transfers, half fares and others received, and after the register readings have been obtained the office also makes a summary, and the amount of cash or tickets over or short is recorded on the sheet. Demerits are given if the register indicates the conductor either short or long. The number of demerits vary from one for a mistake of 25 cents to five for a mistake of one dollar.

In addition to the daily trip sheets, conductors turn in semi-monthly reports, two of which are reproduced in Figs. 17 and 18. These reports are simply to check the receipts of similar runs for the same length of time. The receipts turned

in by conductors on similar runs may vary from day to day, but it has been found that during a period of one-half month the total receipts from similar runs average about the same per hour. The two cards show how closely these receipts

The results on the cards shown, however, are somewhat closer than usually obtained, as the average variation is about 1 per cent to 2 per cent. The office force in checking and comparing the receipts from similar runs throughout the day soon become trained, so that any variation from the usual receipts or variation between cards of similar runs becomes apparent at once. Such variations serve simply as a guide for making investigations.

SOUTHWEST MISSOURI ELECTRIC RAILWAY CO.

Punch **CONDUCTOR'S TRIP SHEET.**

Mark _____

Conductors will find fares as collected. _____ 190__

Conductor. Badge No. _____ Hours _____

Motorman. Badge No. _____ Hours _____

Motorman. Badge No. _____ Hours _____

Run No. _____ Car No. _____ Register No. _____

Run No. _____ Car No. _____ Register No. _____

Run No. _____ Car No. _____ Register No. _____

Trips	Time Leaving Gates	Time Leaving Carriage	No. Register	No. Fares
1			Total No. Fares on Register	
2			Total No. Fares on Register	
3			Total No. Fares on Register	
4			Total	
CONDUCTOR'S CASH ACCOUNT			CASH	
5			Conductor's personal cash at beginning of run	
6			Total cash on hand at end of run	
7			Conductor's personal cash at end of run	
8			Amount remaining to credit of Company and turned in herewith	
9				
10				

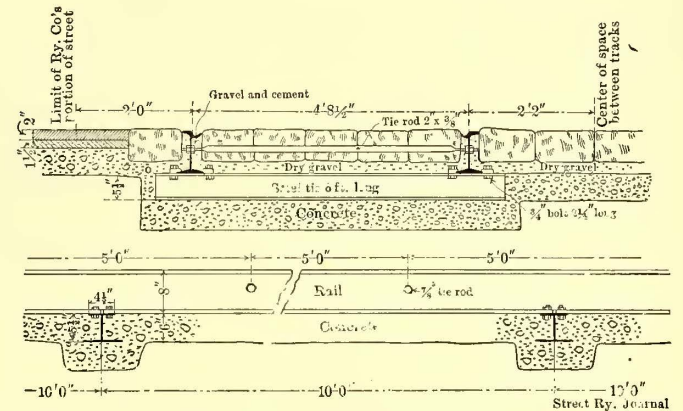
CONDUCTOR'S SUMMARY OF DAY'S BUSINESS			
Office Summary of Day's Business	Coupons Transfers Half Fares	CASH	OFFICE
Transfers			Cash Over
Coupons and Half Fares			Cash Short
5 Cent Fares			Tickets Over
10 Cent Fares			Tickets Short
15 Cent Fares			
25 Cent Fares			
Total Cash—Pass'grs			
Total Cash—Freight			
Total Cash			

FIG. 16.—CONDUCTOR' TRIP SHEET

coincide. The conductors make out the report for each day before turning in the trip sheet. At the end of the half month they turn in the report with all the figures totaled. The office force checks the figures with those on the trip sheets and then reduces the receipts to a basis of receipts per hour by dividing

NEW TRACK CONSTRUCTION IN BUFFALO USING STEEL TIES AND CONCRETE FOUNDATION

The International Railway Company, of Buffalo, N. Y., has decided to lay 5½ miles of double-track steel and concrete roadbed in the manner illustrated in the accompanying sections on its Fillmore Avenue line, which carries considerable heavy traffic through the east side of the city. The



CROSS-SECTION OF STEEL AND CONCRETE ROADBED FOR FILLMORE AVENUE LINE, BUFFALO

new construction replaces wood ties, and involves the use of steel ties embedded in concrete. The ties are double channels, 6 ft. long, 4½ ins. wide at the top and 8 ins. at the base. They are spaced 10-ft. centers, as against 5-ft. centers with wood ties. It is expected that they will last at least three times as long as the latter, or about twenty years. The tee rods are spaced 5 ft. centers. The other construction details can be readily seen by reference to the illustrations.

The Southwest Missouri Electric Railway Company.
CONDUCTOR'S REPORT
For the Half Month Ending June 18 1906

DATE	CASH STATEMENT	Pass'grs	Freight	Freight	COUPONS	Half Fares	Hours
1	47.20	1.48	48.68	14	2	12	13 1/2
2	58.30	1.44	59.74	15	3	12	12 1/2
3	86.80	1.44	88.24	14	4	10	12 1/2
4	46.70	1.04	47.74	14	3	9	13 1/2
5	34.40	1.30	35.70	13	2	8	13 1/2
6	79.00	1.60	80.60	14	4	13	14 1/2
7	67.50	1.47	68.97	14	4	13	15 1/2
8	44.00	1.10	45.10	14	4	12	13 1/2
9	46.00	1.00	47.00	14	3	12	13 1/2
10	42.60	1.30	43.90	13	1	11	13 1/2
11	42.80	1.34	44.14	13	1	14	13 1/2
12	42.20	1.04	43.24	13	2	11	13 1/2
13	60.20	1.30	61.50	14	3	12	13 1/2
14	60.20	1.30	61.50	14	3	12	13 1/2
15	42.20	1.20	43.40	13	1	12	13 1/2
Total	778.60	18.10	796.70	142	36	123	132 1/2

Conductor. W. J. ...

The Southwest Missouri Electric Railway Company.
CONDUCTOR'S REPORT
For the Half Month Ending January 1906

DATE	CASH STATEMENT	Pass'grs	Freight	Freight	COUPONS	Half Fares	Hours
1	47.20	1.48	48.68	14	2	12	13 1/2
2	42.40	1.44	43.84	13	3	12	12 1/2
3	41.80	1.44	43.24	13	3	12	13 1/2
4	0	0	0	0	0	0	0
5	37.90	1.30	39.20	13	2	10	13 1/2
6	57.20	1.60	58.80	14	4	13	14 1/2
7	61.60	1.60	63.20	14	4	13	15 1/2
8	46.20	1.40	47.60	13	3	12	13 1/2
9	48.00	1.60	49.60	14	4	13	13 1/2
10	48.80	1.44	50.24	14	4	13	13 1/2
11	57.20	1.70	58.90	14	5	13	13 1/2
12	43.20	1.50	44.70	13	4	12	13 1/2
13	66.10	1.60	67.70	14	5	13	13 1/2
14	61.70	1.60	63.30	14	4	13	13 1/2
15	46.90	1.50	48.40	13	4	12	13 1/2
Total	707.30	19.20	726.50	139	41	122	131 1/2

Conductor. P. E. Smith

FIGS. 17 AND 18.—CONDUCTORS' SEMI-MONTHLY REPORTS, WHICH SERVE TO CHECK RECEIPTS

by the total hours the car was in operation. The two cards shown were for the afternoon and night run on the main line. It may be noted that, while there is a wide difference between the daily receipts from the two cars, in one instance the receipts from passengers were \$79 on one car and \$59.20 on the other, for the whole period the receipts per hour differ for the two runs by an amount less than 1-3 of 1 per cent.

The famous sink hole on the line of the Urbana, Bellefontain & Northern Railway, which attracted the attention of engineers at the time the road was built two years ago, and for many months balked the construction force that then was building the road, is again giving trouble. This week the company's track and an expanse 50 ft. wide and 150 ft. long, including the country road, sank out of sight and there is now a lake of water 14 ft. deep in the place. The road was tied up until the company could build a temporary track around the newly developed lake. The construction company which built the road dumped more than 2000 carloads of gravel, brush and timbers into this hole, and for more than a year it has given trouble. The ground at this point is of a peat-like substance. Fifty years ago, when the Big Four Railroad was built through this district, a similar experience was had. The timber from 20 acres of land was driven in the form of piling to form a foundation. Finally a high bank was built across the treacherous ground and the steam road has since had no trouble. The electric line will probably have to do something of this kind also,

THE NEW SHOPS OF THE TWIN CITY RAPID TRANSIT COMPANY

The Twin City Rapid Transit Company, of Minneapolis and St. Paul, has begun the erection of new shops for the maintenance of all the equipment operated in the two cities and on the surrounding interurban lines. Construction work

however, the wheel work will be done in the machine shop. The paint shop will be provided with cranes, and a fireproof room will be built for the storage of paints.

Power for the shops will be supplied at 220 volts from the Snelling Avenue sub-station, located in the front portion of the car station. This sub-station is one of the several supplying current for operating the cars, but a motor-generator set

will be installed to care for the shop load. About 300 hp of motors will be employed. The shops will be lighted by both incandescent and multiple-arc lights. All the buildings will be heated by steam from a central plant in the rear of the smith shop.

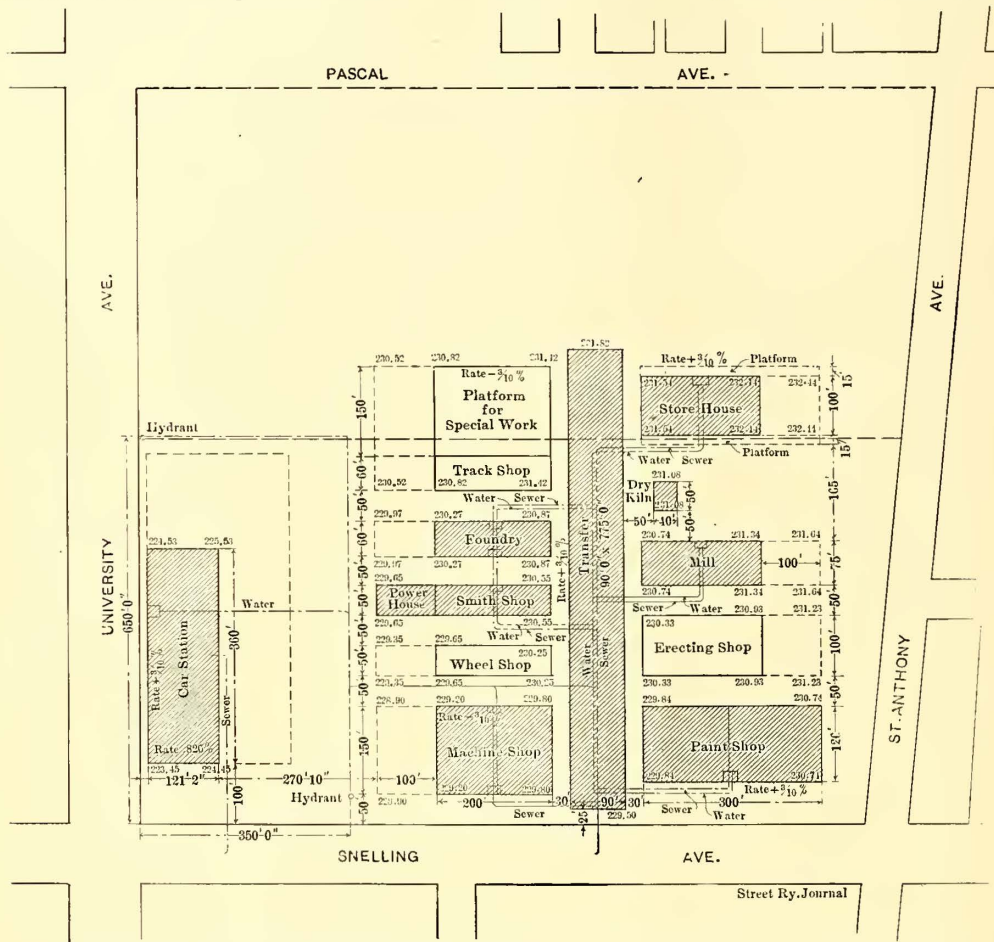
The dry kiln will be heated by hot air, obtained by means of fans which will drive air over steam pipes. Water will be secured from the city mains. A sewage system connected to all the buildings will empty into the city sewer on Snelling Avenue. All of the buildings will be supplied with ample toilet facilities. The shops are being built for a capacity of about 50 per cent greater than the present shops at Blaisdell Avenue and Thirty-first Street, Minneapolis. However, a 20-acre tract, belonging to the company, east of the site now being covered with buildings, will permit future extensions should these be needed at any time. The construction work is under the supervision of

C. F. Ferrin, superintendent of buildings for the company.

TOLEDO & WESTERN DENIED ADMISSION TO CENTRAL FREIGHT ASSOCIATION

At a meeting of the Central Freight Association held a few days ago, a request made by the Toledo & Western Railway Company for admission to the association on the ground that it is a common carrier was denied. As is generally known, this road handles standard freight trains with electric locomotives, and pro-rates business with connecting lines. In spite of the refusal, the Wabash Railroad and the Detroit, Toledo & Ironton announced that they would take independent action and recognize the Toledo & Western as a common carrier and exchange business with it. There is a growing sentiment in favor of such alliances on the part of the steam roads, and it is generally predicted in steam-road circles that within another year this and possibly other freight roads will receive recognition from the Central Freight Association.

The report of the United Railways Company, of St. Louis, for three months ending June 30 shows that 47,206,590 passengers were carried on 1,278,252 trips. During the corresponding period of last year the same company made 1,286,088 trips and carried 44,325,352 passengers.



LAYOUT OF PROPOSED SHOPS FOR THE TWIN CITY RAPID TRANSIT COMPANY

is already well under way. The car station is almost completed, and the foundations for practically all of the buildings are in place. It is expected that they will be ready for occupancy in the fall. The shops are being built on a site about midway between the two cities and cornering on University and Snelling Avenues. The buildings are to be of concrete steel construction. The walls will be faced with cement brick, backed by cement blocks. The blocks and brick are being manufactured by the company on the site of the shops.

The accompanying drawing shows the relative arrangement of the buildings. Those cross hatched are to be erected at once. The machine shop, foundry and mill will be built with a view to enlarging them at some future time by extending them 100 ft., as shown by the dashed lines. As a precaution against the spreading of fire, a 50-ft. space is allowed between the separate buildings, and the car station will be provided with automatic sprinklers.

The machine shop will be built with a central bay and wings on either side. Four tracks will run through the center and will be served by two 25-ton cranes spanning the central bay. Galleries will be built in the wings. The lighter machine tools will be installed in these, while the heavier machinery will be located on the main floor underneath, which will be of wood laid on concrete. A wheel shop will eventually be built adjacent to the machine shop. For the present,

THE CORPORATION AND THE PUBLIC

BY EDWARD P. HULSE

The present seems to be the day of publicity concerning the inner workings of all great businesses. What the cause may be need not be discussed here, but the public is certainly abroad with the interrogation point, and those corporations whose business is large enough to be classed as of a semi-public nature are the ones most likely to feel the effect. Nothing seems now too severe to be asserted against a corporation and those connected personally with its management by the yellow press—and believed by the public. How can this sentiment be overcome by the railway companies? Can it be negated?

There is a remedy—a remedy in the experience of those who have tried it that is easy; and the conservatism of large operations need not be compromised thereby. This is a plea for that method; and specific instances will be cited. Street railway lines pay dearly for not letting the traveling public know more about the business where it touches them and the reasons back of all “rules and regulations”—pay for it in good dollars in a business where the unit is a nickel. I did not use the trite phrase “take the public into their confidence,” for that is not what I mean. I do not believe in too much of the “open-mouth” policy; but I have found that it pays to transmit such an understanding of street railway operation where it meets the public, and of the principles back of it, as any business house is glad and willing to give its customers. I said “pays” with full knowledge of the weight of the word. I am in similar case with the man who said that he knew honesty was the best policy for he had tried both ways. All street railway men know how unfriendliness on the part of the public has a direct effect on the tangible property of a street railway company. Plush seats are cut open, rattan seats are split with a knife, heels ground into fine finish, curtains ripped out, sash springs broken, the least want of repair or the hard working of a door is enough to warrant the public in smashing it. These repairs count up. The uniformed employees of some roads are treated by the public so unfairly, even contemptuously, that it is difficult for these roads to get good men, and in some cities the companies have to accept foreigners who can hardly speak the language. Then from the traffic agent’s point of view friendliness is the greatest asset, and he spends the money appropriated to Account 31 in cultivating it, for he knows that “good will is gain.” Street railway managers in particular become calloused to what the public thinks of the lines. As I said in a previous article* touching this one point: “Road managers become so interested in the details of operation that they are too prone to concentrate all their attention on what might be termed the mere ‘mechanism’ of public service. They would rather have the praise of another railway official to the effect that they were operating a fine road than to know what the public was thinking about it.”

They become so used to the continual petty complaints, when they know that they are giving on the whole a good service, that they refuse even those answers that might be educative. Regulations are posted and the traveling public is expected to conform to them. How readily they would do so if they knew the reason back of each one, and that they were all in the interest of the passengers’ safety or their more speedy transportation. Many roads have tested the advisability of a regular educational pamphlet, and find it results in fewer accidents, a better understanding of the rules, quicker

handling of crowds, and distinctly better relations; and this counts in a business so dependent on the good opinion of the public. The hard-headed manager may profess to care very little for public opinion and the newspapers, but in the end he will have to pull down his flag. It is through the news columns of the papers in the territory served by his road that the public gets the information by which it forms its opinions; and favorable public opinion is the most effective form of advertising that tends to increase both business and pleasure travel. I will give some specific instances in point.

A high-tension line supplying one division of a large inter-urban road is down, through no fault of inspection or lack of supervision, and the return of several hundred Sunday school picnickers is delayed thereby until long after dark. The general manager has his coat off, and is doing everything that mortal man can do over telephone lines to locate the trouble or borrow power to move the cars. The reporter for the most influential morning paper comes in. Ten words would have given him enough for an article that might at least have stated, along with the inevitable facts, something favorable for the company that would tend to hold the confidence of the public in the road’s ability to maintain schedules. The general manager’s distress takes voluble point against the newspaper man, and this is part of next morning’s article:

It was almost impossible to learn anything regarding the trouble or its results, as the officers of the company refused to say a word for publication. General Manager Blank assumed an air of the strictest reticence, giving the impression that the road had had troubles enough of its own of late, he attributing most of them to the newspapers. He declared that he would not tell the reporter a “G— d— thing.” It was not until the parents of the children who were storm-bound began to pour forth their murmurs of discontent that it was, etc.

This incident has stuck to that general manager, and he has heard of it constantly for three years. It has cost his road the business of many church, Sunday school and secret society outings and the letting of many special cars. The president saw it, and established an “information bureau” where the public through the newspapers could be treated from a business standpoint. When some street railway men do consent to talk for the papers it would be better for the company’s dollars had they been muzzled entirely.

Through a newspaper in a large Southern city the editor, bearing a name known the country over, was rasping the local road every day, finally attacking the management, and then individually by name. A friend of both arranged a bloodless meeting where the editor and the general manager became acquainted. The newspaper man found that the street railway man was sincere, and that there was an absolute business necessity for tearing up certain tracks and putting down others, following a consolidation of two lines, with the ultimate result of bettering the service and improving the schedules. The official gave a few good reasons for everything that was done, without telling any more than the public he served had a right to be interested in and to know, and the attacks ceased. And there wasn’t any pass at the bottom of it.

In a large city of Western Pennsylvania an afternoon paper made a specialty of having an article every day abusing the street railway service and fitting horns onto the management. Politics did not enter into it in any way. An official of the company took the trouble to relieve the ignorance of the editor along certain lines, showing him that all that was done was really in the interest of the public, and the paper became a strong supporter of the road. Another instance is in the case of an interurban road, the manager of which had publicly expressed his disdain of the effect of newspaper attacks,

* “Creating Traffic,” STREET RAILWAY JOURNAL, March 11, 18, 25; April 1, 1905.

saying that the "conservative public" knew enough not to pay any attention to them and that the "thinking part of the community" would know that the company had its side, and that therefore it was not necessary to state it. Matters finally got so strained that it took one man's time visiting the forty newspapers along the line and getting acquainted with the members of the staff and the business managements in the interest of regaining public confidence and showing that the company's effort was to adapt its service to the needs of the greatest number. The traffic receipts began immediately to show the direct result of this change of policy, and the paid advertising columns had no part in it. The system is now one of the most popular in the country, and the people along it refer to it with pride, and do everything they can to expedite a service that they have learned to know is good. They became convinced—despite certain editorials advising them to take their time getting on and off the cars "as it would cut down the company's receipts"—that the very rapid transit that they all desired was being hindered by such methods and that the requests to "step lively" and to "move up front" were in the interest of bettering the service and adding to the comfort of all the patrons.

Would not the thousand and one aggravating changes rung on the phrases "stealing franchises," "taking up the city's streets," etc., cease in great measure if the public was schooled to recognize the simple fact that in every great collection of human beings into what is called a city, spaces between the houses known as streets are set apart so that the population may move to different parts of it? On each side of this thoroughfare a small sidewalk is reserved for those who do not care to go with haste and who prefer to walk. The larger central part is for transportation by vehicles of all kinds—bicycles, wagons and carriages, automobiles, etc. Everyone does not have a carriage for rapid transportation and could not afford its up-keep. Cab service supplies to a great extent this need, but the charge is commensurately high. A company agrees to carry the public for a small price, but to do so it must have the use of the public's streets. If it had to secure a private right of way through a city, buying up property on which to build a road, the public would not have cheap transportation. It would cost 50 to 75 cents a mile to carry them at the same speed. Who uses the streets? The public. To whose advantage, outside of a proper financial return that any business is entitled to, are these street railways operated? The public's. Do street railway investments pay the enormous sums alleged? Census figures and other statistics easily available show that they do not, and that many pass their dividends. Who takes no chances on the investment and—profit or no profit—is the unflinching gainer? The public.

This card house of antagonistic sentiment that has been erected over the silence of street railway managements who let impractical theorists do all the talking would fall at the first breeze of a fair expression of the rights and principles. Politics, of course, influences many papers in their attitude, and their friendship could never be gained; but if the public had a few of these basic facts drilled into them, such frothy fulminations would have no effect.

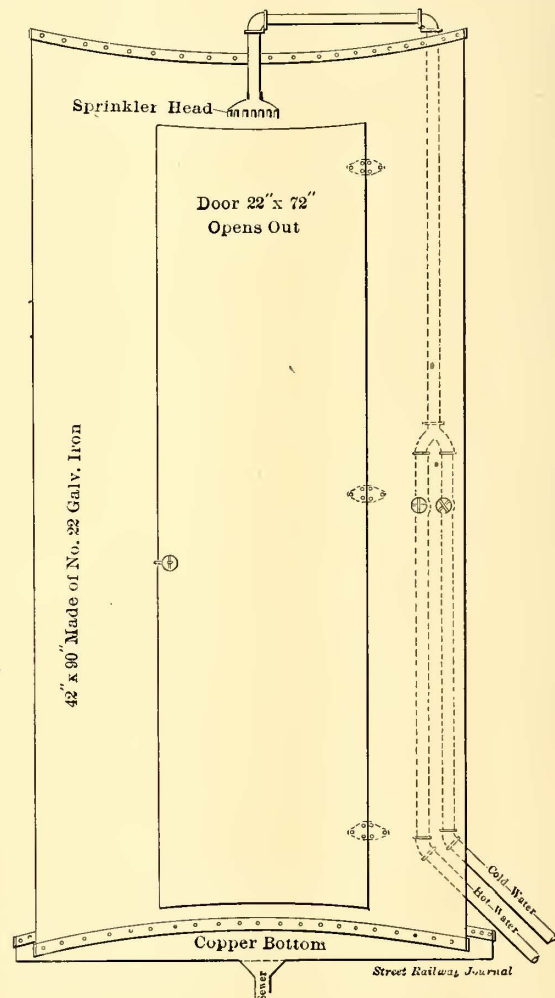
If the people, step by step, get the opinion that they are being "robbed of their streets," that fares are too high, that transfers should hang on every tree, that conductors are tyrannical, that they are being "hustled" when requested not to block a doorway, that they will gain something somehow by stepping off a car like chickens coming out of a hen-house in the morning and stopping one by one to look at the sun, that they should avoid paying fares, that cars have no right on the rails they run on, that motormen should be "dared"

to run over them, who is to blame? If juries can only see one side to a damage suit, as between corporation and individual, regardless of facts, then the "conservative" management—and not the editor who builds up his circulation by catering to public sentiment—is to blame. And don't forget that it costs dollars.

SHOWER BATHS FOR THE MEN

In the issue of the STREET RAILWAY JOURNAL for March 24, 1906, was published a photograph of a "home-made" shower bath installed at the shops by H. S. Cooper, general manager of the Galveston Electric Company, for the convenience of the company's employees. Since the appearance of this article, Mr. Cooper writes, he has had so many inquiries for additional details concerning the baths that he has had a drawing prepared showing the arrangement of the showers and casing. This drawing is reproduced herewith for the benefit of those interested.

Each shower bath consists of a cylindrical casing 42 ins.



DETAILS OF SHOWER BATH BUILT BY GALVESTON ELECTRIC COMPANY

in diameter and 90 ins. high, made of No. 22 galvanized iron. The casing is intended to rest in a copper tray or bottom which is connected with the sewer and prevents water from overflowing upon the floor.

At the top of the casing is a shower head with hot and cold water connections. In the side of the casing is a door 22 ins. x 72 ins., which opens out. Several of these improvised shower baths have been installed at slight expense at the Galveston shops and car houses, and they are very popular with the company's employees.

BRAKE-RIGGING AND UNEVEN WEAR OF BRAKE-SHOES

BY W. L. BOYER

This is something that causes a great deal of expense and trouble for operators, and is one that can be partly overcome by truck builders, if they give the proper attention. It cannot, however, be entirely eliminated on account of the great variation in loads carried on the cars, as the load will change the location of the brake-shoe on the wheel. This, of course, refers to passenger cars only, where equalizer or yoke springs are used. The truck builders in a great many cases are at fault, because they design their truck and brake-rigging without allowing for any compression in the springs. They could avoid this effect by constructing the truck to suit a given weight of car body (furnished by the builder of the car body or by the purchaser) and then adding the weight of the average load of passengers to determine the proper location of the brake-shoe on the wheel. This, of course, is the position in which the shoe is most of the time. The shoe and shoe head should be designed so that pressure would be applied to it in as nearly

brake-shoes kept a more uniform position and when worn out were almost the same thickness throughout.

On longer wheel base trucks, this spring deflection is more serious, for on trucks of the M. C. B. design the springs are usually very long, and of course have a total deflection in proportion. On these trucks no brake-beam is necessary where inside brakes are used, as a tie to hold the shoes in place is all that is required. With this style of truck, two live and two dead levers are used with a curved evener. The brake-hangers are usually connected with links directly with the shoe-head and, as a rule, fastened towards the top of the head, but the same general conditions prevail in regard to shoe wear. The links should be started with about ten degrees' slant, so that the weight of the shoe and head have a tendency to release the brake-shoes from the wheel, independently of any release or kick spring. The pivot point on the brake-shoe head, in this style of brake rigging, should be a trifle below the center line of head to obtain the best results in ordinary service, as shown in Fig. 2. It is very hard indeed to overcome these defects entirely on trucks that are operated in both directions, but no trouble should

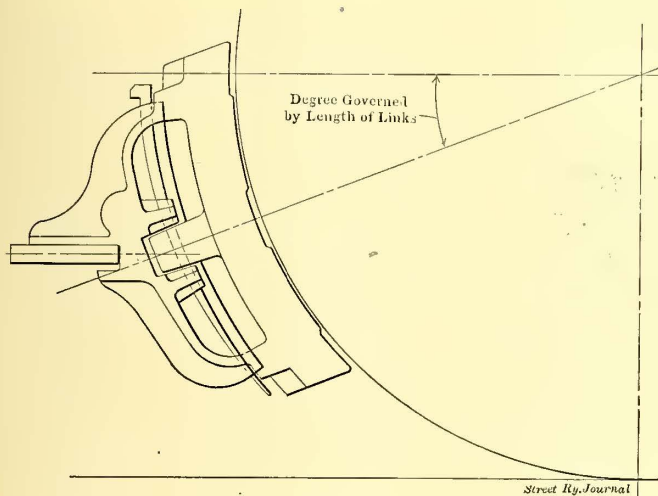


FIG. 1.—SHOE AND HEAD DESIGNED SO THAT PRESSURE IS APPLIED IN A CENTRAL LINE

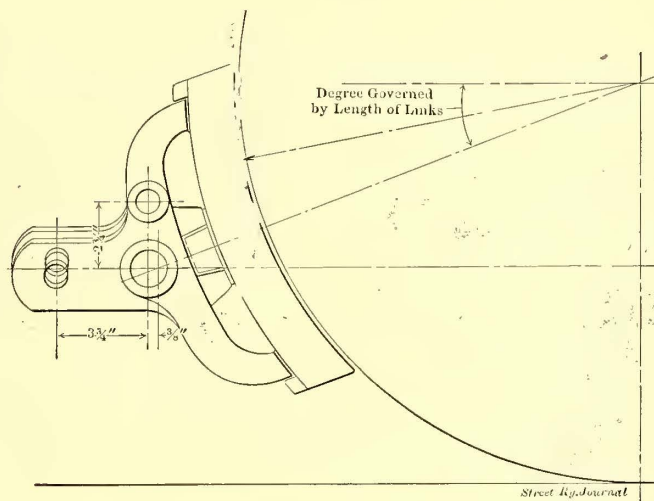


FIG. 2.—PIVOT POINT ON BRAKE-SHOE HEAD A TRIFLE BELOW CENTER LINE OF HEAD

a central line as possible, taking the center line at the point where the brake-beam fits against shoe-head, as shown in Fig. 1, and applies to the brake-rigging so common on short wheel base trucks where a brake-beam is used, and the pressure is applied to the center of the beam from a live and dead lever. The brake-hanger in this case is also assumed to be suspended from the brake-beam independent of brake-head. The slides and guides to hold the brake-beam level should be fastened to either one of the beams with a slide for the other beam to work in. This reduces the friction, and allows the beams to rise as the shoes wear, for the brake links swing in an arc and raise the beam as the latter swings forward.

In addition to these conditions, the truck builders, in trying to give the customer the easiest riding truck possible, estimate the yoke or equalizer springs to about one half of their total deflection with the weights given. This varies in trucks from 1/2 in. to 1 3/4 ins., according to the length of the spring. The result may easily be seen for the wheel can be assumed as stationary and shoe as moving that distance on the wheel. These springs, the writer claims, should be of greater carrying capacity, so that the change in load would not effect such a change of location for the shoe. This experiment has been tried, and while no difference was noticeable in the riding qualities due to the stronger springs, the

be experienced to get the brake-rigging right on single ended cars.

There are cases where men in charge of railway shops have been able to reduce the scrap in brake-shoes to a small amount by having a special brake-shoe pattern made to suit their average conditions. These shoes, as a rule, are made thinner on the end which wears slowest, and the only objection the writer sees to this is that it requires two patterns, one right and one left. On a great many trucks, right and left-hand shoes are necessary, especially so on those that do not use a brake-head, and it would be desirable to make them thinner at one end as described.

Where a head is used and where the shoes do not wear evenly, they can be changed from one side of the truck to the other. In this way, a shoe can be entirely worn out, but it is too expensive a method to be considered in practice.

Where shoes wear faster on top than at the bottom, shortening the links will often overcome the trouble, but care must be taken to clear the swing of the bolster and spring plank under extreme conditions. Truck builders usually figure close at this point, so that great care should be taken in making any changes in the length of the links.

A link-supported brake is the best for all general conditions, whether links are of an adjustable kind or not. Several very good adjustable hangers or links that take up the

lost motion or play, due to wear, in a very simple and effective manner, are in the market, and are coming into general use.

Leverage is another point to consider, and the writer's opinion is that most trucks are used with too high a ratio. This causes an extra expense to the operator, on account of the frequent adjustment necessary for a high leverage. Since air brakes are used on almost all double trucks, a reduction in leverage would not be noticeable in efficiency of brakes, and would allow a car to stay in service longer before adjustment would be necessary. Some of the air brakes in the market to-day are equipped with slack adjusters, and they would work to better advantage with less leverage, for the shoe could be worn thinner with less piston travel between adjustments.

CONCRETE PASSAGEWAY AT ROCHESTER PARK

In order to give the patrons of Genesee Valley Park the benefits of an additional line to the city without making passengers cross the steam railroad tracks of the Lehigh Valley

The railroad tracks are carried over the crossing on 18-in. I beams embedded in reinforced concrete. The engraving gives a good idea of the construction and pleasing appearance of the subway.

FOUNDRY WORK ON ELECTRIC RAILWAYS IN THE SOUTH

A number of electric railway companies in the South are following the practice of operating as a regular department of the shops fully-equipped foundries, in which are made practically all of the bronze and iron castings required on the system. Two of the companies, namely the Birmingham Railway Light & Power Company, of Birmingham, Ala., and the Georgia Railway & Electric Company, of Atlanta, Ga., maintain particularly complete foundries, and it is believed the following information on the results obtained by these companies will be of interest.

The foundry of the Birmingham Railway, Light & Power Company is located at the central repair shops and occupies a space 70 ft. x 30 ft. It contains two 24-in. brass furnaces, with a capacity of 1000 lbs. of metal per day of 10 hours; one



CONCRETE PASSAGEWAY AT GENESSEE VALLEY PARK, ROCHESTER

and Erie railroads, the Rochester Railway Company last year built a subway passage from the park to a loop used by the cars of the South Avenue line on the other side of the railroad tracks. The total length of the passageway is about 350 ft., the subway proper being 150 ft. long, with sloping approaches on 12 per cent grade. The subway is 12 ft. wide and 8 ft. high in the clear under the tracks. The side walls are of mass concrete, averaging 3 ft. in width. The walkway is drained by a 12-in. tile sewer and is paved with brick the entire length and width. It is lighted by incandescent lamps connected with the trolley circuit.

30-in. cupola for iron, with a melting capacity of 10,000 lbs. per hour; one No. 4 Sturtevant blower and a tumbler for cleaning castings, both driven by a 7-hp induction motor; one electrically heated core oven; 30 wood flasks of various sizes and 24 special flasks for moulding brake shoes.

The company makes all castings, except car wheels, used in the construction, repairs and renewals of car bodies and trucks, all castings for power station and gas plant, including grate bars, trolley wheels, and car and motor brasses. The brass castings range in size from $\frac{1}{4}$ lb. to 75 lbs.; iron castings from $\frac{1}{4}$ lb. to 800 lbs. The formula for making brake-shoes

includes 80 per cent machine scrap, or No. 2 founding pig, to which is added 20 per cent car wheel scrap. The average weight of brake-shoes is 36 lbs. per shoe.

The foundry was put in operation in February, and the following is a statement of the foundry department for the eleven months ending Dec. 31, 1905:

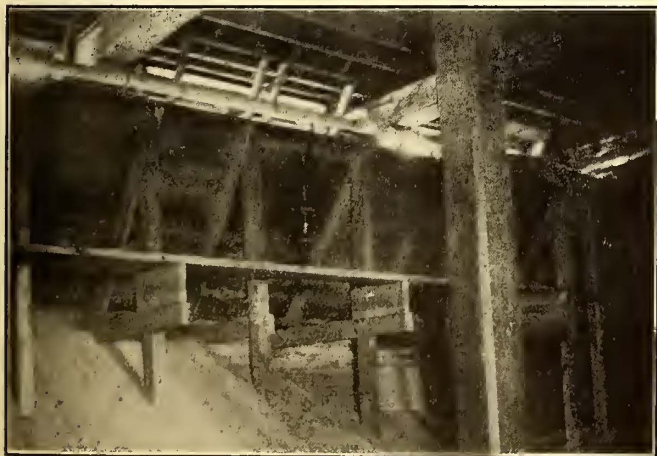
	Brake Shoes	Misc'l Iron Castings	Brass Castings
Output, in pounds, for 1905.....	138,199	235,819	17,509
Cost per 1000 lbs., 1905.....	\$12.05	\$12.05	\$167.67
Cost per 1000 lbs., based on prevailing prices in 1904.....	12.50	20.00	220.00
Total cost for 1905.....	1,672.09	2,852.61	2,948.07
Total cost for 1904.....	1,727.48	4,716.38	3,851.98
Profit credited to foundry account over castings purchased at prevailing prices in 1904	55.39	1,863.77	903.91

From the foregoing statement it will be noticed that the foundry operated by the railway company showed a profit of \$2,823.07 on all castings over the cost in 1904, based on the then prevailing prices when the castings were purchased in the open market.

The foundry of the Georgia Railway & Electric Company, of Atlanta, is equipped with a full complement of tools and appurtenances. The company has a separate account number for the foundry, and to this is charged all labor and material. All scrap used in this department is charged to the foundry account at market prices, and the account this scrap is taken from is given credit for this value. In this way it is possible to ascertain just what the castings are costing. Based on previous results, prices have been set on all castings made in the foundry at 1½ cents per lb., except for brass castings, which are valued at 20 cents per lb. It is stated for the past four years the foundry has shown a net profit of approximately \$100 per month over what it would have cost to buy the same castings in the market. The following is the formula used for making brake-shoes: 40 per cent wheel hubs and spokes; 20 per cent old brake-shoes; 20 per cent wheel rims, and 20 per cent No. 2 pig iron. The average weight of shoes is 35 lbs.

A STEAM SAND DRIER

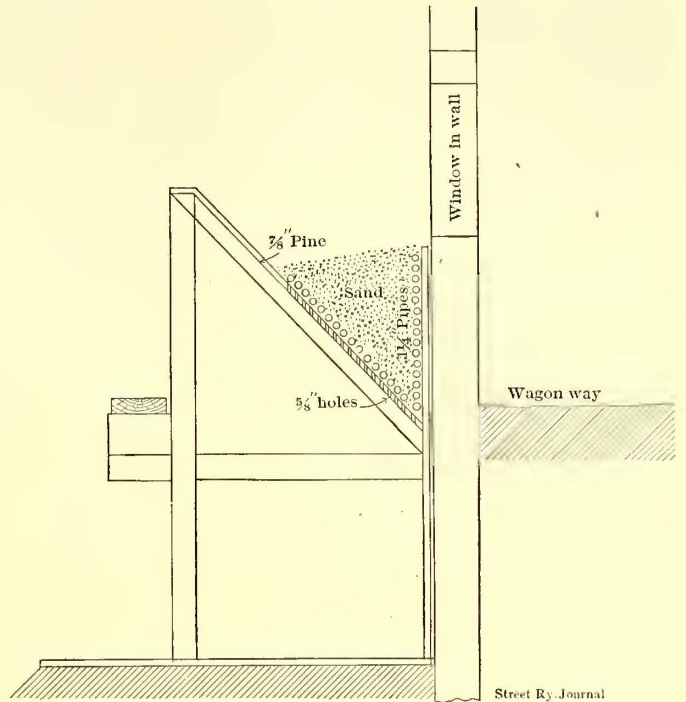
Several methods of drying sand have been described and illustrated in the STREET RAILWAY JOURNAL within the last year. In this connection is described a sand drier built by F. A. Dillman, master mechanic of the street railway system



SAND DRIER EMPLOYING STEAM PIPES

of St. Joseph, Missouri. St. Joseph is comparatively hilly and several excessive grades are encountered on the car lines. This makes the drying of sand a very important feature. The illustration, together with the drawing, shows the construc-

tion of the drier employed. It is built against the rear wall of a car storage shed and extends the full width of the building, about 36 ft. It consists simply of a bin with 1¼-in. steam pipes laid on the bottom and the side, about ¾ in. apart. Steam is supplied from the heater system of the building. The sloping side of the bin consists of 7⁄8-in. pine, and underneath the pipes it is bored at intervals of about 2 ins. with 5⁄8-in. holes, through which the sand when dry falls to the floor



VIEW OF SAND DRIER USED IN ST. JOSEPH, MO.

beneath. There is also an opening about ½-in. wide at the point where the sloping side meets the wall through which sand sifts.

Sand obtained from the Missouri River is hauled in wagons and is thrown direct into the drier through windows in the rear wall of the building. No attempt is made to clean the sand before throwing it in the drier, and consequently considerable dirt and rubbish collects in the bottom of the bin. A sliding door near the bottom at one end of the bin facilitates cleaning. The drier has a capacity of about 48 cu. yds. of sand per week, and, with the exception of the occasional cleaning, requires no attention whatever.

LAKE SHORE ROAD TRYING TO RECOVER SHORT HAUL BUSINESS

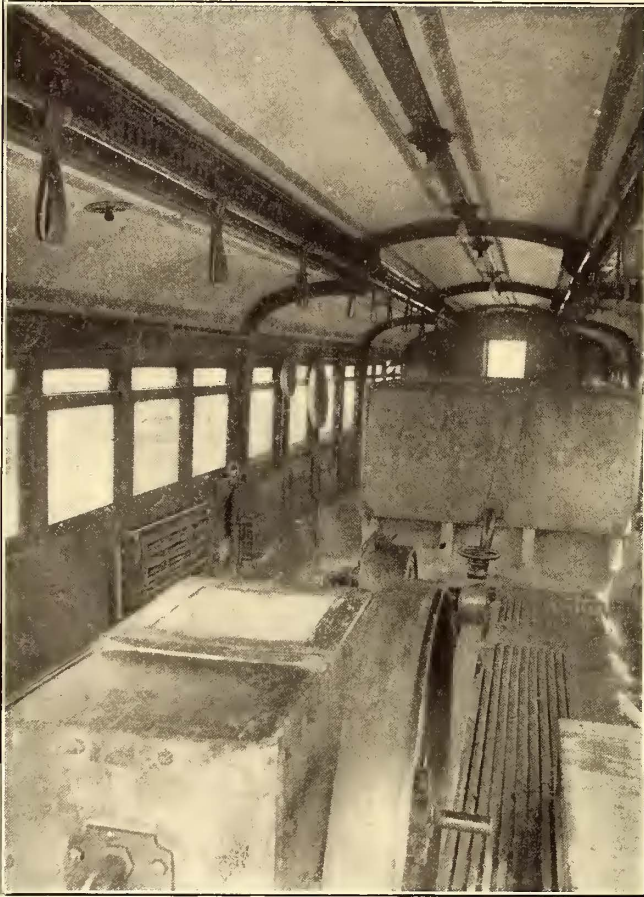
It is announced in steam-road circles in Cleveland that the Lake Shore and Michigan Southern Railway is preparing for an aggressive campaign to win back the commuters' business which has been going to parallel traction lines. This will mean the short haul business in and out of Buffalo, Cleveland, Toledo, Detroit and Chicago. A map has been prepared showing the territory traversed by the Lake Shore and the competing traction lines, and it is stated that the company will establish commutation rates to accommodate every class of business.

The Central Electric Railway Association has adopted an insignia in the form of a button bearing the letters C. E. R. A. in gold on a dark blue background, encircling a modern interurban car in miniature. The buttons can be secured by members on application to the secretary, J. H. Merrill, Traction Terminal Building, Indianapolis, Ind.

WHITEWASHING A LONDON TUBE RAILWAY

BY ALBERT H. BRIDGE

Ever since the tube railway idea took practical shape, new and interesting problems have been continually presenting themselves for the engineer—electrical and otherwise—to deal with. It was but natural that it should fall to the lot of



INTERIOR OF CAR FOR WHITEWASHING A LONDON TUBE

the earlier ones to bear the burden of pioneering work in various directions, and later undertakings have to a considerable extent profited somewhat largely by their experience. In this connection it will be of interest to illustrate the ability to rise to the occasion of one tube railway staff which had to undertake a new duty.

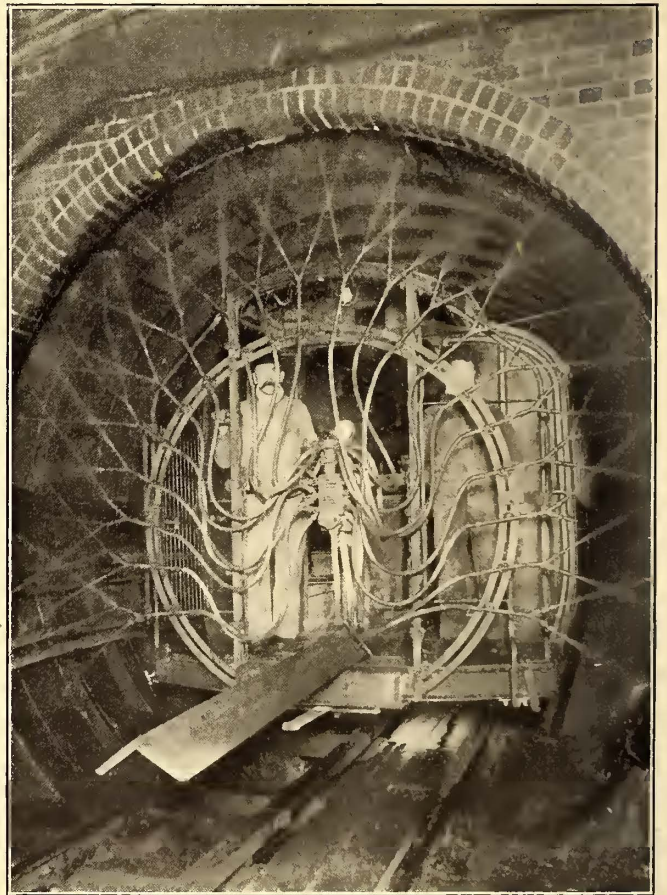
The terminals of the Central London Railroad, and also its permanent way, are under the charge of the Ways and Works Engineer. E. P. Grove, the chief engineer, is responsible for the third-rail and track-rail bonding, and also for the lighting of the tunnels. To him it seemed that this work of his department could be carried out far better if there were improved lighting, and further that the lighting of the tunnels would be more complete if the walls of the tunnels were whitened so as to diffuse the light, which otherwise was confined to the immediate neighborhood of the lamps themselves.

It was evident that any whitewashing would have to be done by machine if it were to be completed within a reasonable time, as the period during which it is possible to do any work in the tunnels is limited from 1:20 a. m. to 4:20 a. m. on weekdays, or to 7:20 a. m. on Sundays. It was Mr. Grover's original idea to get a machine of the usual type supplied by makers of whitewashing and paint-spraying machines, and fix sprays usually hand operated at the end of a car and imitate the hand motion as far as possible while the car was traveling slowly through the tunnel, the machine

itself being driven by a motor. Some difficulty was experienced in getting the makers to depart from their standard practice, as they seemed to consider it impossible to get the intermittent motion for the pumps. While this was still under the engineer's consideration, attention was directed to a machine regularly used in the Kentish hop-fields for washing hops, and it was decided to adapt this for the purpose. The road wheels have been removed from the machine and the tank has been mounted in the car with a shaft from which a 6-hp shunt-wound motor is driven. The pump is inside the tank. The head which carries the jets was removed and it was fixed at the extreme end of the car, twenty nozzles being added, making forty in all.

The pump keeps the pressure at about 90 lbs. per square inch, and it is found that at this pressure there is little tendency to choke if the whitewash has been thoroughly sieved. This whitewash is mixed in a large cast-iron tank which forms part of the water-softening plant in the railroad depot, and being close to the track, the car can be readily charged.

Inside the motor car, which was one of the Central London's own experimental multiple unit cars, a tank was fixed holding about 1200 gallons of whitewash, and this was connected to the small tank containing the pump. This pump keeps the whitewash churned up and well mixed, the cranks

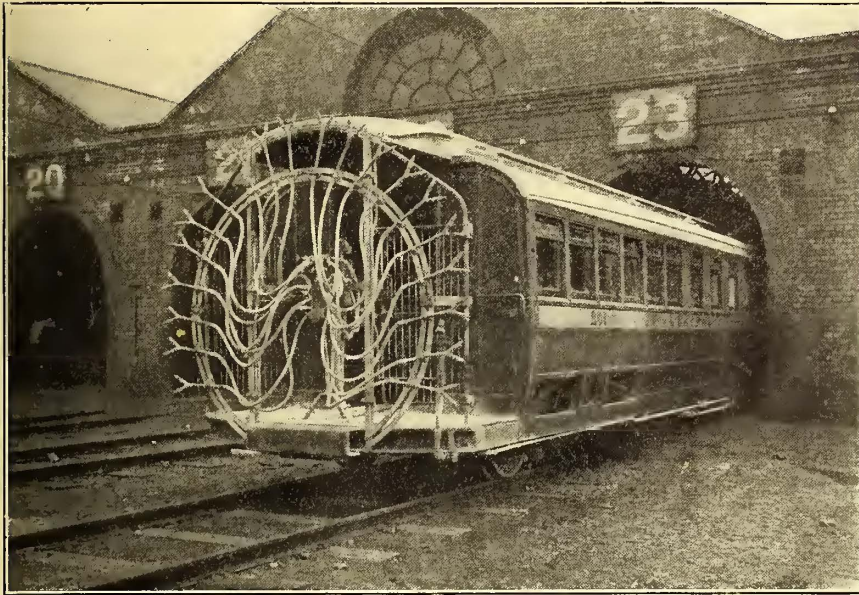


WHITEWASHING MACHINE IN ACTION

and the pump rods being all under the surface of the liquid. By means of resistances, and putting the motors in series, the car can be kept running at a speed of a little over two miles per hour, and at this rate it is possible to do about three-quarters of a mile in forty-five minutes, using about 850 gallons of whitewash and going twice over the work. Previous to the whitewashing, the same machine was used for washing down with water two or three times, so as to remove the dust which had accumulated in the course of five years.

In practice the car goes up to the depot two or three times a night for a fresh supply of whitewash, so that as much as two miles a night have been done. It is not pretended that the finish is as good as could be secured by hand work, but from a sanitary and lighting point of view it has practically the

in their particular task. An inspection includes examination of controllers and replacing contacts, adjusting of brakes and replacing brake shoes, oiling and replacing trolley wheels and poles, cleaning and oiling of motors and replacing carbons, oiling of bearings, but not the changing of bearings and general small repairs and inspections which can be attended to with a few minutes' work. The cars are run over pits for inspections, and at the majority of houses there are loops, so that the cars run through the house; single-end cars are used exclusively in Cleveland.



VIEW OF WHITEWASHING MACHINE ON CAR

same effect. The labor is considerably less, of course, than required by hand operation.

For more perfect work, it is Mr. Grove's intention, as originally proposed, to put the nozzles on a rocking frame to give them a radial movement of 18 ins. or so.

CAR INSPECTION IN CLEVELAND

For the past three years the Cleveland Electric Railway Company has employed the scheme of making all car inspection during the day time while the cars are in regular service. Previous to that time, the company employed a combination scheme of making the inspections during the day time and the necessary light repairs at night, the inspectors doing absolutely no work other than reporting on needed repairs which were done at night. The company's system is so arranged that with the exception of six lines the cars of the various lines run directly to the car houses on every trip. On the six lines where there are no car houses, an inspector takes an extra car to the end of the line and each crew changes cars until all the cars on that line have been gone over. On these lines this usually takes two or three hours. On some of the lines the cars have a lay-over of six minutes in the house and the inspectors work during this period. On lines where there are no lay-overs, they have an extra car and work on the different cars the length of time between the headway of the cars. At times it may require two or even three trips before a car is thoroughly gone over.

The company operates in regular active service 652 cars, and has 930 cars in service, including layovers and trippers. It will be remembered that the majority of Cleveland cars are of the convertible type and are used all the year round. In all there are twenty-six inspectors, three of the larger houses having three inspectors, while the others, with the exception of three small houses which have one inspector each, have two. Where there is more than one, the practice is to divide the work, each man taking care of certain kinds of work so that the men become familiar with and expert

No record is kept of these small repairs and replacements other than the fact that certain material is used during the day. Where more extensive repairs than those described are needed a report is made on a card and the car is laid up. Four of the car houses are provided with facilities for making light repairs, such as changing armatures and wheels, repairing brakes, etc. They have one carpenter at each of these places who can attend to light carpenter work, and takes care of bell ropes, curtains, straps, etc.; also a man who can do light blacksmithing. For general overhauling or anything more than the repairs mentioned, the cars go to Lake View shops. Cars average 150 to 160 miles per day. Inspectors average twenty cars per day, and they are paid \$2.25, so that the cost of inspection is about 14 cents per car per day.

T. Scullin, master mechanic of the company, believes there is no question as to the advantages and economy of day inspection. After the abolishment of the combination scheme formerly in vogue, the company found that it was able to secure better results and with six less men than it had before. Day inspection while the cars are in regular service eliminates the necessity for a great number of pit tracks in a car house and a great amount of switching necessary where all the cars are in the house at once and must be moved to get over the pits. He believes that work done during the day time is always more thorough than night work, and that a man also will do a great deal more work during the day time. The same service can be done with fewer cars because under the day system of inspection a loose adjustment or a broken part can frequently be remedied immediately by the inspector without retiring the car from service.

The system of car cleaning in Cleveland is somewhat out of the ordinary. Cars are swept out each trip by car shifters who come under the transportation department. These men also take care of the stoves in winter and fill the sand boxes. The windows and exterior of the cars are cleaned by car washers who come under the mechanical department. There are about thirty of these, part of whom work days and the others at night. They clean about five cars per day per man. The cars are kept very clean, but there is no set rule as to how often they shall be cleaned, the frequency varying with the character of the weather and the amount of service that a car does.

The Toledo & Indiana Railway has just received a third parlor chair car for use in its limited service between Toledo and Bryan. Although a slight excess is charged on these cars they are proving so popular that the company found it necessary to increase its facilities. The cars were rebuilt from old cars in the company's own shops at Stryker, Ohio.

CORRESPONDENCE

ELECTRIC LOCOMOTIVES IN THE SIMPLON TUNNEL

New York, July 13, 1906.

Editors STREET RAILWAY JOURNAL:

Various daily and technical publications have published statements with reference to the breaking down of two electric locomotives on the Simplon Tunnel. These statements have been made so misleading and may be so hurtful to our interests as American representatives of the "Ganz Railway System" that we would feel very much obliged if you would help us correct same by publishing the following in your esteemed periodical:

You are probably aware that, when the Swiss government decided to use electricity as motive power for the Simplon Tunnel, they provided for five electric locomotives. Three of these were loaned by the Italian State Railways, and these were built by Ganz & Co. and have been in operation on the Valtellina Railway. The other two locomotives were built by another manufacturer on an order received originally from the Adriatic Railway for operation on the Valtellina Railway. This order was, however, canceled later on, due principally to the late delivery, and the locomotives were placed at the disposal of the manufacturers, who then proposed to use same for the working of the Simplon Tunnel. The electric operation in the Simplon Tunnel was to commence on June 1, 1906. From that day on the three electric locomotives built by Ganz & Co. have been continuously in service without any trouble, and they are conveying eight trains per day through the tunnel. The other two locomotives have, however, become unfit for the service on the first day of operation, as the motors broke down and the locomotives had to be sent to the repair sheds. For that reason there are not sufficient locomotives available now for working the traffic exclusively by electricity as motive power, and part of the trains will be conveyed by steam locomotives until the two locomotives referred to are repaired and made fit for service again.

In view of the great difference in behavior of the two types of locomotives, it might be interesting to your readers to know that the motors of the Ganz System have their electrical windings hermetically sealed in metal tubes, protecting them not alone against dust and similar substances, but also against moisture and even directly against water. That this protection is most effective seems to be clearly shown by the experience of these locomotives under the trying conditions of the Simplon Tunnel. As a matter of fact, the Ganz three-phase electric locomotives are probably the most robust electric locomotives ever built.

RAILWAY ELECTRIC POWER COMPANY.

By G. Leve, Second Vice-President.

INTERESTING RECONSTRUCTION WORK IN SAN FRANCISCO

The United Railroads of San Francisco is engaged in an interesting piece of reconstruction work on its Hayes Street line. The conversion of the Hayes Street cable road into an electric line, as in the case of the Sutter Street road, involves the removal of the concrete conduit and the iron yokes that support the old track T-rails and slot rails. Unlike the Sutter Street work, however, the reconstruction is being done largely by machinery.

Chief Engineer Hartwell has arranged a crane and hoist

on a construction car, by means of which the iron yokes of the conduit are pulled out of the concrete in which they are imbedded, breaking up the roadbed at the same time. The yokes of the Hayes Street roadbed are made of sixty-pound rails, which stand much twisting and bending without breaking. Thus, in being dislodged from the concrete bed, the concrete is torn out in chunks, and the slow process of digging out the concrete with chisels and sledges, which has been pursued on the Sutter Street line, is obviated.

A short length of 9-in. rail is chained to the protruding tops of a yoke, the rail being of sufficient length to permit of its operation as a lever. The long end of the lever is then grasped by the crane and the yoke is torn from the track. The larger masses of concrete thus dislodged are broken by hand to a size so that they can be passed through a rock crusher, and after being further reduced by the rock crusher, the crushed concrete is put back into the ground as a foundation for the new roadbed. A steam roller will go over the roadbed before the ties and rails are laid, and in this manner Engineer Hartwell expects to secure a solid foundation for the new track that will make the Hayes Street line an excellent piece of electric railway construction.

With the aid of the electric crane a force of sixty track laborers has removed the south track in Hayes Street from Market as far as Laguna. The reconstruction work is progressing favorably, but the officials of the company are making no promises as to when the work will be completed and the new electric line placed in operation. At the rate the work is progressing it will take several weeks to complete the reconstruction.

THERMIT-WELDING IN NEW YORK CITY

The New York City Railway Company has just commenced the welding of joints on its Lexington Avenue line, from Fifty-Ninth Street to Thirty-Fourth Street, by the Thermit process. It is proposed to weld all joints between Ninety-Ninth Street and Thirty-Fourth Street. The work is carried on between 12 o'clock midnight and early morning, and the night cars continue in operation.

NEW POWER HOUSE AT DALLAS, TEXAS

The Dallas Electric Corporation is now completing a new power house adjoining its old power house. The work is being done by the Columbia Improvement Company, which does the constructing work for all Stone & Webster properties. The work is under the supervision of Charles H. Bigelow, formerly connected with the electrical engineering department of the Boston Elevated Railway Company. The new station is to have two 1500-kw., 60-cycle turbo-alternators, as it is to supply both lighting and railways in Dallas.

SUNDAY CARS IN MANITOBA

Sunday cars were run for the first time in Winnipeg, Man., on July 8. The service began at 8 o'clock and steadily increased in business till midnight. After dark the cars, especially the open ones, were crowded to excess. The day was the hottest of the year. In St. Boniface, St. Charles and Selkirk and other suburban districts the cars did not run, the company not caring to chance a parallel case to the Brown prosecution of the Toronto company for running cars on Sunday through Toronto Junction.

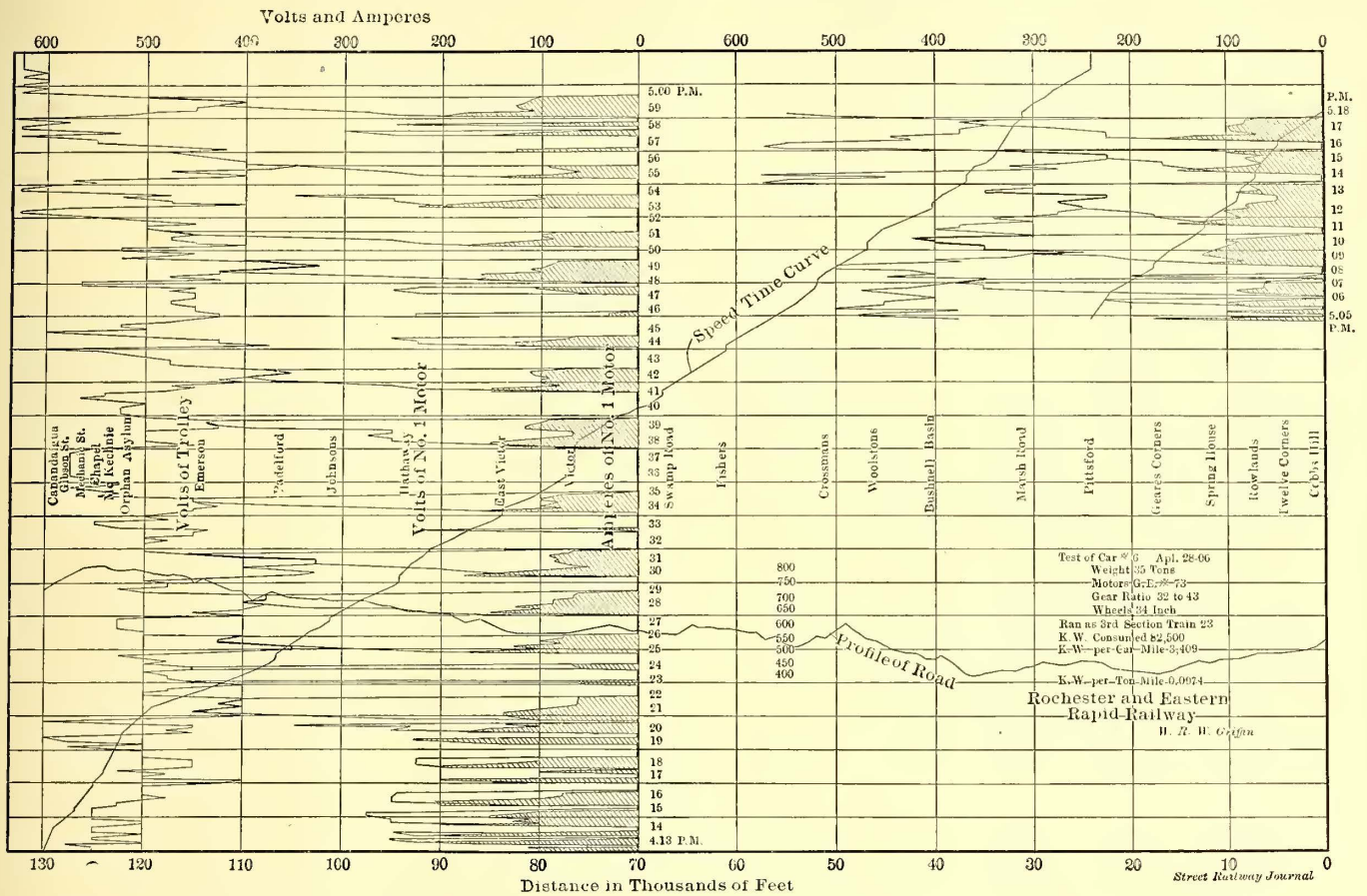
INTERESTING TEST ON INTERURBAN CAR

Through the courtesy of W. R. W. Griffin, superintendent of the Rochester & Eastern Rapid Railway Company, of Canandaigua, N. Y., the results of a long-distance car motor test are here shown. The test was made on April 28, 1906, on the Rochester City line of the Rochester & Eastern Rapid Railway between Canandaigua and Cobb's Hill, a distance of 24.6 miles.

This car was run as third section of a regular scheduled train making the ordinary stops of that train, the intention being to place the test car under actual working conditions

putting from the recording wattmeter, it will be seen that the car required 3,409 kw-h. per car mile and 97.4 watt-hours per ton mile.

For the benefit of those who wish to study the trolley voltage conditions of the line, it may be stated that substations containing two 300-kw rotaries each are located at Canandaigua, Victor and Pittsford. The trolley is single No. 0000 wire. The feeder is 400,000 circ. mil between Canandaigua and Victor and Victor and Pittsford, and 500,000 circ. mil between Pittsford and Rochester City line. For 7500 ft. west of Canandaigua ticket office the track is laid with 73-lb. Lorain girder rail. The remainder of the track is 70-lb.



RUN SHEET, GIVING THE POWER CONSUMPTION AND SPEED TIME CURVES OF TEST CAR ON THE ROCHESTER & EASTERN RAILWAY

as nearly as possible. The car left Canandaigua ticket office 7½ minutes later than the schedule leaving time of the regular train, made four stops at cross streets in Canandaigua, sixteen country cross-road stops, and two station stops to obtain despatching orders, arriving at Rochester city line 6½ minutes later than schedule time, thus making up one minute over schedule running time. By examining the speed time curve of the chart it will be seen that the stops averaged from 20 to 40 seconds.

The car was a 52-ft. coach equipped with four GE-73 motors. The gear ratio was 32 to 43, the trucks were fitted with 34-in. steel-tired wheels. The total weight of the car was over 69,000 lbs., or, in round figures, 35 tons without load.

For the test the car was equipped as follows: Armature in series with No. 1 motor; voltmeter across terminals of No. 1 motor; voltmeter between trolley and ground, and recording wattmeter on entire motor circuit of car. The track was staked and numbered every thousand feet. The instruments and distance were read every five seconds.

An examination of the chart will readily show the position of the controller, since the voltage across a single motor is equal to trolley voltage when the motors are in parallel. Com-

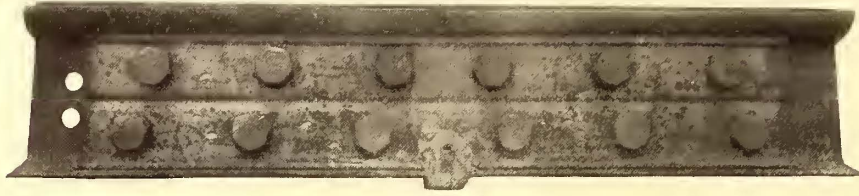
standard T, all bonded with one No. 0000 compressed bond at each rail joint and cross-bonded every 1000 ft. on about 15 miles of track. The track bonding was broken in several joints between Pittsford and Rochester City line, due to construction work going on.

The train was scheduled and did meet one car at Hathaways and two cars at Pittsford; also a work train between Pittsford and Rochester City line.

The Western Ohio Railway Company has opened a new freight and express station at Wapakoneta. The building is 20 ft. x 75 ft. and has wide platforms on both sides with a switch track running along one side. This will be a distributing point for business to Celina, Mintser and St. Marys on the western branch, and to numerous points north and east. The company is also building small freight stations with spur tracks at Sidney and Minster. The company has recently purchased several cars from the Manhattan Elevated, of New York, and these will be fitted up for express and freight service and used as trailers, eliminating the necessity of double-heading the express runs, which is now frequently necessary to take care of the rapidly growing business.

A VARIATION IN THERMIT RAIL-WELDING APPLIED BY THE CLEVELAND ELECTRIC RAILWAY

Charles Clark, engineer of maintenance of way of the Cleveland Electric Railway Company, has been experimenting for

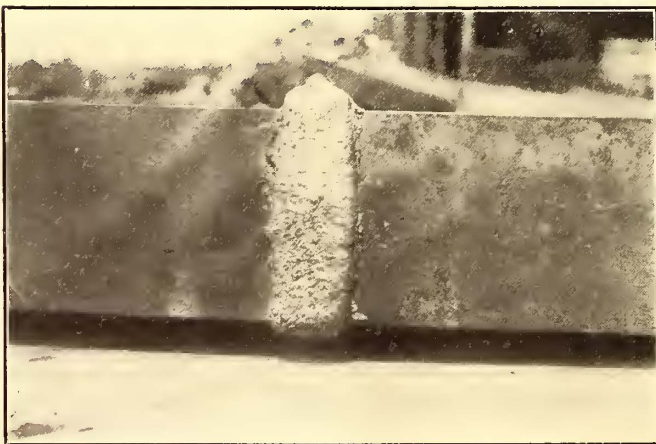


SIDE VIEW OF JOINT, SHOWING FISH-PLATE AND WELD

some time with a new type of rail-joint, and is so well satisfied with it that he exhibited samples of the joint at the recent Saratoga convention, and is installing 2000 of them on the lines of the Cleveland Electric Railway Company. In general principle the joint is a combination of the ordinary angle-plate joint with thermit welding to surround the base of the rail. The angle-plates used are the ordinary twelve-hole, 36-in. angle-plates, but instead of using oval holes the holes are drilled round 1 1/16 ins., and are then reamed with an air reamer to 1 1/8 ins., and machine bolts are put in with a drive fit.

After the bolts are tightened the thermit steel is cast on by means of a special mold and forms a base plate welding, connecting the bases of the rails and extending over the edge of the angle plate, as shown in one of the engravings. The weld on the base of the rail has a contact of about 5 sq. ins. and an electrical conductivity of about 60 per cent that of the rail, while its shortness gives it a high efficiency as a bond. In connection also with the tight angle-plate it provides as mechanically a continuous rail in any welding process. This combination is considered by Mr. Clark better than any type of entirely welded rail. The process described requires about 7 lbs. of thermit and costs complete about \$4.20 per joint.

For use in the company's supply yards, which were de-



WELD AT BASE OF RAIL

supporting a stiff leg derrick having a 40-ft. mast, 30-ft. lie leg, and a 60-ft. boom. It has a capacity of six tons and travels on two special standard-gage tracks giving a travel of 800 ft., the full length of the yard. One of the trucks was weighted with a lot of old wheels for counter weight, and the operation of the crane and motors is controlled from a platform at the side.

Frank G. Norveil, assistant general passenger and freight agent for the merger traction lines in Indiana, has completed arrangements with various steam roads whereby joint excursions may be run periodically



MOLD USED IN WELDING



HOME-MADE TRAVELING DERRICK IN CLEVELAND

scribed in this paper some months ago, Mr. Clark has fitted up a home-made traveling derrick which is of great value in handling material about this yard. He rigged up two old single trucks equipped with motors, with a framework across

during the summer to St. Louis, Chicago, Toledo, Detroit and other cities. The plan is to run excursions into Indianapolis from all points, then carry the excursionists to outside points and turn them over to the steam lines at convenient junctions.

PORTABLE VOLTMETERS AND AMMETERS

In addition to the direct current switchboard instruments made by the American Instrument Company, attention is now directed to a series of accurate portable direct current voltmeters and ammeters. These instruments are built on the permanent magnet, moving coil type, although very different in important respects from instruments of the same class made heretofore. By the use of cylindrical steel pivots journaled in the best grade of watch jewels, friction errors which so often occur because of damage in shipment or from jars during continued service are entirely overcome. This method of pivot control is far more difficult to manufacture than the usual conical pivots working in conical jewels; but it is claimed that when once accomplished the instruments of this kind will remain practically frictionless for many years.

The permanent magnets in these instruments are made of magnet steel, hardened and aged in accordance with the most improved methods. The moving systems combine light weight with extreme stiffness, and with the method of pivoting already noted it is impossible for the moving coil to come in contact with the pole pieces or with the core of the magnetic system. By the selection of a proper winding for the moving coils, "American" instruments have a somewhat larger torque than usual, which permits the use of very strong controlling springs. Because of this fact, and also on account of the unique manner in which current is taken into and out of the moving coils, "zero errors" are completely avoided, in ammeters and milli-voltmeters as well as in voltmeters.

The series resistance in American portable voltmeters is

with a potential difference of 50 milli-volts. All ammeter shunts are adjusted for a potential drop of 50 milli-volts at full load. Consequently any instrument can be used with any shunt, or any number of shunts with one instrument. This is a new feature that will be highly appreciated by engineers who wish to make current measurements through a wide range of values.

These portable instruments are made in two types, designated Nos. 4 and 5. Type 4 instruments are provided with special iron shields inside of the wood cases, and can be used close to large generators or under other conditions where an unshielded instrument would be useless. Type 5 instruments lack the iron shield, but in consequence are lighter in weight and somewhat smaller in size.

Voltmeters and ammeters of both types are guaranteed correct within one-half of 1 per cent, and at any time within twelve months after the original shipment they will be tested or recalibrated (if necessary) without charge, if returned to the factory for that purpose. The only condition imposed is that all transportation charges shall be paid by the owner and the instrument seals must be intact.

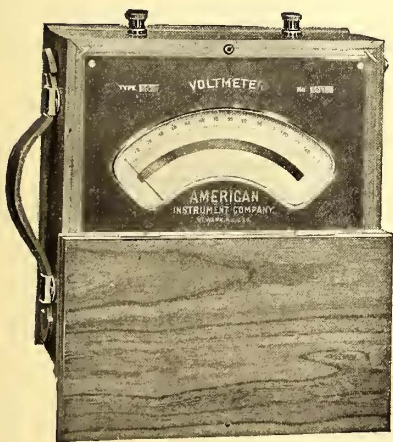
The factory of the company is located in Newark, N. J., but the general sales office is in Philadelphia, where James G. Biddle, president as well as general sales agent of the company, makes his headquarters.

AN AUTOMATIC BOILER CUT-OFF VALVE

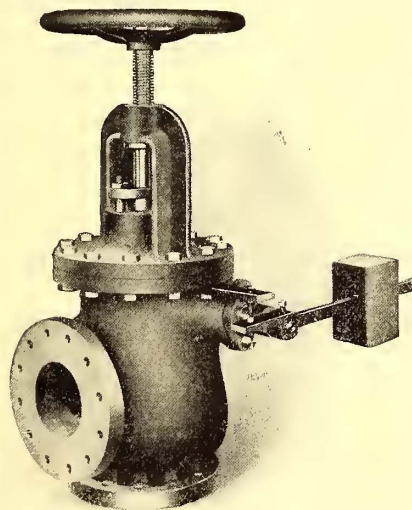
The Lagonda Manufacturing Company, of Springfield, Ohio, has added to its boiler room specialties an automatic stop valve which shuts off all steam from the boilers the moment a steam header breaks, or if a boiler tube fails cuts off that boiler from the steam header and localizes the trouble. This valve works equally well either way, and does not depend upon differences in pressure for its action, but upon the actual flow of steam through the valve. In all there are but two moving parts, one of these being the counterbalancing lever and the other a double-heat valve closing upon either side of a double seat.

Normally the upper valve rests upon the seat and prevents steam from the main from entering the boiler. For instance, if the boiler is shut down the valve closes automatically and stays closed while the boiler is emptied or cleaned. When steam is raised it remains closed until the boiler pressure slightly exceeds the pressure in the main, after which the valve lifts and streams flow from the boiler into the main. The valve is very nearly balanced by the weight, and with a slight flow of steam rises to the mid-position. At that point the weight strikes a stop and the mechanism remains in this position permanently while steam is being drawn from the boiler, except if a break occurs beyond the valve, when the excessive rush of steam would carry the lower valve up against the seat, shutting off the boiler. Of course, with any reversed flow of steam the upper valve would drop instantly into its seat and shut off the main.

The rate of flow at which the boiler would be shut off is determined by the weight of the valve and the distance between the two valve faces. This is adjusted to correspond to the greatest overload at which it is desired to operate the boiler. This valve can also be used as an ordinary stop valve.



PORTABLE VOLTMETER



AUTOMATIC BOILER CUT-OFF VALVE

wound so as to be perfectly non-inductive, and each instrument has a negligible temperature coefficient. All voltmeters are adjusted to a uniform resistance of 100 ohms per volt, and therefore when multipliers are used they can be interchanged. The measurement of insulation resistance and the location of faults and grounds also are much facilitated, as the necessary calculations are greatly reduced.

The portable voltmeters are self-contained up to and including 750 volts, but any range beyond that can be provided for by the use of external multipliers. Ammeters are self-contained up to and including 200 amperes. When it is desired to use one ammeter with several ranges, the plan adopted is to employ a milli-voltmeter with separate interchangeable shunts. Each milli-voltmeter with its loads has a resistance of exactly 1 ohm, and will give full scale deflection

EQUIPMENT FOR NEW LINE AT HAGERSTOWN, MD.

About Sept. 15 next a new line is to be opened between Hagerstown, Md., and Shady Grove, Pa., a distance of 10 miles, 6 miles being in Maryland and 4 miles in Pennsylvania, intersecting at Shady Grove with the Chambersburg, Greencastle & Waynesboro Electric Railway, a line now operated between Greencastle and Waynesboro, and on to Pen Mar, a beautiful resort on South Mountain near the line between Pennsylvania and Maryland, from which two States it derives its name. The name of the new line will be the Hagerstown & Northern, and it will run almost due north from Hagers-



PASSENGER COMPARTMENT OF COMBINATION CAR

town on a private right of way, the maximum grade of which is 3 per cent, and with an average grade of 1.2-1.0 per cent. It is being laid with 60-lb. T-rail, ties spaced 2 ft. centers, standard gage, with overhead construction of 4-0 trolley with double-pole suspension. Power will be bought from the Hagerstown Railway Company.

The new cars for this road are of the combination passenger, smoking and baggage type, one of which is shown in the accompanying view. The J. G. Brill Company, of Philadelphia, is the builder, and the cars embody that company's semi-convertible grooveless-post window system. The cars are particularly interesting from the fact that, although but 32 ft. over the bodies, they have three compartments. The passenger compartment, 18 ft. in length, has a seating capacity for 28 passengers. The transverse seats have high push-over backs with head rolls and corner grab-handles, and are manufactured by the car builder. At the vestibule end of this compartment are longitudinal corner seats for two passengers each, and seats with stationary backs are placed against the glass partition which divides this compartment from the smoking compartment, which measures 6 ft. in length.

Longitudinal seats are used in the smoking compartment, which will seat ten passengers. A wide sliding door in the partition which separates the smoking from the baggage compartment (8 ft. in length) will usually be left open in cold weather, when the windows are closed, for ventilation, and enables nearly one-half of the car to be used by smokers, and besides affords considerable standing space. The baggage compartment, being equipped with the usual hinged seats, can

be occupied by smokers when the compartment is not required for baggage.

The bottom framing of the car includes 12-in. x 3/8-in. sill plates and under trusses stayed by king posts. Air couplers are installed for use when the cars are operated in trains, and heavy channel-iron radial drawbars of the builder's type are used. Other dimensions are: Length of the car over the crown pieces, 41 ft. 5 ins.; width over the sills, including the sheathing, 7 ft. 8 ins.; width over the posts at the belt, 8 ft.; sweep of the posts, 1 3/4 ins.; thickness of the corner posts, 3 5/8 ins.; thickness of the side posts, 3 1/4 ins.; length of the seats, 35 ins., permitting an aisle space of 22 ins. The No. 27-G1 is the type of truck employed, with a wheel base of 4 ft., and the wheels are 33 ins. in diameter with 4-in. axles. The cars are finished in cherry; ceilings of birch.

IMPROVED MOTOR-DRIVEN AIR COMPRESSOR

The accompanying illustrations and description relate to a motor-driven air compressor recently placed on the market

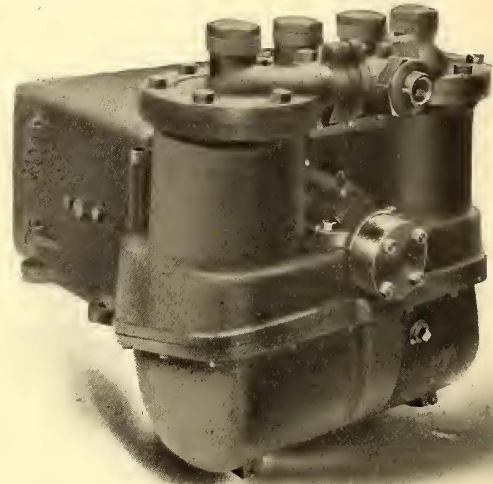
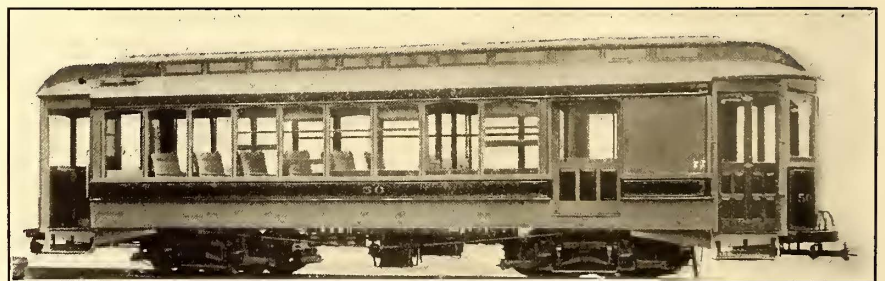


FIG. 1.—MOTOR-DRIVEN AIR COMPRESSOR COMPLETE

by the Philadelphia Air Brake & Machine Company, Philadelphia, Pa. Fig. 1 shows the motor-driven air compressor,



COMBINATION PASSENGER AND BAGGAGE CAR FOR THE HAGERSTOWN & NORTHERN RAILWAY

which consists of a motor and air pump enclosed in a dust-and-waterproof casing. The motor is a series-wound consequent-pole machine, being of ample size and capacity to withstand overloads and hard service.

The armature is built of Swedish charcoal-iron laminations assembled on a steel shaft. The armature coils are insulated with the best material procurable for the purpose. The commutator is built of drop-forged copper bars, insulated with India mica and assembled on a brass shell. It is made of

ample size to withstand mechanical strain and wear. The fields are constructed in such a manner that there are no unnecessary cross-connecting wires in the motor, the terminals going direct to the brush holders and trolley and ground.

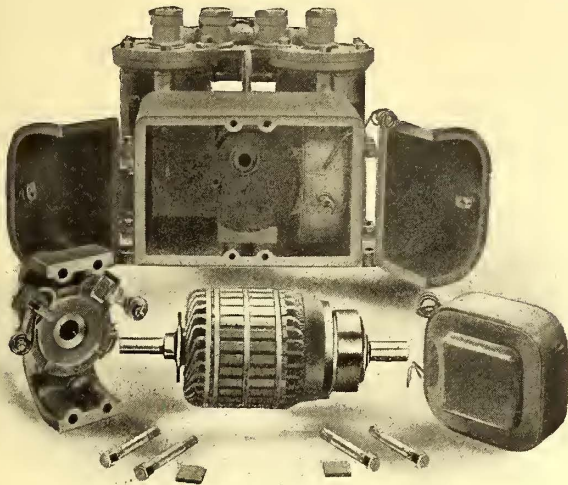


FIG. 2.—MOTOR DISSEMBLED

On the end of the armature shaft is screwed a clutch which engages with a mate on the worm pinion; by this method an armature can be removed in two minutes' time and replaced in three minutes. The armature is supported on a bearing yoke at the commutator end which is fastened to the casing by four bolts. Around the neck of this yoke is fastened the brush-holder collar. The motor is en-

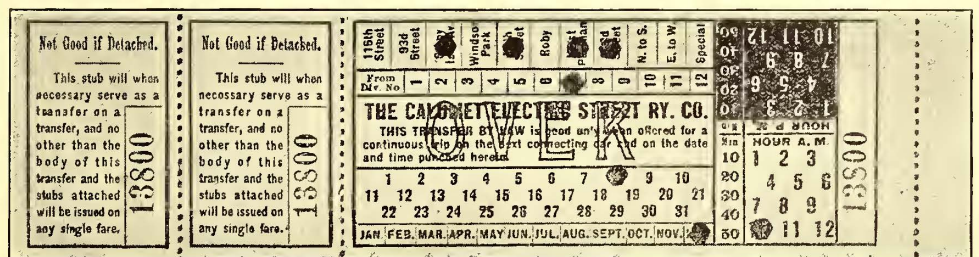
cylinder walls, the weight of the pistons being balanced against each other, and the wear being distributed evenly around the cylinders, thus preventing them wearing elliptically. The valves are placed in the head in such a way that the amount of air cushioned or pocketed is at a minimum, thus avoiding considerable loss by the expansion of this air on the return stroke. The suction and discharge valves are arranged on the cylinder head so as to be accessible for inspection or regrinding, and are interchangeable.

By the use of the Hindley worm and wheel transmission the company says it has accomplished results in economy and life that can not be equaled by any other system of transmission.

It is recommended that the motor be placed under the car, and as no boxing is necessary, the whole makes a very neat appearance.

A NOVEL TRANSFER

Many of the points of intersection of the lines of the Calumet Electric Street Railway, of Chicago, are so far distant from each other that in order to give sufficient accommodation to passengers it has been the custom heretofore to give a transfer on a transfer. It was discovered, however, that undue advantage was being taken of this arrangement by many peddlers, traveling men and others, who would ride



TRANSFER TICKET WITH COUPONS ATTACHED TO PERMIT THREE TRANSFERS

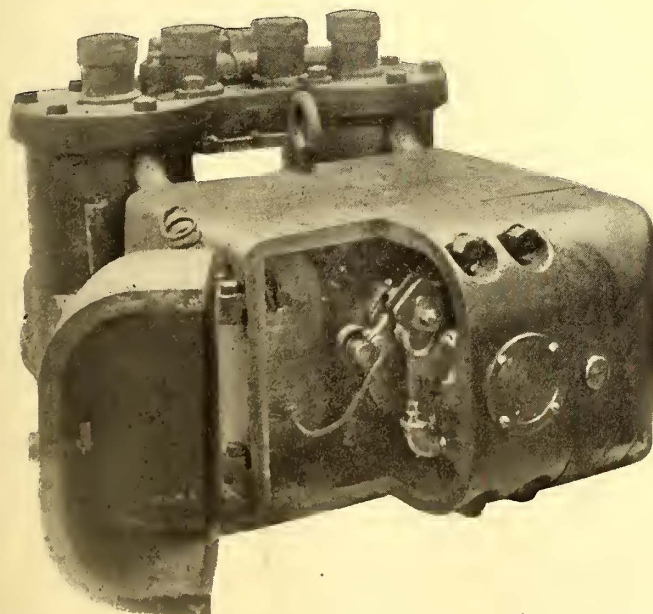


FIG. 3.—ONE OF THE MOTOR DOORS OPEN TO GIVE ACCESS TO INTERIOR

closed by two dust-proof doors, which give easy access for inspection and repairs.

The compressor has all the good features of the company's older type, and several new ones which will appeal to the practical railroad man. The compressor is of the vertical type, the advantages of which are reduced friction on the

from point to point, getting a transfer each time, and in fact would spend a whole day riding on the several lines by the payment of one fare.

To prevent this abuse and still permit a passenger to go from any portion of the single-fare district to any other portion for one fare, H. M. Sloan, general manager of the company, has issued the novel transfer illustrated. The body of the transfer is very similar to those commonly issued by other roads. The addition of the two stubs, however, makes it distinctive. By its use it is possible to ride on four different lines, transferring three times.

The conductor issuing the transfer punches his own line and division number, and the line that will bring the passenger to his final destination. The second conductor removes one stub and punches his own line. The next conductor removes the remaining stub and likewise punches his line. When presented to the next conductor, that one on the car bringing the passenger to his destination, the transfer is taken up and it is of course impossible for the passenger to proceed farther without the payment of another fare.

The transfer in the end contains a complete record of the passenger's travel. The punchings of the transfer illustrated show that the passenger obtained the transfer on division 7 of the 103d Street line. He was transferred successively to the West Pullman line, the Seventy-fifth Street line, and finally to the Stony Island Avenue line, which took him to his destination.

The first form of this transfer issued had but one stub. This, however, was found to be objectionable, and the form shown was substituted.

FINANCIAL INTELLIGENCE

WALL STREET, July 18, 1906.

The Money Market

There has been very little change in the monetary situation during the past week. The demand for money has been somewhat smaller if anything, and although the tone has been easier, rates for all fixed periods ruled practically unchanged from those prevailing at the close of last week. Money on call has been in plentiful supply at rates ranging from $3\frac{1}{2}$ to $1\frac{1}{2}$ per cent, the lowest rate for the year, the average for the week being about 3 per cent. In the time loan department money was offered with more freedom, especially for the over-the-year maturities, and was obtainable at $5\frac{1}{2}$ per cent, while in certain quarters accommodations could be had at $5\frac{1}{4}$ per cent, where choice collateral was offered. At the present time there is nothing in the situation to warrant the expectation of any decided change in conditions in the near future. The banks show a heavy gain in cash for the week, but this will probably be offset by the repayment to the Government by the banks of the special deposits made last March. The position of the New York banks, however, has been materially strengthened by the heavy receipts of gold from the Klondike and from Alaska, and it is expected that substantial amounts of the yellow metal will be imported from Europe. So far this week \$2,000,000 has been obtained in the London open market for shipment to this side, and the engagements of further substantial amounts are likely to be announced in the near future. On July 20 the Secretary of the Treasury will sell \$30,000,000 2 per cent Panama Canal bonds; but assurances have practically been given that the greater part of the proceeds derived from this sale will be redeposited in the banks. The European markets have been steady, with rates for money and discounts practically unchanged. The bank statement published on last Saturday was extremely favorable. Loans decreased \$14,344,700, due in part to the shifting of loans to foreign bankers and trust companies. Cash increased \$3,262,000. Deposits were \$12,411,700 smaller than in the preceding week, thus reducing the reserve required by \$3,102,925. The surplus reserve was increased by \$6,365,725, making the total surplus \$12,830,800, which compares very favorably with the reserves held in corresponding periods of former years. In the corresponding week of 1905 the surplus reserve was \$19,523,250, \$44,563,350 in 1904, \$13,278,475 in 1903, \$15,709,275 in 1902, \$21,029,375 in 1901, and \$19,960,125 in 1900.

The Stock Market

There has been a decided improvement in the stock market during the past week. Trading was only moderately active, but sentiment was more cheerful, and the buying during the last half of the week was considered better than for some time past. The improvement was due in part to the resumption of gold imports from Europe, and to the fact that the local banks have gained substantially from the Sub-Treasury on the week's operations. The bank statement of Saturday was remarkably favorable, and showed an unexpected large increase in surplus reserves, which at the time was practically ignored. On Monday more consideration was given to this feature, and while the money market is likely to work somewhat close for the time being, owing to the flotation of the Panama Canal bond issue of \$30,000,000, the New York City stock issue of \$12,500,000 and the return of \$10,000,000 of public deposits to the Treasury, the fact that Secretary of the Treasury shows a disposition to increase public deposits in national banks has served to cause less apprehension of any monetary stringency. Some estimates place possible gold imports during the balance of the year at \$50,000,000, and the very favorable trade statement for the fiscal year indicates that we have a large credit balance on the other side to which must be added the proceeds of the Pennsylvania loan. Speculative interest has centered in Amalgamated Copper, which, after a sharp decline, turned and moved up very rapidly about 5 points. There has been much uncertainty regarding possible dividend action on this stock, but the general opinion favors the declaration of dividend at the rate of 8 per cent per annum. There was a demonstration against the shorts in Brooklyn Rapid Transit, the Hill and Harriman stocks and the steel shares, and towards the end of the week the market

had broadened out somewhat, and at the higher level of prices the market was well sustained. Thus far there has been nothing to indicate that banking interests are yet prepared to take an aggressive position in favor of an upward movement, but two prominent bankers are due to arrive here next week, and it is expected that their return will be followed by more aggressiveness on the side of higher prices. Fundamental conditions are all decidedly favorable. Crop advices are encouraging and indicate large harvests. Railroad earnings are all large, and all the industries report unusual activity. Speculation has been influenced by rumors that the Union Pacific would buy control of the St. Paul, that the iron ore deal will be completed on the return of certain interests, and that before the political campaign opens there will be a cessation of attacks upon corporations.

The selling of Brooklyn Rapid Transit, based on the efforts to compel a 5-cent fare, simply created a short interest, and it does not appear that the Railroad Commissioners will decide in favor of the advocates of the lower rate. Interborough has been dull and weak.

Philadelphia

Increased dullness characterized the dealings in the local traction stocks during the past week, and prices with few exceptions displayed a declining tendency in sympathy with the weakness prevailing in other quarters of the securities market. Trading in Philadelphia Rapid Transit was extremely quiet, about 2000 shares changing hands from $30\frac{1}{2}$ to $29\frac{1}{4}$. Union Traction was also easier, about 400 shares selling at $63\frac{1}{2}$ and $63\frac{1}{4}$. Philadelphia Company common, after selling at $48\frac{1}{4}$ at the opening, ran off to $47\frac{1}{2}$, and then recovered to 48. Philadelphia preferred was entirely neglected. Consolidated Traction of New Jersey sold at 79 for odd lots, and small amounts of United Company of New Jersey brought 260 and 258. Philadelphia Traction was strong, with sales at $98\frac{1}{2}$ to 99.

Baltimore

Trading in the Baltimore market was broader than for some weeks past and prices generally ruled strong. United Railway issues were again the leading features in point of strength, due to the belief that the plan for refinancing the company will be announced soon, and that it will be favorable to the income bondholders. The 4 per cent bonds sold to the extent of \$30,000, at $92\frac{1}{4}$ and $92\frac{1}{8}$. The incomes rose from $73\frac{1}{4}$ to $73\frac{3}{8}$, on light purchases, while the certificates representing income bonds deposited rose from $71\frac{1}{2}$ to 72. The free stocks sold at $16\frac{3}{4}$ for nearly 1000 shares, while the stock certificates of deposit advanced from $15\frac{7}{8}$ to $17\frac{1}{8}$. Lexington Street Railway 5s displayed greater animation and strength, \$15,000 changing hands, from $101\frac{1}{4}$ to $101\frac{5}{8}$. Other transactions included Washington City & Suburban 5s at $105\frac{1}{2}$, City & Suburban 5s at $112\frac{1}{4}$, Norfolk Railway & Light 5s at $99\frac{1}{4}$, and an odd lot of Norfolk Railway & Light stock at 19.

Other Traction Securities

The market for street railway issues at Chicago was unusually dull. The trading included only a few issues, but prices as a rule held firm. South Side Elevated rose a point to 96. North Chicago brought 33 for a small lot, and sales of West Chicago were recorded at $25\frac{1}{2}$. Chicago Union Traction was weak, several hundred shares selling at 4. The Boston market also was quiet, and apart from Massachusetts Electric issues price fluctuations were extremely narrow. Massachusetts Electric common, after selling at $19\frac{1}{2}$, broke to 18, while the preferred fell from 69 to $67\frac{3}{4}$, and moved back again to $68\frac{1}{2}$. Boston Elevated was unchanged at 152. West End common sold at 95 and 96, and the preferred at 110. Boston & Worcester preferred brought 77 for several hundred shares. In the New York curb market the only transaction during the week was in Public Service Corporation certificates, \$5,000 of which sold at $67\frac{3}{4}$.

Tractions were very quiet in Cincinnati. Cincinnati, Newport & Covington common as usual lead in the trading, about 600 shares selling at 73 to $73\frac{1}{2}$, a fractional decline from last week. Cincinnati Street Railway was up a point from 142 to 143. Cincinnati, Dayton & Toledo 5s sold at 93.

Aurora, Elgin & Chicago common lead in the selling at Cleve-

land, with a range of from 34½ to 34¾. The preferred sold at 77¼. Cleveland Electric was comparatively inactive at 75¼. Lake Shore Electric sold at 16⅞ for the common and 66 for the preferred. There was considerable trading in Western Ohio 5 per cent bonds, which advanced from 82 to 83½, the strong point in favor of this security being the fact that the company is about to take over the Lima, Findlay & Toledo Company's preferred stock, which will add 32 miles to the system without increasing the bonded indebtedness. Northern Ohio Traction & Light 5s sold at 87¼, and Aurora, Elgin & Chicago 5s at 98½.

Security Quotations

The following table shows the present bid quotations for the leading traction stocks and the active bonds as compared with last week:

	July 11	July 18
American Railways	52½	52½
Boston Elevated	152	152
Brooklyn Rapid Transit	73¾	73½
Chicago City	—	160
Chicago Union Traction (common).....	4¾	3½
Chicago Union Traction (preferred)	12¼	12
Cleveland Electric	81	—
Consolidated Traction of New Jersey.....	77	78
Detroit United	92	90
Interborough-Metropolitan, W. I.....	35	35¾
Interborough-Metropolitan (preferred), W. I.....	73¾	73½
International Traction (common).....	a55	a54
International Traction (preferred), 4s.....	79	79
Manhattan Railway	148	148
Massachusetts Electric Cos. (common).....	18	18½
Massachusetts Elec. Cos. (preferred).....	a69½	68
Metropolitan Elevated, Chicago (common).....	26	26
Metropolitan Elevated, Chicago (preferred).....	67	66
Metropolitan Street	—	—
North American	92¾	93
North Jersey Street Railway	27	27
Philadelphia Company (common)	48¾	47¾
Philadelphia Rapid Transit	30	29
Philadelphia Traction	99	98¾
Public Service Corporation certificates.....	67	67¼
Public Service Corporation 5 per cent notes.....	95¼	95½
South Side Elevated (Chicago).....	96	95
Third Avenue	124	124
Twin City, Minneapolis (common).....	113	113
Union Traction (Philadelphia)	63	63
West End (common)	—	—
West End (preferred)	—	—

a / asked.

Metals

The pig iron markets continue firm. In the Chicago district a great deal of business to cover the year is being booked, and a strong revival of buying is reported in the Pittsburg district. Foundry irons are strong, with some interests quoting higher prices. Steel-making irons are in great demand, and prices rule firm. A revival of buying in railroad material is also reported. Locomotive and car manufacturers report that business is coming in freely for 1907. Copper metal is quiet, and prices are somewhat below those prevailing at the close of last week. Lake is quoted at 18¾ and 18½c., electrolytic at 18 and 18¼c., and castings at 17¾ and 18c.

CLEVELAND ELECTRIC APPEALS TO PUBLIC

The question of franchise renewals for the Cleveland Electric is likely to be submitted to a vote of the people. President Horace Andrews, of the Cleveland Electric Railway, has announced that the company's proposition for renewals of franchises will be sent to the City Council on July 24. The proposition will involve not only a reduction in the rates of fare and concessions in the matter of transfers, but will provide for extensions and for at least two new cross-town lines. It will also contain a proposition relative to the building of a subway to the East End, which will relieve the traffic in the congested business district. Accompanying the proposition will be a request that the entire matter be left to a vote of the public, and the company will agree to pay all expenses of placing the question on ballots and submitting it to the public. The company will endeavor to secure an expression of public opinion whether or not the result will be binding upon the City Council.

It is predicted that if this question ever does come to a vote of the people, and the company's proposition involves a reduction of fare to seven tickets for a quarter, or even six tickets for a quarter, with liberal transfer privileges, that the popular settlement will be overwhelmingly in the company's favor. The public of Cleveland is thoroughly tired of the long-drawn controversy, the experiments which have been made, and the disinclination of the old company to make needed extensions until the question is settled, and would be pleased to have the question settled definitely on a reasonable basis at the earliest possible moment.

PROSPECTS OF MERGER OF NORTHERN OHIO PROPERTIES

There is a well defined understanding in Cleveland financial circles, that before many months have passed a comprehensible combination of traction properties throughout Northern Ohio, and possibly Michigan, will be effected. The prime factor of the consolidation will be the Everett-Moore syndicate, which has now regained practically all the traction properties which it lost at the time of its embarrassment four years ago. The Everett-Moore people are now negotiating to regain control of the Cleveland Electric and if this property is secured it is thought that a gigantic merger will speedily follow. Such a merger was the chief aim of the Cleveland syndicate before its financial troubles. The consolidation of the interurban lines in Eastern Michigan into the Detroit United System was an important step in this direction, and a larger merger was to have followed soon.

In addition to the properties which it controls at the present time there are indications that other properties controlled by friendly interests will be included, a community of interests being thought to exist between the Everett-Moore syndicate and the Pomeroy-Mandelbaum syndicate, which have come to an agreement for the building of a line from Fremont to Fostoria, Ohio. This line will connect the Lake Shore Electric with the Western Ohio, the latter a Pomeroy-Mandelbaum property. There are also renewed reports of plans for the consolidation of the Lake Shore Electric and the Cleveland & Southwestern system, the latter being the most important Pomeroy-Mandelbaum property in the State. An extension of the Cleveland & Southwestern will soon connect with the Ohio Central, another of their properties, and this in turn will connect with the Columbus, Delaware & Marion Railway, a Columbus road which has repeatedly declined propositions from the Schoepf syndicate, which is gathering up all the traction lines in the central part of the State. It is believed that the Webb interests, which control this property, would be apt to cast their fortunes with the Cleveland syndicate, as their line forms part of the logical route from Cleveland to Columbus.

The merger, if effected, will combine a group of properties greater in earnings and mileage, both city and interurban, than any community of interests that has yet been effected, not even excepting the tremendous acquisition of the Widener-Elkins-Schoepf syndicate, which has gathered in nearly all the important traction properties of Indiana and Central Ohio. This can be seen by the accompanying table showing the properties, their stock and bonds.

	Miles	Stocks	Bonds
Everett-Moore Properties			
Cleveland, Painesville & Eastern.....	46	\$2,000,000	\$2,500,000
Cleveland, Painesville & Ashtabula.....	30	1,000,000	1,000,000
Lake Shore Electric Railway	200	7,500,000	7,000,000
Avon Beach & Southern Railway.....	12	300,000	300,000
Lorain Street Railway	11	750,000	750,000
Northern Ohio Traction & Light.....	105	7,500,000	7,500,000
Canton-Akron Railway Company.....	57	2,000,000	2,000,000
Canton & New Philadelphia Railway.....	21	600,000	1,000,000
Tuscarawas Traction Company	13	350,000	350,000
Toledo Railways & Light	120	12,000,000	12,000,000
Mauce Valley Railway & Light.....	20	1,000,000	1,000,000
Detroit, Monroe & Toledo Short Line.....	75	3,000,000	3,000,000
Detroit United Railway	350	12,500,000	25,000,000
Detroit & Port Huron Shore Line.....	125	2,500,000	2,500,000
Pomeroy-Mandelbaum Properties			
Cleveland & Southwestern.....	135	5,000,000	3,000,000
Cleveland, Ashland & Mansfield.....	46	1,500,000	1,500,000
Ohio Central Traction Company.....	30	750,000	400,000
Western Ohio Railway	112	3,000,000	3,000,000
Columbus, Delaware & Marion.....	101	2,500,000	2,500,000
Cleveland Electric Railway	230	23,400,000	16,000,000
	1,839	\$89,150,000	\$92,300,000

NEW YORK TRANSIT ROUTES APPROVED BY COURT

The Appellate Division of the Supreme Court has approved all the plans for the \$450,000,000 system of rapid transit roads, conditionally upon the Board of Rapid Transit Commissioners deciding within two years which of the routes they have concluded finally to construct. This will enable the Board to take the condition of the city's finances into consideration to determine which routes should be built. After that, the court holds, if the Board finds itself able to construct more roads application must be renewed to the court. This will render null and void the approval of all routes not selected and contracted for within two years.

Decision was given in the matter of the application of the Rapid Transit Board on the proposed Third Avenue route and eighteen others. Judge O'Brien, presiding, writes the opinion, in which all the judges concur, and which states:

It is agreed on all hands that transit facilities should be furnished as speedily as possible, and that the extent of the facilities to be furnished should in some degree be proportionate to the rapid growth of our population throughout the greater city. Upon the question of the present necessity for all of the routes proposed we find no grounds for differing from the conclusion reached by the Rapid Transit Commissioners, and were there no other question involved our duty would be simple and plain.

There is, however, involved another and very serious feature, and it relates to the financial ability of the city to undertake the proposed construction. It is shown by the record before us in the Third Avenue case that the nineteen routes of subway will cost \$300,000,000 for construction and \$150,000,000 for equipment, or a total of \$450,000,000.

Under the restriction imposed by the constitution, the total borrowing margin of the city, most favorably viewed, did not exceed on Jan. 1, 1905, \$61,000,000. If we can look at the future, there is a likelihood, in view of the increased values of property, that the city will have a debt incurring capacity between July 1, 1906, and Jan. 1, 1907, of something like \$110,000,000. And if all of it were appropriated for rapid transit construction there would be nothing left for the other departments of the city government, which in expense and importance are increasing and expanding from year to year.

Probably no prudent city administration would deem it wise, in the present condition of its financial affairs, to commit it in the near future to an expenditure for rapid transit exceeding \$50,000,000.

It is well known that at this time a percentage of the children of this city are denied proper schooling by reason of the limited facilities. What may be said of the limitations that may be entailed upon future generations if by the supposed necessities of rapid transit the credit of the city should be so impaired as to make it impossible for proper provision to be made for schools and the other various municipal needs, such as proper policing, fire service, paving, etc.?

Again by the adoption of the proposed plan, and the practical monopolizing of all the city's streets, wedded to a single scheme or idea of transit construction or management, the people are practically forever excluded from asserting and exercising a right which has much of reason and argument in its support, to wit: to own and operate their own municipal subways.

To have property affected by the approval of a route which might never be built, acting as it would as a notice to all that the street was appropriated for railroad purposes, would impede the development and improvement of property along its lines.

In the subway built the city advanced for construction more, as events proved, than was absolutely necessary for construction proper, and this excess was available to the contractors, who were bound and from their own funds agreed to advance the moneys needed for the equipment and operation of the road. The feature, however, that was undoubtedly most attractive to bidders was the lease obtained for a period of fifty years. Under the Elsberg bill the lease of subways is limited to twenty years.

Regard being had, therefore, to these different and conflicting interests, we think the right solution, so far as it rests with this court, will be to approve all of the routes conditionally, upon the Rapid Transit Commissioners deciding within two years which of them they have finally concluded to construct. This will enable them, within the period named, in view of the then existing condition of the city's finances, to determine just what routes should be built, and after that time they should be required, if able to construct other routes, to renew their application to this court. This will render null and void our approval of all routes not selected and contracted for within the said two years.

TRACTION AFFAIRS IN CHICAGO

At a meeting of the committee on local transportation of the Chicago City Council, held July 15, President Mitten, for the Chicago City Railway Company, and General Counsel Gurley for the Union Traction Company, promised to submit to the committee by Sept. 15 next the valuations of the intangible property of their respective systems. The valuations for each road will be given in lump sums, the officials refusing to submit figures on the valuations of the unexpired franchises on each street and

parts of streets. The Council committee want the values claimed by the companies for each street. At a previous meeting, at which the city officials contended that the values be given in detail, John P. Wilson, speaking for both of the railway companies concerned, said:

"It is a mixed question of law and fact. We have certain rights in some important streets as to the legal status of which there is no possibility of the city and ourselves ever agreeing. The city has one view of the law and we have another. It is an open question.

"The city is in possession of all the facts in the case. It has all the ordinances under which we claim rights and its own lawyers to interpret the law for it. Anything we could furnish would be nothing more than you have now, and it would be a waste of time for us to try and get together on the legal contentions."

The bids received by the Union Traction Company, on July 5, for lowering the La Salle Street, the Washington Street and the Van Buren Street tunnels, it is reported, will be rejected, and new bids will be asked for. The War Department is not satisfied with the plans upon which the bids were based, but insists that the top of the La Salle Street tunnel shall be 5 ins. lower than provided for, the Washington Street tunnel 7 ins. lower, and the tunnel at Van Buren Street 10 ins. lower.

NEW HAVEN OUTLINES A HARTFORD, BRISTOL AND WATERBURY ELECTRIC SERVICE

A proposition has been received by Mayor Henney, of Hartford, Conn., from President C. S. Mellen, of the Consolidated Railway Company, which operates the electric railway properties of the New York, New Haven & Hartford Railroad, which, if accepted by the city, will mean a rapid trolley service between Hartford and New Britain and Bristol, and ultimately Waterbury. The proposition is that the Consolidated be permitted by the city to build a line with T-rails from a connection with the New England Railway, through Imlay Street, Farmington Avenue, Ford and Pearl to Main Street, thence north on Main to High Street, and south on High to Asylum, thus forming a loop taking in the principal business section of the city.

In his reply to the proposition of President Mellen, Mayor Henney offers an opportunity for a full consideration of the matter, and gives the citizens who may be interested, as well as the Consolidated, a chance to be heard. He suggests a meeting for July 23, at which time it can be determined how the matter is looked upon by the city and the company.

President Mellen's letter is as follows:

New Haven, May 10, 1906.

Hon. W. F. Henney, Mayor, Hartford, Conn.

My Dear Sir:—The Consolidated Railway Company respectfully petitions for the right to lay a double-track line from a connection with the New England Railroad, crossing Hawthorne Street, thence through Imlay Street, connecting with its present tracks in Farmington Avenue, thence via Farmington Avenue and Asylum Street to the intersection of Ford and High Streets. Thence through Ford Street and Pearl Street by single track to Main Street, thence through Main Street to High Street, thence through High Street by single track to an intersection with the present tracks on Asylum Avenue.

The new tracks to be laid with T-rail of the pattern shown in the blueprint herewith. The present tracks in the streets named to be relaid with a similar T-rail.

The object of furnishing tracks with a T-rail of the standard shown by blueprint above referred to is to enable the company to move cars of the M. B. C. standard wheel from a connection with the New England Railroad through a loop by the streets mentioned, returning to said connection, thence using the tracks of the New England Railroad from the point of said connection to Bristol, and, when the double track now under contract between Bristol and Waterbury is completed, to Waterbury.

Assuming that such permission is granted by the proper authorities of the city, we undertake, as soon as the work may be done, to prepare the tracks of the New England Railroad between the point of connection at or near Imlay Street for operation by trolley, and the cars thereon operated to all make the loop through the streets of Hartford before outlined, substituting the proposed service for the present, and that we have been obliged to discontinue temporarily through the injunction recently granted enjoining further operation of the third-rail service.

I am addressing this application to you, assuming that you will refer the same to the proper authorities of the city for consideration, and we hope to be advised of any time appointed for a hearing that the company may be properly represented and know that the objects sought to be accomplished are properly laid before the authorities of the city.

Very respectfully,

C. S. MELLEN, President.

FALL MEETING CENTRAL ELECTRIC ASSOCIATION

The Central Electric Railway Association will open its fall campaign with a meeting, on Sept. 26, at Robinson Park, near Ft. Wayne, Ind., a resort on the lines of the Ft. Wayne & Wabash Valley Traction Company, selected in order to give the members an outing as well as a meeting.

At a recent meeting of the executive committee of the association a committee of three, consisting of President E. C. Spring, Vice-President Henry and H. A. Nicholl, was appointed to transact business for the entire executive board during the balance of the year. This will enable the association, through Secretary Merrill, to arrive at some definite conclusion in connection with several schemes which the officers have in mind.

Secretary Merrill is hard at work on the through passenger tariffs for the roads out of Indianapolis, Dayton and Toledo, and has secured the approval of all the companies interested in the first tariff. A meeting of the various roads will be called within the next week to inaugurate the tariff and to decide definitely upon a few minor details of handling it.

Mr. Merrill has just returned from a trip calling on some of the roads in the vicinity of Cincinnati and Southern Ohio to interest them in the sale of inter-line tickets and the adoption of the interchangeable coupon books. The fact that the majority of interurbans entering Cincinnati operate only to the outskirts of the city and transfer passengers to city cars, is appreciated to be a great drawback to the sale of through inter-line tickets, but it is believed that in spite of this, these roads will be induced to participate; in fact, one road is already in the interchangeable agreement. The secretary is preparing to issue a fine folder map of all the roads in the association, and this and other advertising matter calling attention to the work of the organization will doubtless have the effect of lining up the few roads in the district not already members.

PLEASANT OUTING AT MONROE PIERS

Following a custom established two years ago by Mathew Slush, then president of the Detroit, Monroe & Toledo Short Line, the officials of the Detroit United Railway, which now owns the Short Line, recently entertained representatives of connecting lines, newspaper men of Southern Michigan and Northwestern Ohio, and hotel men of a number of cities on the various lines, at Monroe Piers, the beautiful resort operated by the Short Line. Special cars were operated over the Western Ohio, Toledo, Bowling Green & Southern, Lake Erie, Bowling Green & Napoleon, the Toledo & Indiana, Toledo & Western and Detroit United lines. Guests to the number of eighty had a fine time during the few hours passed at the Piers. The entertainment features included a trip on the lake in a launch, a spin on the figure eight, a dip in the fine bathing beach, and finally a dinner at the Lotus Hotel. R. G. De Lisle, traveling passenger agent of the Short Line, had charge of all arrangements. An interesting announcement was made by John H. Frey, assistant general passenger agent of the Detroit United, to the effect that beginning this week the company would operate through limited cars between Mt. Clemens, Mich., and Toledo, passing through Detroit. It was intimated that this was a preliminary step to the operation of through cars from Cleveland to Port Huron, Mich., forming the longest interurban service in the world.

Irwin Fullerton, auditor of the Detroit United, gave some interesting data regarding that system. He said that the company now operates nearly 700 miles of road, and last year carried about 116,000,000 passengers. Brief addresses were made by F. D. Carpenter, general manager of the Western Ohio; Henry Bullen, general superintendent of the Short Line; President Williams, of the Lake Erie, Bowling Green & Napoleon; George B. Kerper, of the Toledo Urban & Interurban, and C. T. Chapman, general freight and passenger agent of the Toledo & Western.

Many improvements have been made at Monroe Piers during the past year, among them the erection of a fine Casino, an electric lighting plant and a number of amusement features. The management has eliminated the sale of all liquors, which has added greatly to the popularity of the resort as a pic-nic park. The management of the resort and hotel is in the hands of Alexander McFee, representing the Short Line Company.

A CHICAGO-NEW YORK ELECTRIC TRUNK LINE BEING PROMOTED

An electric trunk line between Chicago and New York, to be known as the Chicago-New York Electric Air Line, is being promoted by Chicago parties, with offices in the Monadnock Block, Chicago. In full page advertisements in the Sunday editions of several of the Chicago papers subscriptions for stock are being solicited. The advertisements give a general description of the prospective road, stating that it will be constructed on as nearly a straight line as is possible, and that it will be 160 miles shorter than any existing route between the two cities. It is proposed to operate trains drawn by electric locomotives, at a speed of 75 m. p. h., so that the run between the two terminal cities will be made in 10 hours.

The advertisement states that the profits the "road will make for its stockholders are almost beyond calculation."

Shares with par value of \$100 are offered at \$25. In addition to its value as stock each share will entitle the holder to \$100 in passenger fare, or in the payment of freight charges on the completed road. It is estimated that the road will cost \$150,000,000. At the offices of the company a representative of the STREET RAILWAY JOURNAL was told that the road would first be constructed from Chicago to Goshen, Ind. Quite a portion of the right of way had been negotiated for and construction work would begin in September.

MAP OF INTERURBAN RAILWAYS IN THE CENTRAL STATES

A blue-print map has recently been published by the Arnold Company, of Chicago, showing the interurban electric railways in Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa and Missouri, and in the territory contiguous to these States, such as Western Pennsylvania, Western West Virginia, Northern Kentucky, etc. The map shows lines in operation, under construction and proposed, and is drawn to a scale of 35 miles to an inch.

REPORT OF MONTREAL STREET RAILWAY BENEFIT ASSOCIATION

The report of the Montreal Street Railway Mutual Benefit Association for the year ended April 30, 1906, was submitted at the third annual meeting of the association, held June 18. The following is a summary of the relief work done during the past year as compared with the preceding year:

	1904-5	1905-6
Number of members disabled through sickness or injury.....	611	687
Number of visits made by physicians to disabled members.....	692	1,390
Number of consultations given by physicians to disabled members.....	4,026	7,885
Number of prescriptions issued.....	2,864	6,751
Amount paid for sickness and injury.....	\$6,239.10	\$8,706.70
Amount paid for medicine.....	783.73	1,826.86
Amount paid for pensions.....	nil	215.00
Amount paid for death and burial insurance.....	5,767.67	4,050.01

Since the formation of the association the following amounts have been distributed:

For sickness and injury.....	\$17,995.75
For medicine.....	2,678.59
For pensions.....	215.00
For deaths and burials.....	9,817.08
For medical attendance.....	3,615.81

Total \$34,322.83

The committee of management of the association gratefully acknowledge the special Christmas donation of \$3,000 received from the Montreal Street Railway Company, making the total contributions, etc., from the company, \$13,461.23. This amount, together with the fees and dues received from the members, viz.: \$10,757, and the proceeds of the picnic and interest on investments and bank deposits amounting to \$6,482.14, making a total revenue for the year of \$30,700.37. The expenses being \$21,705.29, there was left a surplus of \$8,995.08.

ANNOUNCEMENT BY INDIANA, COLUMBUS & EASTERN COMPANY

W. Kesley Schoepf, of Cincinnati, head of the syndicate which has recently consolidated a number of Ohio roads under the name of the Indiana, Columbus & Eastern Traction Company, has made an interesting announcement as to the financing and plans of the big company. The company is a holding corporation, operating a system which, as has already been outlined in these columns, has a total capitalization of \$24,000,000, one-half of which is bonds and the other half consisting of \$1,000,000 preferred stock and \$11,000,000 common stock.

The flotation of the securities of the company will be carried out in nearly every large city in the country. Drexel & Company, of Philadelphia, and Rollins & Sons, of New York, have taken a contract to float about one-half of the \$12,000,000 bond issue, and have issued a prospectus offering these bonds at 97 and interest. The offer declares that \$4,900,000 of the bonds will be sold at these figures, the issue being termed a general and refunding mortgage drawing 5 per cent interest and payable May 1, 1926.

In a letter to prospective bond buyers, Mr. Schoepf analyzes the financial report thus: Total bond issue, \$12,000,000; reserved for retiring underlying bonds (of which sufficient amount are already held to reduce the amount to \$1,250,000), \$2,908,000. To be issued for acquisition of and extensions of lines, power plants, terminals and other improvements, \$4,992,000; balance for additional betterments and further extensions, \$4,100,000.

The first item of \$2,908,000 is set aside to take up the bonds of the Appleyard lines, which are still in the hands of a receiver, and until final payments are made the ownership will continue to remain vested in the old bondholders.

The second issue of \$4,992,000 for extensions and acquisitions of lines is the one now to be marketed, minus \$82,000, which will go to floating the issue. The last item of \$4,100,000 is to cover future operations and improvements, and the same will not be issued until the company has shown its ability to earn one and one-half times the interest charges on all outstanding bonds and those to be issued.

Speaking of further extensions, Mr. Schoepf says that provision has been made for the construction of the line from Lima to Bellefontaine and for the electrification of the steam road from Lima to Defiance; and also for the expenditure of about \$1,000,000 for the improvement of roadbed and terminal facilities. It is the intention to erect as soon as possible well-equipped terminal stations in Dayton, Springfield and Columbus, giving facilities equal to the Indianapolis terminal station.

Mr. Schoepf comments further as follows: "The concentration of ownership of these various Ohio lines insures the greatest economy both in operation and construction. The result is an electric transportation system, in grades, alignment, right of way and construction of the same high standard established by steam roads. The company, however, is not competitive to steam roads, nor does it propose to attempt to handle heavy freight or through matter, but only express matter, the distribution for department stores, produce, milk and other light freight for which it is particularly equipped."

THE DATES OF THE ACCOUNTANTS' CONVENTION

The dates of the accountants' convention at Columbus have been set by the executive committee of the association. They are the morning and afternoon of Tuesday, Oct. 16, the afternoon of Wednesday, Oct. 17, and the morning and afternoon of Thursday, Oct. 18.

AN IMPORTANT IOWA DECISION

The Supreme Court of Iowa has handed down a decision of considerable importance, relative to the assessment and taxation of street railway and interurban railway property. It holds that where street railways and interurbans are owned by the same corporation and operated jointly the whole property of the company must be assessed by the Executive Council as an interurban railway. The case in which the opinion is delivered is that of the Waterloo & Cedar Falls Rapid Transit Company appellant vs. Board of Supervisors of Black Hawk County. The Executive

Council of Iowa assessed the interurban and street railway properties of this company as an interurban property, and so certified the assessment to the county authorities of Black Hawk County. The company sought to enjoin the Board of Supervisors from collecting taxes on the assessment, asserting that the city railway portion of their property should be assessed by the city assessor. The Board of Supervisors filed a demurrer, and this demurrer was sustained by the District Court of Black Hawk County. The company appealed to the Supreme Court, and the Supreme Court now upholds the decision of the lower court.

JAPANESE RAILWAY PROJECTS

Another scheme is on foot to construct an electric railway between Osaka and Nara, with a capital of about \$1,000,000. It is anticipated that electric railways will be running parallel with all the principal railway lines in the course of a few years.

The Minomo-Arima Electric Railway Company, capital \$2,500,000, has been formed to build a double-track line between Osaka and Ikeda and on to Mina, the maple resort, and Arima. Other new projects are from Takarazuka to Mikage via Nishinomiya, and also from Iguchido to Ikeda.

A general meeting of the Hankaku Railway Company has decided to raise a loan of \$1,500,000 from a Japanese capitalist for the extension of the shipping business, etc., of the company. The net profit for the period just closed amounted to \$36,000, and after providing for the reserve, etc., a dividend at the rate of 3.2 per cent per annum was declared.

A general meeting of the Sanyo Railway Company adopted a proposal to present \$10,000 to Mr. Matsumoto, late president of the company, in recognition of his services. A proposal to construct 140 open steel goods trucks to carry 9 tons each, ten open steel goods trucks with conductor's compartments, also to carry 9 tons, and ten 7-ton goods brake vans, at the estimated cost of \$102,000, was also agreed to. The net profit for the period just closed has been declared at \$1,244,800.

ALLIS-CHALMERS COMPANY AND THE MANUFACTURE OF CHRISTENSEN AIR BRAKES

Since the announcement, made some weeks ago, of the acquisition of rights to build and sell Christensen air brakes, the Allis-Chalmers Company has been busily organizing its new department for the extensive manufacture of this well-known device, which was formerly manufactured and sold by the Christensen Engineering Company and later by the National Electric Company.

J. H. Denton, who was general superintendent of the National Brake & Electric Company, has been engaged to act as manager of the new air brake department, and he will be surrounded by a staff of men who have been especially trained in this branch of manufacture. Shop facilities are being provided as rapidly as possible, and it is expected that shipments may be made from stock within seventy-five days from date. The entire second floor of the north shop, Reliance Works, Milwaukee, now occupied by the company's general offices, will be devoted to the manufacturing and assembling of air brake equipments, following the removal of the offices to the West Allis Works.

The following men, all of whom are thoroughly conversant with air brake practice, are now associated with the Allis-Chalmers organization:

F. C. Randall, formerly vice-president and general manager of the National Electric Company, for the past year has been manager of the New York district office of the Allis-Chalmers Company, and, owing to his intimate acquaintance with the manufacture and application of air brakes, is exceptionally well qualified to advise with traction men on this subject; W. W. Power, formerly manager of the National Brake & Electric Company's Philadelphia office, was recently appointed manager of the Philadelphia district office of the Allis-Chalmers Company; Geo. C. Voigt, formerly of the National Electric Company, has lately identified himself with the Allis-Chalmers Company, and will have charge of air brake sales in Western territory, and George C. Dresser, until recently with the National Brake & Electric Company, is to be attached to the Allis-Chalmers Company's New York office, as a special representative of the air brake department.

STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED JULY 10, 1906

825,289. Safety Apparatus; John Barberic, Brooklyn, N. Y. App. filed Feb. 26, 1906. When the semaphore is set at danger, a trip is simultaneously operatively set in the roadbed, so that in case the engineer disregards the danger signal the trip will engage means on the train by which the air brakes are automatically set.

825,295. Combined System of Transport by Monorail and Auto-Car; Raymond Snyers, Brussels, Belgium. App. filed April 6, 1905. A frame carrying two revoluble monorail-wheels, a hollow shaft extending across the frame between the monorail-wheels, an arm or lever mounted upon each end of the hollow shaft, a road-wheel revoluble supported at the end of the arm or lever, and a torsion spring secured within the hollow shaft.

825,298. Electric Car Heater; Harold W. Buck, Niagara Falls, N. Y. App. filed Dec. 8, 1900. An air pipe conducts the heat generated in the motor windings into the car, a supply of fresh air being constantly supplied to the motor casing.

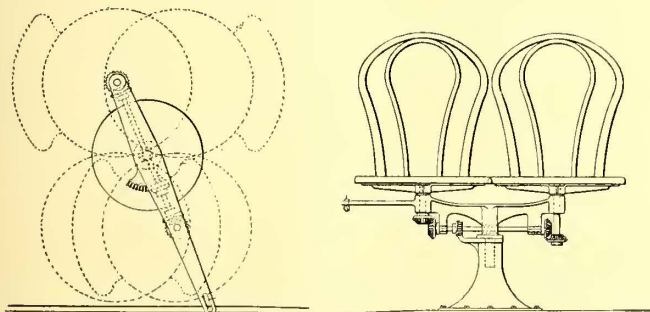
825,299. Support and Hanger; Joseph T. Bunn, Washington, D. C. App. filed Jan. 19, 1905. The hanger is suspended at the end of a long shank or standard, secured by suitable guy wires, the object being to provide a hanger for trolley wires whose guy wires will not interfere with any guards or guiding fingers mounted upon passing trolleys.

825,318. Block Signal System; Laurence A. Hawkins, Schenectady, N. Y. App. filed Jan. 25, 1905. A three-position semaphore is motor operated, and magnet-operated detents controls the position at which the semaphore is set.

825,366. Track Laying Machine; Charles O. Wescott, Puyallup, Wash. App. filed April 9, 1906. Relates especially to mechanism for unloading the rails from the forward car of the construction train and placing them into position on the ties.

825,396. Electrically Controlled Railway Switch; Frederick T. Kitt, Denver Col. App. filed July 18, 1904. A track switch whose point is thrown to alternate positions by successive closures of a single circuit. A solenoid armature has a pin dropping into a crown-shaped cam, so as to step the solenoid around at each actuation.

825,431. Pleasure Railway; La Marcus A. Thompson, New York, N. Y. App. filed Aug. 8, 1905. Comprises a building provided with a front wall, a portion of which is arched to form an opening, pairs of inclined ways extending from opposite sides of the opening, the upper portions of said ways being beyond the opening and the lower portion within the opening.



PATENT NO. 825,736

825,501. Trolley Wheel; Charles F. Wilson, New York, N. Y. App. filed Jan. 17, 1905. The wheel has sheet metal flanges, which are riveted to the central portion of the wheel and which constitute the tread thereof.

825,538. Inductive Bond; Lemuel F. Howard, Edgewood, and Philip B. Rice, Wilkinsburg, Pa. App. filed March 2, 1906. An inductive bond comprising a conductor having parallel portions, a laminated magnetic covering for said parallel conductor, the laminated magnetic covering along the parallel portions being common to both portions.

825,611. Railway Car; Allen E. Ostrander, Paterson, N. J. App. filed Nov. 4, 1905. Details of construction of a car having bulged or convex sides to conform to the inner contour of a tube or tunnel, the invention relating particularly to means for bracing the sides of the car.

825,668. Car Fender; Richardson C. Layton, Brooklyn, N. Y. App. filed Jan. 8, 1906. Details of construction.

825,678. Rail Cleaning and Roughing Device; David Price, McKeesport, and Harrison C. Zimmerman, Duquesne, Pa. App. filed Jan. 22, 1906. A track cleaner or rougher, composed of a plurality of cutting discs, each separately rotatable on a common axle and arranged eccentrically one to the other.

825,682. Removable Cross-Over; Clarence B. Ryan, Pittsburgh, Pa. App. filed April 2, 1906. Comprises a plurality of frames carrying rails, and portable track sections supported by the frames.

825,724. Railway Car Brake; Pearl P. Hatcher, St. Louis, Mo. App. filed March 8, 1906. A track brake comprising a vertically reciprocating spring-controlled plunger, having a brake-shoe at the lower end thereof, superposed over the rail, an air-brake cylinder having a reciprocating piston, a spindle carried transversely by the plunger, a vertically oscillating lever having a forked end riding over the ends of the spindle, and intermediate connections for oscillating the engaging arm of the lever downwardly, and depressing the plunger and its shoe upon a movement of the air-brake piston in one direction.

825,734. Switch Operated Signal Light; George W. Jordan, Purvis, Miss. App. filed Sept. 26, 1905. A pair of spring blades are held in proximity to the rails so as to be pressed into engagement with one another by the wheel flanges of a passing train.

825,736. Car Seat; John B. Kilburn and Albert N. McConnell, Philadelphia, Pa. A pedestal having a beam pivoted thereon and revoluble chairs pivoted upon the beam, a rotary shaft and gearing intermediate of the shaft, chairs and pedestal.

825,740. Derailer; Thomas W. Linn and John H. Patrick, Clymers, Ind. App. filed March 19, 1906. The derailer is permanently mounted in a suitable casing at any desirable point, the invention relating particularly to means for cutting away ice and dirt that may have accumulated when it is desired to slide the derailing member into operative position.

825,781. Trolley; John H. Walker, Lexington, Ky. App. filed Sept. 9, 1905. The trolley harp is provided with upper and lower prongs, and the conduit leads extend alongside the upper prongs, and are braced against upward movement by said upper prongs and against downward movement by the lower prongs.

825,816. Car Seat; Francis K. Fassett, St. Louis, Mo. App. filed Jan. 11, 1904. Details of construction of a seat of the "walk-over" type.

825,834. Means for Controlling the Spread of Wheels of Railway or Tramway Vehicles; James C. Hinton, Arncliffe, New South Wales, Australia. App. filed Sept. 20, 1904. The axles are adjustable laterally in order to adapt the car for different gages of track.

825,847. Electric Car Signal Circuit; William Lintern, Cleveland, Ohio. App. filed Aug. 22, 1905. An accumulator battery on the car into circuit with which the tail lamps are automatically cut in case of failure of the power circuit.

825,871. Fender; William S. E. Sevey, New Orleans, La. App. filed May 5, 1906. A hinged fender adapted to normally rest in a raised position against the dashboard, and which can be expeditiously lowered when necessity demands.

PERSONAL MENTION

MR. B. L. PEER, of Rochester, has been appointed advertising agent for the Rochester & Eastern Rapid Railway Company.

MR. J. WHYTE EVANS has resigned as president of the United Railways Company, of Portland, Ore. He is succeeded by M. H. St. John Dix.

MR. G. H. RETTEW has resigned as superintendent of the Greenville Traction Company, the Paris Mountain Water Company, and the Greenville Gas & Electric Power Company, all of which are controlled by the American Pipe Company, of Philadelphia.

MR. ANDREW N. CULVER, who built the first steam railroad to Coney Island, over which the Brooklyn Rapid Transit Company now operates by electricity, and who was mainly instrumental in building up that resort, died Tuesday, July 10. He was 74 years old.

MR. WILLIAM M. MARINAN, for twelve years in the employ of the Elmira Water, Light & Railroad Company, of Elmira, N. Y., has resigned from the company to become general superintendent of the Dunkirk, Fredonia & Brockton Electric Light, Gas & Street Railway Company.

MR. ALFRED BEIT, of Wernher, Beit & Company, of London, England, died on Monday, July 16. Mr. Beit was largely interested in mining operations in South Africa and elsewhere and as a member of Wernher, Beit & Company also was interested in

street railway systems in Portugal and South Africa. Until recently he was one of the principal owners of the Mexico City Tramway Company, Mexico City, Mex.

MR. A. R. DIMICK, formerly chief despatcher for the Oregon Water Power & Railway Company, has been appointed assistant superintendent to succeed Mr. G. F. Boynton, who resigned to become claim agent for the traction lines owned by the Portland Railway, Light & Power Company.

MR. JOS. A. LOCKHART, assistant superintendent of the New York & Fall River Street Railway, has resigned to become connected with Stone & Webster, of Boston. Mr. Lockhart's successor with the Newport & Fall River Company is Mr. George L. Southerland, a conductor on the Newport division.

MR. GEORGE W. BOTHAM has resigned as superintendent of the Dayton & Western Traction Company, to go with the Northern Electrical Manufacturing Company, of Madison, Wis., with which company he was identified before going into the operating end of the traction business. His resignation took effect July 12.

MR. W. B. GRAHAM, superintendent of the Paterson division of the Public Service Corporation, has been made superintendent of the Newark district. Superintendent Strong, of the Jersey City district, will take Mr. Graham's place at Paterson. Mr. Graham formerly was superintendent of surface lines of the Brooklyn Rapid Transit Company.

MR. J. D. DEWEES, of Salem, Ohio, an experienced steam road man, has been appointed traffic manager of the new Youngstown & Ohio River Railway, and Mr. Wilson V. Myers, also of Salem, has been appointed auditor of the company. Both officials will have their offices in Salem. The line will be placed in operation between Youngstown and Salem this fall.

MR. P. L. FOCARDI, electrical and mechanical engineer, has resigned his position with J. G. White & Company, with whom he has been for a year and a half, to return to the New Jersey Foundry & Machine Company, of New York City. Mr. Focardi is a son of the late Mr. G. Focardi, the sculptor of popular groups, and is a graduate of Columbia University in the class of 1901.

MR. ALSON C. RALPH, of Boston, Mass., who has been with the Thomson-Houston and General Electric Companies almost continuously since January, 1891, as erecting engineer and expert electrician, has severed his connection with the General Electric Company, and accepted a position with Stone & Webster, of Boston, as superintendent in charge of construction and development work, and is now in El Paso, Tex., superintending the work of installing new apparatus at the El Paso power plant.

MR. E. V. McGRATH, of Findlay, has been appointed soliciting passenger and freight agent of the Dayton, Springfield & Urbana and the Urbana, Bellefontaine & Northern divisions of the Indiana, Columbus & Eastern with headquarters at Springfield, Ohio. He was formerly traveling passenger agent for the Cincinnati, Hamilton & Dayton (steam), and was under Mr. D. J. Edwards, who has become traffic manager of the Schoepf line, and to whom he will again report.

MR. FRANK C. SYKES, assistant engineer of maintenance of way of the United Railroads, under Engineer Warren C. Lane, has tendered his resignation to take effect at the end of June. Mr. Sykes is widely known in San Francisco and has been with the company and its predecessor, the Market Street Railway Company, for many years, having been an assistant to Mr. Henry H. Lynch, when the latter was at the head of the engineering department of the company.

MR. JAMES F. HEYWARD, who was formerly general manager of the City & Suburban Railway Company, of Baltimore, has been appointed to assist Mr. W. Kesley Schoepf in the management of the systems in Ohio which have recently come under control of Mr. Schoepf and his associates. The work delegated to Mr. Heyward is the management of the Cincinnati Traction Company, including one of the interurban lines. Mr. Heyward for the last eight years has been acting as a street railway expert with offices in New York.

COL. E. C. SPRING, president of the Central Electric Railway Association, acted as host on Friday, June 29 at a luncheon given to the members of the executive committee of the association at the Country Club in West Milton, Ohio. The table was tastefully decorated with flowers and bore covers for nine persons. The center piece was a floral monogram of the letters "D. C. & P.," the initials being those of the Dayton, Covington & Piqua Traction Company, of which Mr. Spring is manager. Following the lunch the guests were taken on a trip through the city of West Milton in a big 12-seat automobile.

MR. H. F. BALL, superintendent of motive power of the Lake Shore & Michigan Southern Railway, has resigned to become a vice-president of the American Locomotive Company, in charge of a branch of the company which is devoted to automobile work. It is understood that the company will engage extensively in the manufacture of gasoline railway cars as well as automobiles. Mr. Ball has taken an active interest in the experiments which the Lake Shore has been making with gasoline cars. He went to the Lake Shore about fourteen years ago, and was employed as a draughtsman. He succeeds Mr. W. H. Marshall, who, some time ago, was called to the presidency of the American company.

MR. G. C. PIERCE, formerly purchasing agent of the Hudson Companies, of New York, has just been appointed general superintendent of the East St. Louis & Suburban Railway Company. Mr. Pierce was one of the pioneers in the electric railway business, and had charge of the interests of the Westinghouse Company on the Pacific Coast for several years. Later he went to Mexico, where he spent three and one-half years in power development in connection with the San Ildefonso Light & Power Company, now a part of the Mexican Light & Power Company, of Mexico, and with the Mexican Traction Company, now a part of the Federal District Railway Company, of the City of Mexico.

MR. WILLIAM H. OWENS has been appointed general manager of the electric light and power utilities of Granite City, Venice and Madison, to take office at once. He has been in charge of the Edwardsville light and power plant since Feb. 10 last. These properties are owned by the McKinley syndicate, which operates municipal utilities and interurban and city lines in Illinois. Mr. Owens, who is only 25 years old, was graduated from the University of Illinois in 1902, and secured a place as clerk in the Danville office, going thence to Champaign, Springfield and Edwardsville, with successive promotions to the posts of assistant cashier, cashier and auditor. Then he was appointed manager of the Edwardsville properties, and now takes charge of those of the Tri-Cities. Mr. D. Bell will be assistant superintendent of the Venice plant.

MR. ELMER E. COOK has just resigned his position as general manager of the rolling stock and traction department of the Brush Electrical Engineering Company, of London, and has returned to this country to take up his residence here. Mr. Cook was formerly connected with the McGuire Manufacturing Company, of Chicago, with which he was associated for the nine years preceding 1900, when he went to England. The Brush Electrical Engineering Company is one of the large manufacturers of tramway rolling stock in England, and while connected with it Mr. Cook designed rolling stock of all descriptions and had charge of the organization of the staff of the selling and traction departments. While engaged in this work Mr. Cook designed several types of all-steel cars which his company built for the Yerkes and Great Northern & City Underground lines, and for the London, Brighton & South Coast Railway, also a steel tramway car for the subway route of the London County Council. Mr. Cook has also designed a radial truck for street railway cars, which has attracted considerable attention in England.

MR. CHARLES RUFUS HARTE, until lately in charge of the New Haven improvement of the New York, New Haven & Hartford Railroad, at New Haven, Conn., has been assigned to the construction work of the Consolidated Railway, the electric holding corporation of the New York, New Haven & Hartford Railroad. Mr. Harte will have charge of all new construction, with headquarters at New Haven. Born at Marietta, Ohio, in 1870, Mr. Harte received the degree of C. E. from Columbia School of Mines, New York, in 1893, and, entering the construction department of the New Haven Road, has held positions of increasing responsibility on four-tracking the New York division, New Haven to Housatonic River; Forest Hills elevation in Boston; four-track connection, Back Bay station to terminal, Boston; and double-tracking the Naugatuck division. Resigning in 1901 to go with Stone & Webster, of Boston, Mr. Harte located and started construction on the interurban electric railway from Sydney to Place Bay, Cape Breton, Nova Scotia, and the Clinton extension of the Terre Haute Electric Company, Terre Haute, Ind. In 1904, Mr. Harte was recalled to the steam road to take charge of the very extensive four-tracking improvements at New Haven, preparing the plans and representing the engineering department in the extended discussion with the city of New Haven which followed, and working out the details of the scheme finally adopted. Shortly after work began, several large construction jobs were merged under one head, Mr. Harte remaining as assistant in charge of the New Haven work until his recent transfer and promotion.