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# THE STREET RAILWAY JOURNAL

VOL. I. { NEW YORK: }  
          { 32 Liberty Street. }

DECEMBER, 1884.

{ CHICAGO: } No. 2.  
          { 8 Lakeside Building. }

## Cable Traction Railways in Chicago and San Francisco.

The system which we here illustrate\* is the outgrowth of the inventions of Mr. A. S. Hallidie, as first put into operation on Clay Street Hill, San Francisco, in 1873.

Fig. 1 shows a transverse section through the driveway and road bed; also the tube, supporting pulley, rope and "grip."

Fig. 2 is an isometrical view. (See next page.)

Figs. 3, 4 and 5 show the grip of the Clay Street, and Presidio & Ferries roads. A vertical slide, working in a standard is moved up and down by a screw and hand wheel, and operated by the small screw going down through the large one. The screw operates wedges which open and close two horizontal gripping jaws with soft cast iron lining-pieces. On each side of the jaws, and attached to them, are two small sheaves, held by rubber cushions sufficiently in advance of the jaws to keep the rope therefrom, and yet to lead the latter fairly between the jaws without touching them, when they are opened out. In order to grip the rope the slide is drawn up by the small screw, and the wedge at the bottom not only closes

the jaws but forces the guide sheaves on to the rubber springs. The bracket carrying the standard of the slide is attached to a "dummy" car. The steel

shank of the standard is  $\frac{1}{2}$  in. thick and  $7\frac{1}{2}$  in. wide; the slot in the tube being  $\frac{3}{4}$  in. wide.

The grip used on the South Street Line, San Francisco, is as shown in Fig. 6. The motion of the grip jaws being vertical: it takes and releases the rope sideways, instead of beneath as on Clay Street, and the jaws are operated by levers.

The California Street Railway has a lever grip taking the rope sideways.

The Grand Street Railway has a lever grip, vertical in its motion, and taking the rope from above; not so good an arrangement, as the jaws and rope are under the dot and catch the dirt therefrom.

The Presidio & Ferries Railway has a grip of the Clay Street type but heavier.

On this road there is a curve at the intersection of two streets, 2,600 feet from the start, and the rope is deflected by two 8-foot horizontal pulleys. The streets descend from both directions towards the curve, and about 30 feet before reaching the latter the rope is released, and picked up again after the curve is passed; gravity carrying the car and dummy around the curve.

The Market Street Line, being on level ground, uses a combined car and dummy.

In Chicago the tube is deeper than in San Francisco, and the rope is 30 in. above the tube bottom.

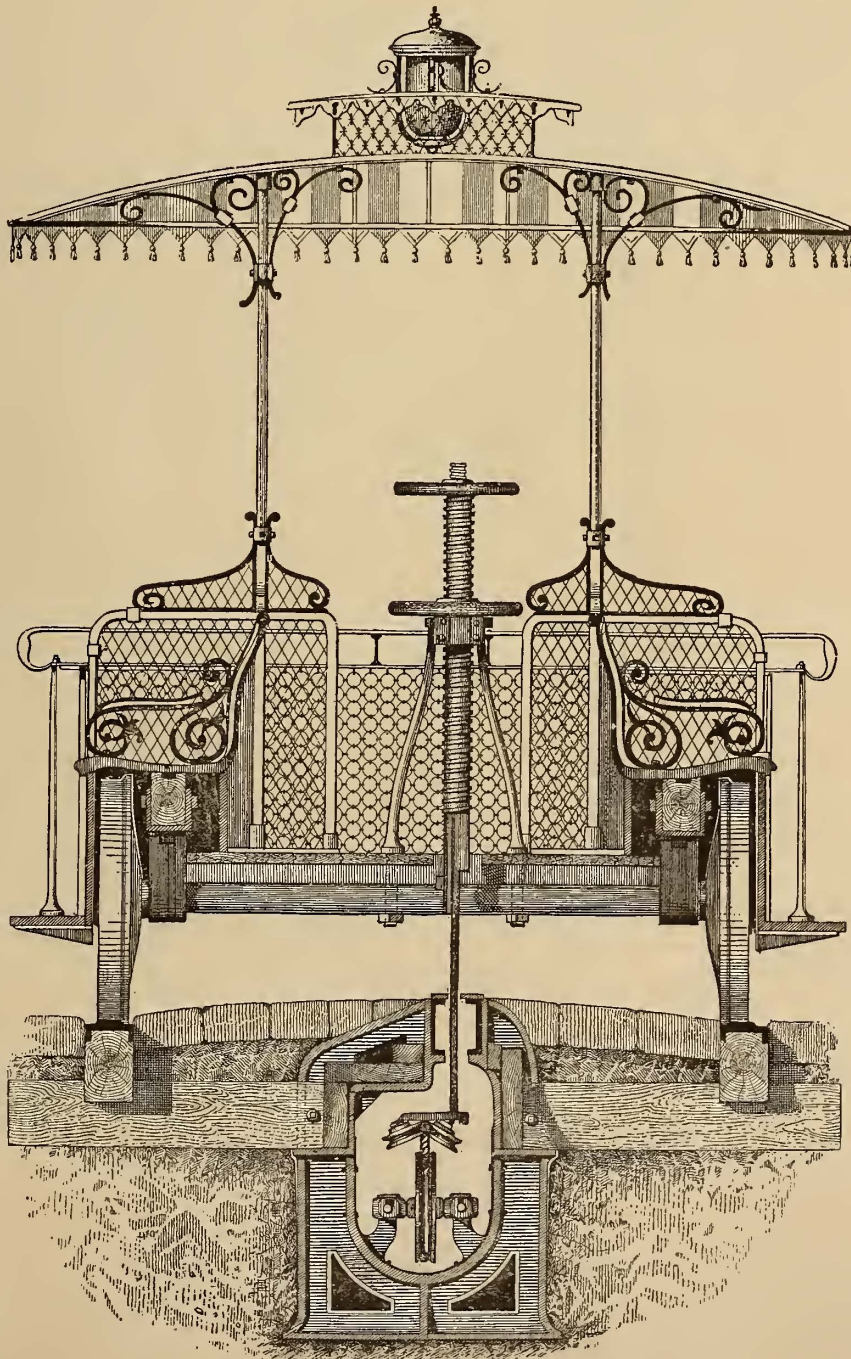


FIG. 1.

\* National Cable Railway Co., 2 Wall Street, New York City.

Origin of the Word Tramway.

ED. STREET RAILWAY JOURNAL:—

The origin of the word "tramway" seems to be exciting not a little interest, as evidenced by your own columns as well as those of other technical journals. I have never seen what I believe to be the true origin of the word stated. In my opinion, it was derived from the word "trammle" and my reasons for this belief are as follows.

The word "trammle" is contained in Dr. Samuel Johnson's Dictionary, and as a verb is defined by him "to catch, to intercept." It has been in use for centuries in England at that time. The word 'tram' or 'tramway' or 'railroad' or 'railway' is not found in his dictionary, published first in 1755, nor in the copy I have dated 1828. In my copy of Smeaton's works published in 1812, I cannot find the word tramway, but in a report to Lady Irwin of January 27th, 1779, entitled an "account of the measures of coals at Newcastle and London" occurs the following, "since the invention of coal wagon roads," \* \* \* and "since the laying of wagon ways in Yorkshire (the first of which is in Mr. Smeaton's memory) to carry coals to the navigable rivers," etc., etc. Nicholas Wood in his treatise on rail roads, published in 1825, states: "that cast iron rails with an upright ledge for the purpose of keeping the wheels upon the line of the former, were first adopted about 1767." In the year 1800, we are told that Mr. Benjamin Outram, an engineer, in adopting this rail on the public railway at Little Eaton, in Derbyshire, first introduced stone props instead of timber for supporting the ends and joining the rails.

Mr. Outram, however, was not the first who made use of stone supports, as the late Mr. Barnes employed them in forming the first railroad which was laid down in the neighborhood of Newcastle-upon-Tyne, viz.: from Lawson Main Colliery to the river, in 1797. In my copy of the Engineers' and Mechanics' Encyclopædia, by Hebert, now a rare book, under the head Railways it is stated:

"The earliest account we have of the introduction of railways is in the 'Life of

the Lord Keeper North,' from which it appears that about the year 1670 they were made use of at Newcastle-upon-Tyne for transporting coals from the mines to the shipping in the river. These railways were constructed of timber. It is stated by some authors that these wooden rails were subsequently improved upon by making ledges at their sides to prevent the wagons

as 1776, or twenty-four years before Outram built his road, although Smeaton, in writing to a lady, used the expression "coal-wagon roads" in 1779, probably because she might not understand the new word. Mr. Smiles, in his Life of Stephenson, accredits the origin of the word to Outram, by dropping the first syllable, but we have seen that Outram did nothing to warrant such distinction.

Mr. Wood was living at the same time, and we have seen that in his opinion Mr. Outram did nothing but use stone, and was anticipated therein by Mr. Barnes. If the use of stone was considered a matter of such prime importance by the people of that day, the roads should have been called "Barnesway," or some equivalent word recognizing the man who *did* introduce stone, anticipating Mr. Outram by three years!! I therefore do not think the word was derived from Outram, but rather from the old English word, or trammle. Webster's Dictionary of 1850 defined to trammel—1st, to catch, to intercept; 2d, to confine, to hamper, to shackle.

It had been in familiar use for years, yea centuries, in England, and what more natural than that it should be applied to those new roads, when they, by the use of upright ledges upon the rails, "confined" the wagons to the said tracks. They could not turn off, as was the case at an earlier day and is the case in the street railroad of today, and the word originated at this time, as we have seen.

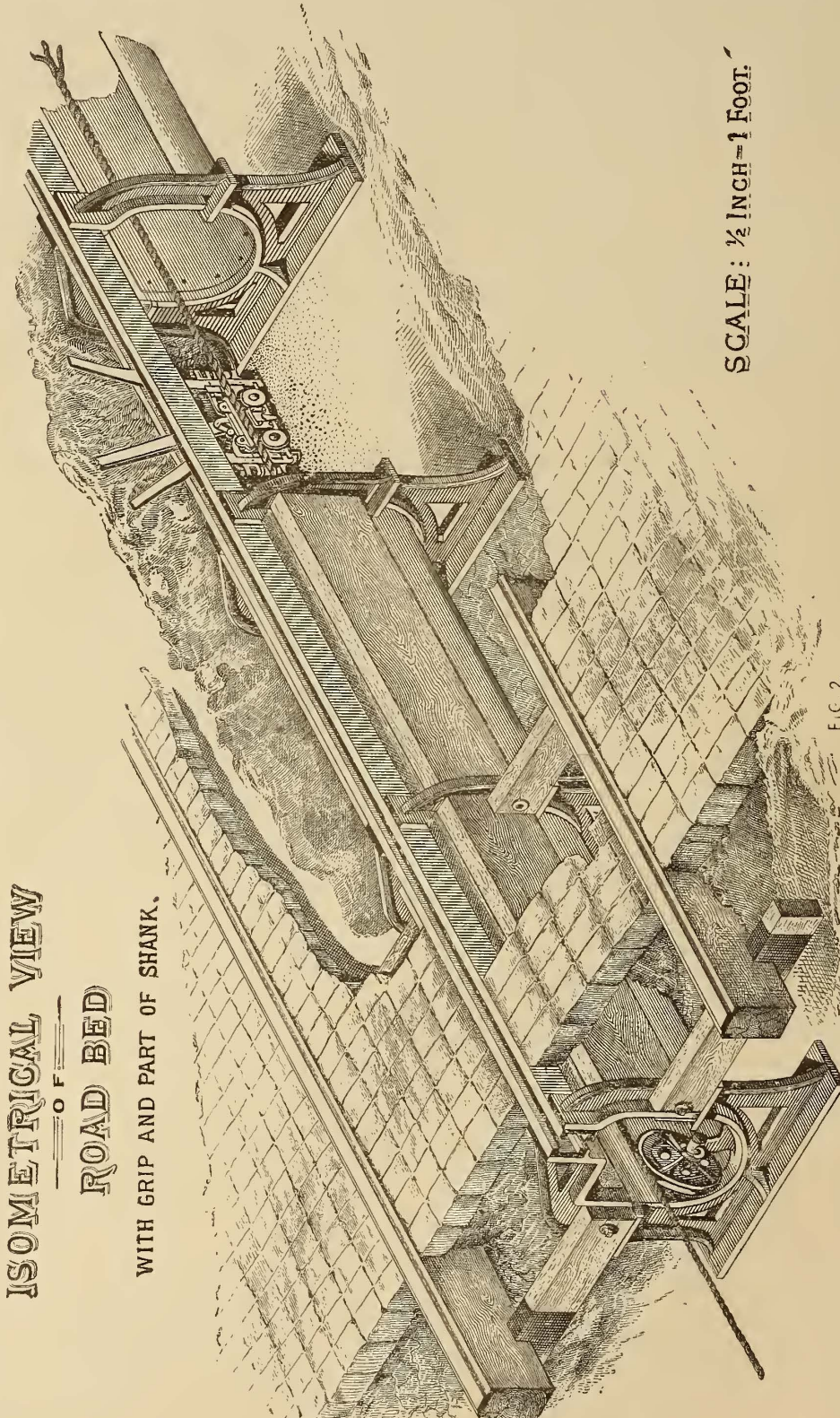
The word "tram" was not contained in Dr. Johnson's Dictionary, and I, therefore, think it originated from trammle.

Yours truly,  
AUG. W. WRIGHT.  
Chicago, Dec. 9, '84.

ED. STREET RAILWAY JOURNAL:—

With regard to the pronunciation of Outram I never heard it pronounced other than Oo tram, accent on the first syllable, and I think that is correct, tho' don't quote me as an authority on that point.

With regard to my letter there is only one point on which I am dubious, whether the originator, Francis Outram, had a title or not. My reasons are this: James Outram, a descendant of the originator, was a prominent General during the Indian mutiny, and was created a Baronet for services therein. When he died, in 1863, he was succeeded by Francis Outram, now Sir Francis Outram and living in Staffordshire, I think. These



ISOMETRICAL VIEW  
OF  
ROAD BED  
WITH GRIP AND PART OF SHANK.

SCALE: 1/2 INCH = 1 FOOT.

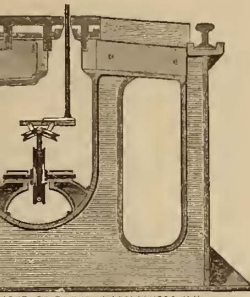
FIG. 2.

from going out of their tracks; a form which was subsequently given to them in cast-iron and termed *Tram Plates*. \* \* The introduction of cast-iron plates having an upright ledge was originally effected by Mr. Carr, at the Sheffield Colliery, about the year 1776."

The foregoing quotations prove that the word "tramway" was applied to railways with cast-iron rails having ledges as early

two, James and Francis, are always called the first and second Baronets; therefore, the originator could not have been a Baronet, though he may have been a knight, and if so; then, of course his title died with him.

Of course you know the title of knight dies with the person on whom it is conferred, and the title of Baronet is hereditary. I mention that the family seat of the Outram's was at Butterly Hall, Derbyshire.



AM. JOUR. OF RAILWAY APPLIANCES N.Y.  
FIG. 3.

Mason Mach. Works, Taunton, Mass.

**Resistance to Traction on Tramways.**

ED. STREET RAILWAY JOURNAL:—

In the subjoined extract from a paper read before the "Western Society of Engineers," by Augustine W. Wright, C. E., Chicago, May 17, 1881, your correspondent "Xerxes" may receive an answer to his enquiry as to the "Resistance on Tramways," on page 124 of your last number.

Will you or any of your correspondents be kind enough to explain the cause of the increased resistance on the steel track over iron track, viz: 4.1 iron, and 7.1 times steel?

JOS. S. PAXSON.

Ambler, Montgomery Co., Pa.

"I recently made the following tests of the force required to start car No. 110, of the 'North Chicago City Railway Company,'

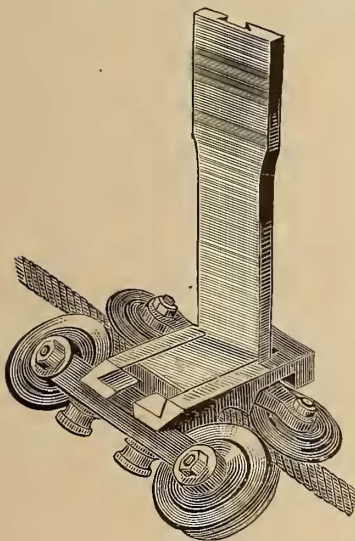


FIG. 4.

and to keep it in motion after it was under way, using a Fairbank's dynamometer. The track has a grade of two-tenths of a foot in each hundred, and was not very free from sand. Between Chicago Avenue and North Avenue, on Clark Street, Division and Clyburn Avenues, 88 tests with an average of 14.8 passengers weighing (estimated at 140 lbs.) with car 6,772 lbs., the force required to keep the car in motion at an average speed of five miles per hour, including stoppages, averaged 109½ lbs., or per ton 32.3 lbs. This is on an old worn-out rail. Between Chicago Avenue and Madison Street, on Clark Street, on new steel rails, 53 tests with an average of 20.9 passengers, gave 29½ lbs. as the force required to keep the car in motion. This

is an average of 15.6 lbs. per ton. The car made 17 starts on this track averaging 18.7 passengers. Average force exerted to start, 426.5 lbs; average per ton, 116.5 lbs. On the first mentioned track 30 tests with an average of 18.1 passengers gave an average force of 487 lbs.; average per ton, 134.6 lbs.

These tests indicate that on the steel rail about 7.1 times the force necessary to keep the car in motion must be exerted to start it. On the iron rail 4.1 times the force must be exerted to start the car than is required to keep it in motion.

These tests show the enormous loss of power required in making frequent stoppages.

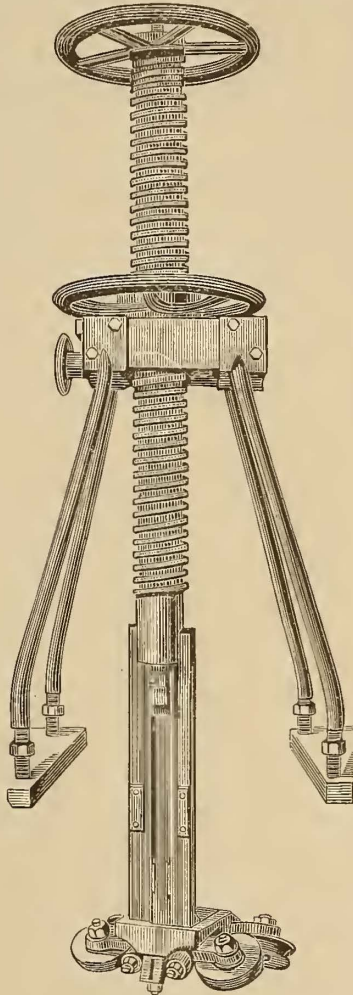


FIG. 5.

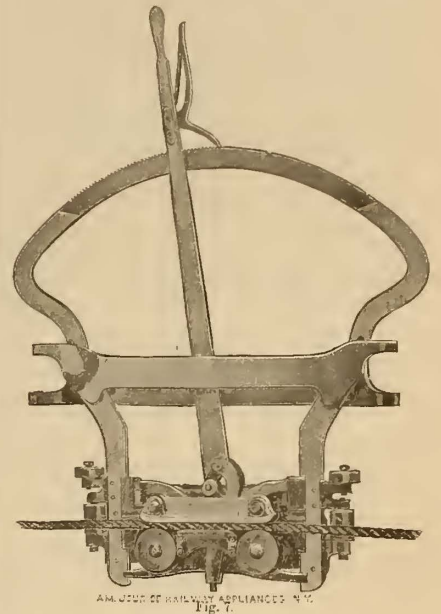
According to English engineers, a tractive force equal to 100 lbs., continuously exerted will draw on a level road as follows: common gravel, 15 cwt.; macadam, 2,700 lbs.; granite pavement, 3,500 lbs.; broken stone surface, 3,400 lbs., laid on an old flint road; same on rough stone pavement, 4,800 lbs.; wood pavement, 5,475 lbs.; stone pavement (good), 6,700 lbs.; iron railway track, 27,600 lbs. WHITNEY.

**The St. Paul Street Railway.**

We have to thank Mr. H. M. Littell, Superintendent for a copy of the annual showing for 1884, of this enterprising road. During the past year, the old cars have been condemned to destruction; old iron rails and vexatious delays at switches, supplanted by double steel tracks. New routes have been established and old ones abandoned for more convenient streets; 45,975 feet of new track were laid. Three new snow plows have been bought and one is building. The "fare conveyor" will be used throughout. New barns and offices have been erected, 244 feet on Forbes St., 286 on Oak St., and 67 on Ramsey St.

President Lowry will build the Dayton's

Bluff line as soon as the fill will permit. St. Paul and Minneapolis will be connected. The year's work may be summarized as follows:



AM. JOUR. OF RAILWAY APPLIANCES N.Y.  
Fig. 6.

FIG. 6.

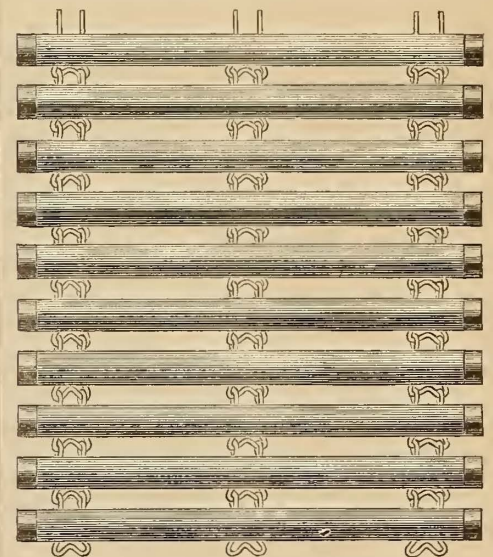
Miles of track and paving (8.65), cost.....	\$128,700
New cars added (37), cost.....	50,000
Mules and horses added (200), cost.....	31,000
Offices, barns and other buildings, cost.....	75,000
Real estate, cost.....	30,000

Total cost of 1884's improvements. \$314,700

The \$50,000 for cars includes also other rolling stock and equipments. The road has cost, up to the present time, a trifle over a million dollars.

**Toffler's Rolling Wood Mat.**

The cut shows a make of wood mat\* in which the slats are connected by two or

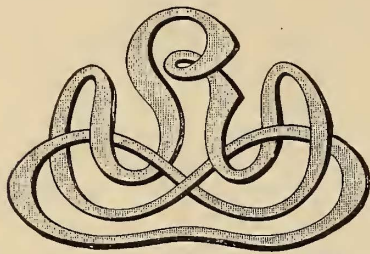


more continuous double chains, passed through small diametrical holes. The chains are of tinned wire.

\* Warneck & Toffler, 111 E. 2d St., N. Y.

**Reserved for Ladies.**

A New York man suggests that one side of the street cars be reserved for ladies. One side should also be reserved for the man who sits cross-legged and occupies half the aisle with his feet, and soils the other half with tobacco juice—and that side should be the outside.—*Norristown Herald.*



**American Street Railway Association.**

OFFICERS, 1884-5.

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*Second Vice-President.*—Henry M. Watson, President the Buffalo Street Railway Co., Buffalo, N. Y.  
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**Electricity as a Motor.**

The committee on electricity as a motor for railroad transportation is not prepared to make a report from personal inspection; but from the information received from different sources, they feel justified in reporting the possibilities of the new system to be very flattering. The experiments made in different places demonstrate beyond question its safety and practicability; and it will not be long before the question of economy will be fully determined by the experiments at Cleveland. In this country and in Europe, there are now several electric railroads in successful operation. The Litcherfelde road, in Berlin, has been for four years a financial success, and the results of the experiments at Coney Island, Menlo Park, and by Messrs Daft & Edison, at the Mechanics' Fair Building at Boston, Mass., have thus far been very satisfactory and encouraging. I herewith submit for your consideration the enclosed communication of Mr. W. A. Knight, of the Brush Electric Company, of Cleveland, Ohio, giving the result of the Cleveland experiment in detail. This letter, coming as it does, direct from the operator of the street railroad at Cleveland, in response to a request from this committee soliciting such information as would be valuable and interesting to the convention, is really the sum and substance of this report, and contains all the reliable information before this committee.

As chairman of the committee I confess that I have not given to the investigation of this question as much of my attention as its importance demanded; but the unusual pressure of official duties during the last six months has occupied all my time.  
 ED. C. PETERS, Chairman.

**Brush Electric Company.**

CLEVELAND, O., October }  
 8th, 1884. }

E. C. PETERS, Esq., Chairman, Committee on Electricity as a Motive Power of the American Street Railway Association.

DEAR SIR:—Your favor of the 30th ult. is at hand, and contents noted.

The electric railway which we are now operating here is about one mile in length, and at present only one car is run on it. The second car will soon be completed, and the line will then be extended across the railway-tracks to a distance of about one and a-half miles. This section, with its two cars, will be operated all winter without intermission, to demonstrate the "rough and ready" character of the motor, after which the system will be extended over the 20 miles of tramway owned by the East Cleveland Co.

Last winter we operated a trial railway, built in the yard of these works; and as it stood the tests of all kinds of weather, we have no doubt in our own minds as to its efficiency the year round.

Briefly the system may be described as follows:

Midway between the rails a conduit 8 inches deep is laid flush with the pavement, in the manner of a cable road. Two iron rails serving as conductors are supported within this conduit, and through a slot five-eighths of an inch wide in the top of the conduit a plow depends from the car, and by means of two brushes makes contact with the conductors. Through this plow the current is conveyed to the motor, which is situated between the wheels under the car, and is tightly boxed up to prevent access of dust, etc. The motor weighs half a ton, and the car is an ordinary two-horse box car, weighing, exclusive of motor, two tons. The motor is geared to the axles of the car by friction gear and link-belts. The movement is controlled by levers at either end of the car, these levers operating the commutator brushes on the motor to start, stop, or reverse the motor, or to make it go at any speed desired. It has been run at a speed of fifteen miles an hour.

The dynamo supplying the current is located about a mile from the line and is run by the engine used by the company for grinding corn. It is connected to the conductors in the conduit by an over-head line of No. 8 wire. In practice, no over-head line will be used and a greater economy may be anticipated. The power is sufficient to run two cars, as the engine and

dynamo after being started in the morning, runs all day without attention. Only one man is employed to do the firing, and the expense of power, including fireman, coal and oil is about four dollars per day.

With a larger plant, larger and more economical engines, boilers and dynamos would be used, and a much greater economy obtained.

The conduit will cost from five to seven thousand dollars a mile when made of steel, and it ought to last a lifetime. To equip an ordinary two horse car will cost in the neighborhood of \$1,500 and the power at the central station for each such car will be in the neighborhood of \$1,200. Each car will pull another car of the same size.

The steepest grade we have experimented with is 500 feet to the mile, and no difficulty was found in overcoming it.

The conduit is kept free from dirt, snow, etc., by a brush depending from the car through the slot. Catch basins are placed at intervals varying from 50 to 100 feet, and where possible a sewer connection is made.

The system is similar to a cable road in that it requires a conduit and a central power station; but it differs in every other respect.

It may be operated on single tracks, as well as on double tracks; and branches may run out from the main road in every conceivable manner. Any speed may be assumed at the will of the operator without wear of machinery. Ordinary car-drivers can operate it after five minutes instruction. Stoppages can be made quickly by reversing the motor. Running off the track does not injure the machinery, and a flexible connection on every car enables the motor to run the car back on to the track when the lever is reversed. A much smaller conduit can be used than with cables, and there is no machinery along the line. The conductors cost but \$200 a mile and the wear of the brushes upon them seems to be nil.

We use a high tension current because our investigations have showed us that when distances greater than one or two miles are to be overcome, no other current will give the necessary economy. The conductors are, however, inaccessible, and no danger is anticipated. We are ready to equip any road not exceeding 25 miles in length.

Hoping I have touched upon the main points of interest,

I am, very truly yours,  
 W. H. KNIGHT.

**Uniform System of Accounts.**

*The American Street Railway Association:*

GENTLEMEN—The committee appointed on "A Uniform System of Accounts," is of the opinion that what is wanted is "A Uniform System of Operating Expense Accounts,"

**Sub-Divisions of Operating Expense Accounts, and of Construction, Equipment and Improvement Accounts.**

**1. CONDUCTING TRANSPORTATION.**

- 1 Supervisors, Inspectors and Starters.....Labor—Starting Cars, supervising the running of Cars, and overseeing and keeping time of Conductors and Drivers.
- 2 Receivers and Clerks..... Labor—Receiving and reporting fares paid to Conductors, putting up and selling change, and handling fare boxes.
- 3 Conductors.....Labor—Conductor's wages.
- 4 Conductor's Extra Pay.....Conditional percentage on Conductor's earnings.
- 5 Switchmen, Flagmen, etc.....Labor—Switching, flagging and pushing, curve men, turntable men, gatekeepers, and driver of advertising car.
- 6 Car and Lamp Cleaners and Watchmen....Labor—Lampman, Car and Lamp Cleaners, and Watchmen at Car Houses.
- 7 Lighting, Oiling and Cleaning Cars..... Oil, matches, etc., for lighting; oil, brooms, brushes, rags, sponge, etc., for oiling and cleaning, and straw used in Cars.
- 8 Stationery, etc..... Envelopes, slips, cards, notices, bill-boards, paste, school tickets, and employees' passes.
- 9 Registers and Punches.....Expense incident to use of same.
- 10 Furniture and Implements.....In Car Houses and Receiver's and Starter's Offices, including money satchels, boxes, and carts, and repairs of same.
- 11 Car License.....Payable to City.
- 12 Loss from Accidents.....Legal, medical and other expense growing out of injuries to persons and property.
- 13 Fuel, Light and Water.....Used in Car Houses and Receiver's and Starter's Offices.
- 14 Car Houses and Office Repairs.....Labor—Repairing, whitewashing, and cleaning Car Houses and Receiver's and Starter's Offices.
- 15 Car House and Office Repairs.....Materials, etc., used, and other expense of same not charged in No. 14.

2. MOTIVE POWER.

- 16 Animals.....Cost of Animals, and expense incident to purchasing same.
- 17 Care of Animals.....Salt, medicines, etc., and other expense not charged in Nos. 16 and 18.
- 18 Stable Men .....Labor—Foremen, Hostlers, Surgeon and Watchmen.
- 19 Forage.....Cost of same, including freight.
- 20 Handling Forage.....Labor—Hauling, weighing, storing, cutting, grinding, and otherwise handling and preparing food.
- 21 Stable Tools, Implements and Machinery.....Groomers, extinguishers and all Stable tools and machines, and repairs of same, not charged in No. 24.
- 22 Feed-mill, Implements and Machinery.....Machinery and Implements used in handling food, wagon license, inspecting scales, and all repairs not charged in No. 24.
- 23 Blacksmith's Tools.....Including material used, and other expense of making and repairing not charged in No. 24.
- 24 Shoeing Animals, etc.....Labor—Shoeing animals and repairing machinery, tools, etc., in Stables and Harness and Smith Shops.
- 25 Shoes and Nails.....Including material used, and freight on shoes, nails and material.
- 26 Harness and Repair.....Labor—Making and repairing Harness.
- 27 Harness and Repairs.....Material and tools used in Harness Shop, and other expense of making and repairing not charged in No. 24.
- 28 Furniture and Repairs.....Elevator, Stoves, Clocks, etc., in Stables and Smith and Harness Shops.
- 29 Fuel, Light and Water.....Used in Stables and Smith Shops, including cost of wells and pumps on premises.
- 30 Drivers.....Labor—Driver's Wages.
- 31 Driver's Extra Pay.....Conditional percentage on Driver's earnings.
- 32 Stable and Smith Shop Repairs.....Labor—Repairing, whitewashing and cleaning Stables, Smith Shops, wells, pumps, fences, and yards adjoining.
- 33 Stable and Smith Shop Repairs.....Material used and expense incurred, not charged in No. 32.

3. MAINTENANCE OF WAY.

- 34 Track Repairers.....Labor—Supervisor, Foremen, Teamsters and Laborers on Track and Turntables.
- 35 Track Repairs.....Cost of Wood material used, including freight and work done on same, not charged in No. 34.
- 36 Track Repairs.....Cost of Iron material used, including freight and work done on same, not charged in No. 34.
- 37 Track Repairs .....Water, rock, gravel and other expense not elsewhere charged.
- 38 Track Cleaners.....Labor—Removing obstructions from track.
- 39 Cleaning Track.....Salt, residuum, oil, etc., used for this purpose, and expense of removing obstructions from track.
- 40 Road Tools and Implements.....Including plows and scrapers, road wagons and carts, license on same, and repairs not charged in No. 41.
- 41 Road Tools and Implements.....Labor—Making and repairing all tools, implements, vehicles, etc., used on road.
- 42 Incidental Road Expenses.....Any expense incident to Maintenance of Way not chargeable to other sub-accounts.

4. MAINTENANCE OF CARS.

- 43 Car Repairers.....Labor—Repairing Cars.
- 44 Car Repairs.....Cost of Material used, and other expense not charged in No. 43.
- 45 Car Furniture and Repairs.....Fare Boxes, poles, racks, signs, single and double trees, curtains, lamps, chimneys, etc., and repairs not charged in No. 46,
- 46 Car Furniture and Repairs.....Labor—Making and repairing any of same.
- 47 Shop Tools and Machinery.....Machinery, tools and furniture, used in Car and Paint Shops, and expense making and repairing not charged in No. 48.
- 48 Repairing Tools and Machinery.....Labor—Making and repairing same.
- 49 Furniture and Repairs.....Used in Car and Paint Shops.
- 50 Fuel, Light and Water.....Used in Car and Paint Shops.
- 51 Repairing Car and Paint Shops... Labor—Repairing, whitewashing, and cleaning Shops and premises.
- 52 Repairing Car and Paint Shops.....Material used, and other expense not charged in No. 51.

5. GENERAL EXPENSE.

- 53 Salaries of General Officers.....President, Vice-President, Directors, Secretary, Treasurer and Superintendent.
- 54 Expenses of General Officers.....Traveling and other expense on Company business not chargeable to others sub-accounts.
- 55 Salaries of Clerks.....In Offices of Superintendent, Secretary and Treasurer.
- 56 Office Expenses.....Fuel, light, water, ice, postage, telegrams, wages of Janitor, etc.
- 57 Stationery and Printing.....Books, maps, blanks, stationery, printing, advertising, and other like expense, not chargeable to No. 8.
- 58 Telephone Service.....Cost of same, and repairs of Office telephone.
- 59 Furniture and Repairs.....Safes, counters, desks, chairs, clocks, money scales, awnings, etc.
- 60 Office Repairs.....Labor—Repairing General Offices.
- 61 Office Repairs.....Material used, and other expense not charged in No. 60.
- 62 Interest, Discount and Exchange.....Including expense of paying Coupons.
- 63 Sprinkling.....Sprinkling street in vicinity of General Offices.
- 64 Rents.....On Buildings and ground.
- 65 Taxes.....Payable to City and State.
- 66 Insurance.. Premiums on same.
- 67 Legal Expenses.....Attorney's and Clerk's fees, copies of Court records, City ordinances, etc., not chargeable to No. 12.
- 68 Detective Service.....Any expense of this character.
- 69 Real Estate Expenses.....Surveyor's fees and any expense incident to purchase and sale of Real Estate.
- 70 Gratuities.....Rebates of fares, and donations of every kind.

CONSTRUCTION, EQUIPMENT AND IMPROVEMENT ACCOUNTS.

- 71 Cars.....Labor—Building new Cars.
- 72 Cars.....Material used, and other expense of building new Cars not charged in No. 71.
- 73 Track .....Labor—Constructing new Track.
- 74 Track.....Material used and other expense of constructing new Track not charged in No. 73.
- 75 Buildings and Improvements.....Labor—On new Buildings, Sheds, etc.
- 76 Buildings and Improvements.....Material used, and other expense of new Buildings and Improvements not charged in No. 75.

rather than a Uniform System of General Accounts of Assets and Liabilities.

A circular was issued by the Chairman of this Committee to the several street railroad companies belonging to this Association, asking for a list of accounts kept by their respective companies. The Chairman wishes to report that the responses were promptly received from nearly every company in the Association, showing that a great

and general interest is felt in this matter. The information is gathered that there is a great diversity in the methods of keeping accounts, and it is certainly very evident that a uniform system of keeping operating expense accounts would result in very great good, not only for the opportunity it would afford for comparisons, but it might possibly furnish information which would result in savings to many companies.

Your committee take pleasure in presenting the system now in use by the Louisville City Railway Company, and of recommending and offering the same for your consideration and discussion.

The operating expense accounts kept by that company are as follows:

- No. 1.—Conducting transportation.
- No. 2.—Motive power.
- No. 3.—Maintenance of way.

- No. 4.—Maintenance of cars.  
No. 5.—General expense.

Under these general headings are kept several sub-accounts, as shown in the accompanying form kindly furnished by the Louisville City Railway Company, and which is herewith presented by your committee as part of this report. The form may be modified to suit the different companies.

Respectfully,  
E. K. STEWART,  
*Chairman.*

### Track Salting.

We continue from page 6 of our November issue our abstract of the official report of the discussion on and documentary evidence connected with the report of the special committee of the A. S. R. W. Ass'n on track cleaning, etc.:

Dr. Elijah Whitney said that both the railways and the city authorities should be taxed for the purpose of salting the streets and melting the snow. New York streets could be cleaned thus for one-fourth the cost of the present way, by horses and carts.

Mr. Johnson, of Cleveland, reported that they kept their track clean by salting, though against the ordinance.

Mr. William Richardson said that there was a very full investigation of this question in Philadelphia, in 1862, before Select Council, Board of Health, etc., and published in the *Sanitarian* some five or six years ago. It included thermometer and other tests, and was used before committee of Brooklyn Common Council, which I referred to, and had a very considerable effect.

[Association took a recess for an hour.]

In a letter from Mr. Richardson to the association, furnishing valuable letters and other documents, he desired to express the obligations he was under, in 1874, to James Watt, M. D., Registrar of Vital Statistics, who personally appeared before the Brooklyn Council Committee with a statement of valuable facts in refutation of the prejudice that the use of salt on the streets was injurious. In these he was supported by the Sanitary Superintendent, Dr. Avery Segur, and the Health Commissioners, Drs. Hutchison and Conklin, and James Jourdan, Esq., President of the Board.

The present Commissioner of the Health Department of Brooklyn, Joseph H. Raymond M. D., at the investigation in 1881, at which time he held the office of Sanitary Superintendent, in addition to writing the Committee a very full and statistical report (herewith appended) attended before the Committee; and gave emphatic evidence that there were no evil results from the use of salt, on public health. Dr. Raymond as Inspector, Sanitary Superintendent and Health Commissioner of Brooklyn, had for many years been an untrusting and anxious investigator of every question affecting, whether nearly or remotely, the health of the city. His written report had the emphatic endorsement of James Crane, M. D., at that time Health Commissioner of Brooklyn, and for many years connected with the Metropolitan Health Department.

*Abstract of Report of Brooklyn Committee on Public Health, April 4, 1881.*

The Committee on Public Health referred the matter to the Commissioner of the Department of health, who referred it to the Sanitary Superintendent.

In Dr. Raymond's report he says in brief:

The opponents of salt claim that its use tends to the spread and production of contagious diseases. The diseases of this nature in Brooklyn are: diphtheria, scarlet fever, measles and small-pox. I am unable to see the least relation between the use of salt and the prevalence or fatality of these diseases. The greatest mortality from diphtheria during 1880-81, was for the week ending November 6, 1880. Salt had not been used up to that time, nor was it used until nineteen days after.

In 1877 there were 730 deaths from scarlet fever; in 1878 there were 363 deaths, one-half as many as in the preceding year, while the salt used was about the same; in 1879 the deaths were 344, still lower than in 1878, while the amount of salt used was greater than in the two preceding years; during 1880 there were but 222 deaths from this disease, yet the railroad companies probably used more salt than ever before.

In November, 1880, there were two deaths from measles; in December, no deaths; in January, 1881, five deaths; and in February, three deaths; this is the time of the year when salt is principally used. In March, 1880, there were thirty-two deaths; in April, thirty-four deaths; in May, thirty-two deaths; and in June, twenty-one deaths; this was during the time when no salt was used.

From the summer of 1877 to the summer of 1880, there was absolutely no small-pox in Brooklyn, and yet during the winters of all these years, salt was used in the railroad streets. From May 30, 1877, to September 23, 1880, there was not a single death from this disease. It would seem to be a proper inference that the sprinkling of salt on the streets is not detrimental to the public health, through the medium of contagious diseases.

This subject was, during the year 1862, investigated in a most thorough and scientific manner by the best chemists and physicians of Philadelphia.

Professor Rogers, of the University of Pennsylvania, testified, that the "use of salt is calculated to preserve the atmosphere of the streets in a state of salubrity."

B. Howard Rand, M. D., testified "that the use of salt in thawing the snow cannot have any injurious effect on the health of the community. \* \* \* In respect to its alleged tendency to produce epidemics, I do not think it a matter within the range of possibility even."

Dr. Kenderdine, of the Episcopal Hospital, testified: "I know of no injurious results from salting the streets, except the loss of professional business; it prevents falls; I have had no cases of fracture from such accidents since—at least, none happening on streets with railroads."

D. Hayes Agnew, M. D., testified: "Diphtheria, which is assumed to be one of the results of salted streets, is not a new disease, but has prevailed both in and out of cities, long before railroads of any kind had an existence."

At this investigation, a report was made by a Committee of the College of Physicians, which, in closing, presented the following resolution: "That in the opinion of the College of Physicians, there is no evidence that the practice of salting the railway tracks passing over the streets of the city exerts any injurious influence on the health of citizens." This was signed by the following eminent men: Casper Morris, Franklin Bache, Edward Harts-horn, J. M. DeCosta, and D. Francis Condie.

At a recent meeting of the Common Council Committee on Public Health, of this city, communications were read from Drs. Elisha Harris, of the State Board of Health, Joseph C. Hutchison, formerly Health Commissioner of this city, and Avery Segur, M. D., formerly Sanitary Superintendent, giving the weight of their names and opinions to sustain the statements made by the Philadelphia experts, that there was no evidence that the salting of tracks was a detriment to the public health.

In conclusion, permit me to say, that I have never been able to discover any facts which would, even in the slightest degree, tend to prove that this practice is detrimental to the public health, nor have I been able to find any such evidence on record.

The following letter is from Dr. Joseph C. Hutchison, alike eminent as a physician and surgeon, and formerly one of the Health Commissioners of Brooklyn. It was

sent to the Mayor of Brooklyn, at the time the question of prohibiting the use of salt was before the Common Council, in 1881.

BROOKLYN, January 10th, 1881.  
HON. JAMES HOWELL, JR., Mayor of Brooklyn.

DEAR SIR:—Having been requested to express to you my opinion of the effect upon the public health of sprinkling salt upon railroad tracks for dissolving snow and ice to effect its speedy removal, I beg leave to state briefly and without reservation, that *the results of the practice are not injurious to the health of the city.*

On the contrary, the well-known anti-septic effects of common salt in preventing decomposition of vegetable and animal accumulations in our streets, which cause the exhalation of noxious gases, has a salutary effect upon the public health. "Salting," by preventing putrefaction, tends to make the atmosphere over the salted street more pure and salubrious, and the liquefied snow and salt running into the sewers purifies and corrects, to a certain extent, their offensiveness.

The public convenience would be promoted by having a trench made through the snow and ice, from the railway tracks to the inlets of the sewers, and keeping the inlets open, so as to carry off the liquid mixture. I presume from the fact that the sewer inlets are usually closed, that an ordinance is already in existence requiring that they be kept open!

The greatest sufferers from the use of salt upon the railroads are the doctors, both by reason of the purifying effects of the melted salt upon the streets and sewers, and the prevention of accidents—broken bones, etc.—from falls.

I beg leave to call your attention to an exhaustive report on the influence upon the public health of salting the streets for the removal of snow, made by the Philadelphia College of Physicians in 1862, in which it is clearly shown that the practice is in no way injurious to health.

I am, sir, very respectfully yours,  
JOS. C. HUTCHISON, M. D.

The following endorsement is by the late Dr. Elisha Harris, for many years Registrar of Vital Statistics of the City of New York, and at the time of his death Secretary of the New York State Board of Health Commissioners:

I fully concur in the foregoing statement by Dr. J. C. Hutchison. This matter should be regarded as one of facts, as here stated, and not of mere opinion.

ELISHA HARRIS, M. D.

The following approval is from Dr. William M. Smith, the health officer of the port of New York:

I approve the opinion, and concur in the recommendation of Dr. J. C. Hutchison.  
WILLIAM M. SMITH, M. D.

The following letter is from Dr. Avery Segur, for several years Sanitary Superintendent of the City of Brooklyn, and now Examining Physician of the Mutual Life Insurance Company, of New York:

281 HENRY STREET,  
BROOKLYN, JAN. 31, 1881.

EDWIN BEERS, ESQ., President of the Broadway Railroad Company, Brooklyn:

SIR:—My attention was directed to the use of salt for removing snow by the horse-car railroad companies several years ago (1873-4) when I was in the service of the Health Department as Sanitary Superintendent.

I then learned that in the City of Philadelphia an investigation had been made by a medical commission, and that no evidence of injurious effects on health from such use of salt was found; and the result of the inquiry was that these medical experts affirmed that removal of snow with salt was not detrimental to the public health.

The same opinion was held by such of

our own physicians as I consulted about the matter. I was then, and have been always since interested in, and attentive to, all questions involving the causes of sickness in cities; and I have never seen any evidence from any source, either professional or the general public, to sustain the opinion that the use of salt to remove snow from the streets should be prohibited.

The importance of the sanitary condition of the streets to so large a portion of our population who pass a considerable time in the horse cars, and the difficulty of establishing the affirmative or negative of any proposition about causes of disease (as at present the allegation that the use of salt on snow in the streets is injurious as well as the contrary denial—more or less valuable opinions of individuals), have led me to consult the reports of various official bodies charged with the care of the public health. In all the volumes of reports of the New York city Board of Health since 1866, among the multitudes of matters, having a sanitary interest, upon which the board has acted, I do not find that this matter has demanded or received any adverse attention; although street-cleaning, street-filth, etc., are very prominent. So with the Massachusetts State Board of Health, although it has affirmed the proposition that the public streets should be no less safe to health than secure to limb. I hope the present inquiry of our Common Council will end in an important contribution to the knowledge of this subject, or, if that is not immediately practicable, to the suspension of opinion which opens the way to knowledge.

The experience of this winter has made me wish that all the streets in the city were as comfortable, dry and passable on foot or in vehicles, as are the streets in which the horse-cars run.

Very respectfully,

AVERY SEGUR, M. D.

The following letter is from Samuel Mitchell, foreman and veterinary of the Broadway Railroad Company, of Brooklyn:

EAST NEW YORK, January 21, 1881.

To the Health Committee of the Common Council of the City of Brooklyn:

GENTLEMEN:—Having been requested to give an opinion on the subject of salting the railroad tracks; and as I am the oldest railroad employee in Brooklyn, and having given the matter close observation both as regards its effects on man and horse for the last twenty years, I think I can dispel some of the erroneous ideas held by many of my fellow citizens on this greatly misunderstood subject. First, as regards its effects on the health of the drivers and other employees in the Broadway Railroad Company's service, several of whom have worked with me for the last twenty years, would say that they are as hearty and as healthy as I am, and few men of eighty-one years are better preserved than myself. It may be that the salt preserved me! As regards the horses, I never have found any trouble with them from the use of salt. I have the care and management of several hundred, and with ordinary attention to cleaning the snow and mud from their feet, the horses do as well in the winter as in the summer. If the persons who are opposed to salting the tracks would take the trouble to investigate the subject, they would find that salt is soluble in water, but is not volatile. By mixing eight ounces of salt in one gallon of water, and evaporating or distilling the dryness, the eight ounces of salt will be left. This plainly proves that none of it has mixed with the atmosphere, if salt were volatile and injurious to health, seamen and those living on the sea coast would suffer from it. If the fault-finders would learn a little practical chemistry they would think and speak differently concerning the use of salt.

Very respectfully, your obedient servant,  
SAMUEL MITCHELL.

The following letter was sent by the (then) Professor of Chemistry of the University of Pennsylvania, R. E. Rogers, M.

D.,\* to a special committee of the Select Council of the City of Philadelphia, in the year 1862:

UNIVERSITY OF PENNSYLVANIA, }  
PHILADELPHIA, February 24, 1862. }

To the Committee of Select Council, having in charge the inquiry, respecting the influence on the public health of the practice of sprinkling salt upon the City Railroad tracks for removing snow and ice:

GENTLEMEN:—Having since my interview with you at your public sitting on January 24, obtained additional positive data relative to the cooling effect of salt when employed to hasten the removal of snow from the city railroad tracks, and believing that it is your wish to procure all information bearing practically upon the subject, I venture to address to you this communication, trusting that in a sincere desire to contribute to the cause of truth will be found my apology for so doing.

Satisfactory conclusions upon a question so important as this, involving, as it does, considerations of public health, cannot be reached by the dogmatic assertion of individual opinion, nor by the captious criticism, nor ridicule of the opinion of others who differ from us, neither by mere surmises as to causes and effects, nor the invention of hypothesis, however ingeniously devised or skillfully reasoned out, but alone by carefully ascertained facts, the results of observation and experiment.

I shall, therefore, not undertake to discuss or comment upon any of the voluminous and somewhat conflicting testimony, which has been elicited during the agitation of the subject, but confine myself to a line of demonstration.

As will be remembered, there occurred on the 3d instant a heavy fall of snow, commencing in the night, and continuing into the next morning. Availing myself of the opportunity it afforded of ascertaining by practical tests more fully than I had already been able to do, the extent to which salt, as used upon the city railroad tracks, really reduces the temperature, I made on the 5th inst. two series of observations, one upon the materials in which persons walking had to tread, the other upon the atmosphere.

The thermometer which I employed was correct in its indications, and graduated to half degrees. The day was clear and cool, the temperature at noon, in the shade, 33°. The railroad tracks had been, as I was informed, salted to the usual extent, and the snow along these portions of the lines exposed to the sun was thawing rapidly, while that sheltered from its influence had melted but little.

The first observations were commenced at 12 o'clock noon, and continued an hour and a half, and, whereupon, the temperature of the melted or liquid mixture of salt and snow, which had accumulated at or near the crossings of Chestnut and Eighth, Ninth, Tenth, Eleventh, Twelfth and Thirteenth Streets, and upon that of the unmelted mixture of the same materials at several intermediate points between the intersections of these cross-streets and Chestnut, stood as follows:

The columns below exhibit the results.

TEMPERATURE OF THE MELTED OR LIQUID MIXTURE OF SNOW AND SALT.

Chestnut and 8th, the temperature of the liquid mixture was.....	27½°
Chestnut and 9th, the temperature of the liquid mixture was.....	28½
Chestnut and 10th, the temperature of the liquid mixture was.....	28
Chestnut and 11th, the temperature of the liquid mixture was.....	27½
Chestnut and 12th, the temperature of the liquid mixture was.....	27½
Chestnut and 13th, the temperature of the liquid mixture was.....	28
Average.....	27 <sup>83</sup> / <sub>100</sub> °

\*Since deceased.

TEMPERATURE OF THE UNMELTED MIXTURE OF SNOW AND SALT.

At a point 50 feet above 8th, on Chestnut Street.....	26½°
At a point opposite the Continental Hotel.....	26½
At a point 50 feet above 9th, on Chestnut Street.....	27
At a point opposite the Markoe House.....	27
At a point midway between 10th and 11th, on Chestnut Street.....	26½
At a point midway between 11th and 12th, on Chestnut Street.....	27
At a point midway between 12th and 13th, on Chestnut Street.....	27
Average.....	26 <sup>84</sup> / <sub>100</sub> °

The second observations were made on the afternoon of the same day, commencing at half-past three, and continued for an hour and a half. Their object was to ascertain whether there was any difference, and, if any, how great, between the temperature of the air which rested at a small elevation over the salted streets, and that over the snow, where no salt had been used.

The thermometer employed was the same used in the earlier part of the day, and was so carried that the lower end, or bulb, hung at a point three feet above the snow.

The afternoon was altogether calm, and, therefore, especially favorable for fair experiment. Starting from the intersection of 13th and Chestnut Streets, the thermometer at 33°, I proceeded down Chestnut to 9th, pausing occasionally to note the indications of the instrument. At each observation, a gradual diminution was apparent, and on reaching 9th Street, the temperature, as nearly as I could detect, had fallen to 32½°. Turning up 9th, I traversed that street as far as Arch, and in my progress observed a similar gradual decline in the temperature, and by the time I had arrived at the corner of 9th and Arch, the thermometer marked 32½°. I next walked up Arch Street to 12th; still the instrument showed a gradual fall, and on reaching 12th Street it stood at 32½°. From Arch, I proceeded down 12th to Walnut. Along this street was noticed a like progressive diminution in the temperature; and when I reached the corner of 12th and Walnut, it was just 32°.

Turning now down Walnut, I walked as far as 9th. During this interval the decline still continued, and at about the previous rate, so that when at the corner of 9th and Walnut streets the instrument recorded, as nearly as the eye could define, 31¾°. From 9th and Walnut, I walked towards Chestnut, and at the intersection of 9th and Sansom Streets, lingered 15 minutes to make my last observation. The temperature of the atmosphere had still continued to fall, and at this point was a minute fraction of 31½°. For clearer inspection, these results may be tabulated thus:

Commencement of observations at 13th and Chestnut, temperature 33°.

Along Chestnut to 9th (salted), fall from 33° to 32½°
“ 9th to Arch (unsalted), “ “ 32½ to 32½
“ Arch to 12th (salted), “ “ 32½ to 32½
“ 12th to Walnut (unsalted), “ “ 32½ to 32
“ Walnut to 9th (salted), “ “ 32 to 31¾
At intersection of 9th and Sansom (unsalted), fall from.....

From this record it was evident that the afternoon was steadily growing colder as the hour became later, and too, at about the somewhat uniform rate of about a quarter of a degree for every fifteen minutes. At 9 o'clock p.m., the thermometer stood at 28°. The diminution took place as rapidly, and to an equal extent, in one street as in another, thus conclusively proving that at an elevation of three feet above the surface of the material on the ground there was no essential difference between the atmosphere of the salted streets and that of those where no salt had been thrown; since had such a difference existed, the thermometer should have fallen more rapidly and to a greater extent, so soon as it was taken from an unsalted to a salted street, and then should

have risen again, or shown a more tardy rate of fall upon being removed from a salted to an *unsalted* avenue.

These observations of matters, purely of fact, while confirming statements previously made to your Committee, furnish, I conceive, evidence of significant bearing upon the question at issue, and will, I hope, tend to correct some of the misimpressions and misapprehensions which have prevailed on the subject. Thus, in the first place, it is shown that the belief that salt as used in the quantity employed by the City Railroad Companies for hastening the removal of snow from their tracks produces a mixture *intensely cold* to the feet, is *erroneous*, since the average reduction of temperature in the liquid mixture of snow and salt was, at the places of experiment, only 4.17° below that of snow water, and the average reduction in the unmelted mixture was but 5.22° below that of snow itself.

In the second place, it is demonstrated that a like error has prevailed in supposing that the atmosphere breathed by the men and horses over the salted streets is *greatly colder* than that which they inhale on the *unsalted* thoroughfares, the tables showing that, at an elevation of three feet above the ground, there is no appreciable difference between the temperature of the air resting over the salted snow and that of the snow alone. That the air *immediately in contact* with the salt and snow mixture is a *little colder* than that resting upon the snow itself, no one will doubt, but so little is the air a conductor of heat, that this small difference of temperature does not, as proved by experiment, extend to any considerable distance into the upper strata.

In regard to the point about which there may appear to be some difference of opinion, I would here reiterate the statement already elsewhere made, with a word of explanation, that so far as the admixture of salt with snow really cools the atmosphere immediately adjacent to it, an effect at most but very limited, so far does it tend to *condense*, and thus abstract the moisture which that atmosphere contains dissolved.

If then a portion be condensed, it must hold *less moisture* than it did before, therefore, it is *less wet*, *less damp*, in other words it is *drier*.

As the question is a *practical one*, these terms should be employed in that sense alone. An atmosphere to be wet or damp must by *common interpretation* be capable of communicating wetness or dampness to bodies in contact with it, and to do this, two conditions are requisite, the one, that it be in the language of the meteorologist, saturated, that is the "dew point," and the temperature of the atmosphere must correspond; the second, that *that saturated atmosphere be warmer than the objects which it surrounds*.

It is, therefore, evident that in the case under consideration, the air, resting on the snow and salt mixture being *colder* than animals and the garments of persons, it cannot give to them any of its moisture—it (the air) cannot be to them *wet* or *damp*.

In conclusion, I would submit the following summary of what I regard to be the established points connected with this vexed question.

That salt does not itself volatilize or evolve either of its constituents, and being an antiseptic, or correction of putrefaction, *tends so far as it exerts any influence*, to preserve the atmosphere over the salted thoroughfares *pure and salubrious*.

That the practice of salting the railroad tracks is attended by the production in the liquid and semi-liquid mixture, of a temperature *not more than a few degrees colder than that of melted snow*.

That the use of salt, while it accelerates the thawing of the snow, likewise, by forming a solution less readily frozen at night or in cold weather, than simple snow water, *promotes and greatly hastens* the drainage of the city, and thereby in pro-

portion curtails the period to which the feet of persons and horses are subjected to the cold. That this depression of temperature is *only temporary*, and continues just so long as the snow is melting. The solution when once formed obeys the law of all other liquids, and may be warmed by the sun or other influences.

That the atmosphere at the elevation above the surface at which men and animals on the street breathe it, is not rendered *perceptibly colder* by the use of salt.

That so far as there is any *hygrometric* change produced in the air, the effect of salt is to render it more free from moisture, practically drier. This effect is at most but small, and only occurs near the surface of the cold mixture.

That leather is penetrated by salt and water less readily than by pure snow-water, and in consequence of the very small percentage of salt present, is not, when wet with it, sensibly more difficult to dry than when wet with pure water alone.

The erroneous impression which widely prevails that salt, as used in the streets, greatly promotes the absorption and retention of water by leather, is derived from the fact that, at the *sea shore*, shoes often remain damp, and are at times prone to moldiness upon the surface.

The cases are *not analogous*. The water of the sea is not merely a solution of *common salt* but contains likewise along with other ingredients *chloride of magnesium*, a substance which is remarkably *hygrometric*, or disposed to absorb moisture from the air. Besides, the air, itself during the prevalence of winds from the sea, is often so loaded with moisture as to explain, in itself the excessive dampness experienced.

That there is nothing corrosive in the solution of salt and water, nor any specific power to rot or disintegrate leather or fade colors.

In making this communication, which is intended as testimony chiefly on the scientific points involved, I would not have it understood, that I either ignore or undervalue the importance of that attention which it is the duty of the railroad companies to bestow, to keep the crossings clear, and to provide adequate outlets at intermediate points along their tracks for the escape of liquid accumulations.

On the contrary, I believe that much of what has been said in extenuation of the practice of "salting," depends upon their being a correspondingly free drainage.

I am, very respectfully, your obedient servant,

R. E. ROGERS, M. D.

(To be continued.)

#### Car Decoration.

Those of us who can remember a few years back, and call to mind the growth and change of car decoration, during twenty years, many perhaps ask themselves what we are drifting to in this direction. There was a time when light colors and curved mouldings were the only things "proper," and the ceilings were of various styles from jumble-esque to mixtoidal. Hard woods were religiously filled, painted, rubbed, and varnished, lest the too curious traveler should see that the Almighty had presumed to put a grain in wood. Rare and strange flowers lolloped all over the canvas; red tailed birds with marvelous purple crests hung horizontally in a lavender colored sky, and spread their yellow wings and displayed their sea-green breasts to the admiring gaze of beefy but boneless cherubs, who were engaged in weaving endless and useless wreaths and garlands, from trailing branches of endless length and great uniformity of leafage. The skilful application of grindstones and upper disks to glass, with a red or blue veneering, produced pineapples scarcely less prickly and uninviting than thistles, and fat comfortable nettles growing on the same stalk as

the classic acanthus, the civic oak, and fame's own laurel.

All this has changed.

Outside the cheerful canary and the honest though ugly buff have given place to hybrid olive and funeresque maroons.

Within, ash and butternut, cherry and bay, are Queen Anned and Eastlaked, graved; gouged and gargoyled; chamfered and daveled, filled and varnished "flat." Monochrome ceilings rest the eye. In some places, wicker-work overhead racks, more tasty than the brass bird cages which they supplanted, certainly give one the impression that if the car upset they wouldn't cut you very deep—at least not "on de bias, so 'twon't nebbber heal up."

And so through, around and over the car and its decorations—there have been some changes and some improvements, but the end is not yet; unity is absent; harmony seems to hate traveling; and the "eternal fitness of things" is largely unattained in car decoration.

We want to put more brains and less money in this line.—*Journal Railway Appliances.*

#### On. Title.

The publishers of this paper had so far decided to call it "the tramway," that they had the design for a heading prepared by an artist; but the prevailing opinion seemed so strong against the title, that the name was changed to the present one, more especially as the matter, though an unimportant one to us, seemed to be considered a serious one by the National Association. This latter body, had, in fact, requested another railway paper to change the name of one of its departments from "tramway" to STREET RAILWAY. So it may perhaps, be considered as settled that there are, officially, no "tramways" in America. In this connection, however, let us say that the prejudice against the word "tramway" is far from universal on this side of the water, even in quarters where Anglophobia is most pronounced.

In this connection we may say to those who object to the word "tramway" simply because it is English, that street railway men are largely responsible for the introduction of the word "railway" in America, instead of the word "railroad."

"Consistency, thou art a jewel."

#### Salting.

We think that this will be the last year that municipal corporations will try to stop track salting. Perhaps in the not distant future they will make it compulsory. Aldermen and Councilmen are strange beings.

#### Annual Reports.

The season for annual reports draws nigh, in fact, is at hand. We hope that the "crop" for '84 will make a favorable and satisfactory showing. We should take it as a favor if officers would see that we get early copies of their reports when issued.

#### Teaching Conductors to Steal.

We hope to have something to say at an early day upon the subject of the action of passengers in teaching conductors how to steal, and encouraging them in their peculations.

#### The Convention Reports.

In reply to numerous inquiries we have to make a general statement: that as the American Street Railway Association decided to exclude all reporters, except its own official stenographer, from the recent convention, and to limit the publication of reports and discussions until edited by the Secretary, we cannot give in this issue any part of any of the discussions on reports except that on salting.



- THE -  
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**Editorial Notes.**

THE number of subscriptions received for the STREET RAILWAY JOURNAL since the issue of its first number, and the words of commendation accompanying many of them are very gratifying to the publishers. If the subscriptions continue to come as they now bid fair to, our subscription list will soon be a tolerably good directory of the street railroads of the country, giving not only the general officers, but in some cases a dozen or more foremen, etc., as well.

WOULD it not be a good plan to see that the STREET RAILWAY JOURNAL reaches some of your foremen and other leading men, as well as the officers of the company?

SUBSCRIBERS to the *Journal of Railway Appliances*, who wish to transfer their subscription to the STREET RAILWAY JOURNAL will please write us to that effect. There are quite a number of names on the list of the former paper who took it on account of its street railway department, and who would now prefer the STREET RAILWAY JOURNAL, but we are not in all cases able to distinguish such, and would be glad to have them write us.

WE shall esteem it a great favor if our readers will notify us of changes on the roads with which they are connected, or of which they have knowledge. Such for instances as changes in officers; extension of track or addition to rolling or live stock, either made or to be made, and in short everything of interest, especially if you know of a proposed road. But don't assume that it requires some event of great importance to warrant your writing, *we want to hear from you.*

**Coming Articles.**

In coming issues of the STREET RAILWAY JOURNAL, the Reports and Discussions of the National and State Association Conventions will appear regularly. There will be plenty of short news items from all over the country, and, among other things, editorial and communicated articles about Car Painting, Heating, Lighting and Ventilation; Best Form and Material of Rails and Best Mode of Construction of Track; Grinding Wheels; Independent vs. Rigid Wheels; Choice and Care of Stock; Car Starters; Fare Collection; Motors and the Cable System; Shoeing Horses; The Refined Habits of the Louisville Street

Railway Mule; Humorous Incidents of Street Car Travel; the Kickers' Column (a sort of "Lion's Mouth" for memoranda concerning faults and abuses). All subjects considered by the National and State Street Railway Associations will be discussed editorially; and our columns will be open to communications from Street Railway men all over the country.

**Our "Kicker's" Column.**

We have already announced our intention to maintain our editorial independence, and while offering good will to all, to express at the same time our candid opinion on all subjects which may come to us for notice. We give the street railway interests credit for fair-mindedness and common sense, and are perfectly satisfied that they are willing to hear objections and acknowledge faults. No one would attempt to say that street railway service and methods could not, in some instances, be improved. These faults are, in most cases, trifles, but everything worth doing at all is worth doing not only well, but perfectly. Trifling faults are the most pernicious, because usually the last to be corrected, yet we have the word of a great master of trifles that "Trifles make up perfection, and perfection is no trifle."

Our "kicker"—omnipresent—always on the alert, will give his attention to these trifles, criticising with unsparing pen, where criticism is deserved, and commending where praise seems merited. On the other hand, we feel convinced that those criticised will take his comments (which will be *rigidly impersonal*) in the spirit in which they are made, and will heartily support his efforts to enhance the value of "trifles."

**Which Side of a Tie Should Go Up?**

[The following editorial from the Track Department of the JOURNAL OF RAILWAY APPLIANCES should prove interesting to those of our readers using timber for either cross-ties or stringers.]

There is one question on which there is a great diversity of opinion, although there are very few reasons adduced as to why one opinion or the other is formed, and that is whether the heart or the sap side of a tie should be laid uppermost; and in this we think our readers ought to be considerably interested, and might with great advantage exchange views, *with the reasons therefor.*

Opinions are plenty, but reasons, facts and figures scarce. In looking over the reports of a meeting of road masters on a well-known line, we find one claiming that "the heart side of a square sawed tie should be turned up in all cases, for the reason that a tie sawed in this way will warp to the heart, and if heart side down will make loose tracks and be difficult to keep in line or surface." Another gives us a reason for putting the heart side next the rail, that "when the timber is dry this is the rounding side of the tie, and being the hardest part of the timber is the best side for the rail to rest on, and will hold the spike the best." A third says that "the sap side would better be turned down, as ties rot first on top." A fourth calls for the sap side up, because "the sap side, when it becomes seasoned, throws off the water much better than the heart side." A fifth says (and this man is a "timber man"): "Take trees that will face 7 to 10 inches, and I do not think that it makes any difference in the durability of the tie, if it is properly hewn and so laid heart down or up. I do not think it makes much difference which side is up; I do not see why it should. \* \* \*

A tie never seasons after it is laid in the ground; it will never season so as to check more on one side or the other. The durability is in this—that is, in having the back taken off."

Number six wants the sap side up, "be-

cause it checks from the heart and the water runs in."

And number seven says: "It is owing a good deal to the time when the timber was cut. In our country a good many cut their timber in the spring, and all the logs are either split or sawed, and in two or three months in summer you find two or three inches of sap rot that is not fit to go up under the rail, and you have got to turn it down to get some good part of the tie. What I claim about turning the heart down is this: if the tie be cut at the proper season of the year then the sap side of the tie would have no sap in it. The reason for turning the heart side down is that it will rot more quickly than the other side. Whether it is best to turn the heart side down or up is all owing to the time when the timber is cut. We buy timber at all seasons. When you cut large oak down in the spring just one-half of the life of the timber is gone on account of the sap being in it. Big heavy timber should not be cut in the spring."

The economical side of the matter calls for expert judgment; whether it pays best to get a longer life, or to hold the spikes better; and here comes in the opportunity for keen appreciation and wise balancing of the comparative and actual values of each advantage and disadvantage.

We hope that this question may interest our readers and call forth some expressions of opinion.

**Jottings.**

THE best pavement between the rails—upon which the animals appear to travel with greater confidence and less fatigue than any other possessing the requisite firmness and durability—is said to be one of rather small cobble stones laid with a slight inclination from the centre towards the rails. The top of the pavement should be of the same height as the adjacent edge of the rail. Horses should be shod with flat shoes, rather broad at the heel and without calks. The frog should not be cut away, so that a portion of the weight shall come upon it when even the animal treads upon an even surface. Horses on the Brooklyn City R. R.'s travel an average of 16½ miles daily. The average rate of speed on the New York City R. R.'s is from 6 to 6½ miles per hour, including stoppages.

A CAR weighing 4,000 lbs., carrying 28 passengers, would require the exertion of a force of 68½ lbs. ( $\frac{8200}{130}$ ) to move it upon a level rail at a low speed.

By far the larger proportion of street cars used in the world are of American design and construction. The present tendency is to build cars light, thus economizing the dead weight to be hauled.

DOUBLE-DECKED cars are largely used upon the street railways of Europe. Such cars usually seat 22 passengers inside and 24 outside, and weigh about 5,000 lbs.

ONE-HORSE cars are said to be more economical in use and to cause a saving of time of about 15 per cent. over two-horse cars.

A HORSE can draw on a good stone tramway road a load 11 times as great as he can move with the same effort and the same speed on an ordinary gravel road. The force of the draught being only 1-189 of the load in the first instance, while in the second it is 1-16th. Even upon a very dry and smooth Macadamized road in its best condition, the traction power required is 3½ to 4 times as great as upon a firmly supported tramway.

F. G. B.

**Notes.**

THE Cincinnati Street Railway has put in ten sets of Vose's new steel Cone Springs. The Cincinnati Inclined Plane Railway is also using the spring, and speaks very highly of it.

THE Globe Street Railway, Fall River, is putting on a number of new cars.

### The Pronunciation of "Advertisement."

We were "brought up" to say advertisement, but got switched off to pronouncing it advertisement about half the time. On consulting the "booktionaries," we find that Perry, 1805; Smart, 1857; Cooley, 1863, and Cull, 1864, give the word as our home instructors of Lancashire English predilections started us. But Webster, 1864; Walker, 1806; Knowles, 1845, and Worcester, 1860, give both pronunciations as allowable; although every one of these last give advertisement first.

The word advertise is given with the accent on the last syllable by Webster, Perry, Walker, Knowles, and Cull. Smart and Cooley put the accent on the first syllable only, with a long *i* in the third syllable, and couldn't pronounce it that way to save their tongues. Worcester puts the accent on either the first or the third, and Cull on both, and the latter gets our vote.

### Comments of our Kickers.

— Every time I pay six cents on a Philadelphia Street Railway, I feel myself defrauded to the amount of one cent. A cent is not much to me, but it is an unhandy coin, and when I hand out a dime I get four of these awkward discs of bronze to carry about in my pocket. They won't buy anything but stamps or newspapers, and I take the latter by the year and the former I buy in quantity, and the principle is what galls me most of all.

— Street cars will stop anywhere for any one in Philadelphia and some other towns. This is unfair for horses, passengers and drivers of other vehicles. Better the Chicago rule; stop only at the further side of street crossings. The lady who is too tired or too sick to walk half a block ought to stay indoors till she recovers or gets rested.

— The Allentown, Pa., street cars are very dirty, and usually "funky." Soap and water don't cost much and it should be remembered that "cleanliness is next to godliness," especially in cholera seasons.

— Opinion is divided between those favoring car windows to raise, and those favoring the pattern which drops. The question can be settled by coaxing the drop-window crowd to ride in one of their favorite cars on a right cold day. It will kill off the whole generation with congelation of the spinal marrow.

— The People's Co. (Philadelphia), uses disinfectants liberally about its depot. My comment is hearty endorsement.

— The Union Line (Philadelphia), charges six cents fare, and sells five tickets for thirty cents; wherefore the tickets? Same comment applies to all but three Philadelphia companies. P.

— When a conductor will not stop the car at West Warren Street, but insists on carrying me in a driving rain, some eighty or a hundred feet further, to Warren Street crossing, I can bring him to a stop in just twenty feet, by ringing in fares on him at the rate of 35 a minute. This is calculated so:—Velocity of car, eight miles, or  $5,280 \times 8 = 42,240$  feet, in one hour or  $60 \times 60 = 3,600$  seconds; that is,  $42,240 \div 3,600 = 11.73$  feet per second, then as 20 is to 11.73, so is 60 a minute to 35 and a small fraction. How beautifully science aids us in our daily affairs!

— It might not be a bad idea for conductors to be furnished with tarred-ended sticks, with which to fish pennies out from between the cracks of the wooden mats on car floors.

— In Wilmington, Delaware, there was at one time a director of the city railway, who was in the habit of collecting cash car fares (seven cents) in the "bobtail" cars, and depositing tickets (20 for a dollar.) "How doth the Little Busy Bee," etc.

— Is there any particular use in having a car stop at No. 369, and then again at No. 375, on an up grade?

— "Kid-knockers" are needed on many lines. They prevent children from getting under the wheels, and often save the car-horses from serious injury.

— In some cities the centre bearing rail is the one allowed, and in others, it is absolutely prohibited. Is there not a good deal of whichness in this howness?

— Rubber covered steps are desirable in icy weather.

— The man who jumps backwards off a car, and thereby falls on his what-do-you-call-it, should be run over by a dray and put out of the world where his example does harm.

— How many conductors are lead to steal, by old drivers?

— On some lines, the old diphtheria-laden straw litter is still used in cars. That is the only thing good that I can see in the car store—it renders the use of straw impossible.

— Don't you think that drivers would see more passengers if they had nice warm "mitts" on?

— You can rest assured that if it costs a man \$12 a week to live, he will not be both honest and over-active if you pay him only \$10.

— They say that if the East New York and Bedford night cars down, on the Fulton Street Line, Brooklyn, were just two minutes earlier, they would connect every time at the City Hall with the Court Street Line. It might pay somebody to cipher this out so that passengers would not be exasperated by seeing the hind green light about ten blocks ahead on Court Street. Both the Fulton Avenue and the Court Street lines lose night fares in damp weather on this account. "All of which I saw, and part of which I was."

— What redress is there for the countryman who puts his fifty cent piece in the box in the bobtail car, and has to whistle for his change?

— In Camden, N. J., the City Railway people are pious—at least they keep Sunday. From the fact that Sunday is about the only day that most Camden people have for exchange of family and friendly visits, I'm inclined to think that the piety is enforced on the street railway men.

— Car steps should have a back guard where the riser would be in a regular stair case. A passenger is liable to put his foot through and get his ankle broken or his head thumped.

— Has a thin man any rights that a fat woman is bound to respect? It's no fun to be "sat upon," as often happens, by a 340 pound sylph.

— How pleasant it is to have your face wiped by an umbrella in the hands of some one who has stacked it (the umbrella, not his hand nor your face) in the space where the window sash goes when the window is opened.

— The conductor who objects to taking all pennies for two six cent fares is apt to get nothing but pennies so long as this kicker rides in his car, which he does pretty often.

— Who should decide whether or not a silver piece is too smooth to pass? I've had conductors refuse to accept smooth pieces, and others insist on giving them in change. It would seem to me that the recipient should have the say in all cases.

— Has a driver any right to insist on receiving a fare before the passenger has ridden ten feet in "the wrong car" simply because he rang the fare up when the passenger touched the platform? Strangers unfamiliar with car-lines are just as much entitled to protection as though they needed none.

— Who shall decide whether an over-sized eleven-year old boy is or is not entitled to ride for half fare? Must the boy carry a birth certificate with his photograph, attested each year by his pastors and masters?

— Hasn't a woman a right to nurse her baby in a crowded car? Has a conductor the right to suggest that the meal be de-

ferred in consideration of the mixed character of the load?  
W.

### Colors versus Oils, Dryers & Varnishes.

Take it in general, the manipulator of the above has very little or no knowledge of the chemical combination of the articles he uses, nor does he know anything about the chemical reactions, oxidation or decomposition of the same, and that through these almost all difficulties arise.

All colors, oils, dryers and varnishes should be divided into two classes: firstly, those containing sulphur, and secondly, those containing lead.

It is an old established fact, that whenever sulphur and lead become closely combined, they will form black sulphite of lead; and through the chemical action taking place, destroy the color crumble it down and separate a part of its constituency. Thus we find a white color—for instance, white lead if mixed with linseed oil, boiled with sulphate of zinc or sulphate of manganese, or a dryer containing any compound of sulphur turn yellow, crack and decay while had they been mixed with an oil dryer or varnish containing a manganese and lead complication, the action of the sulphuret of hydrogen could not have taken effect; at least not so soon.

Some of our best and finest colors contain sulphur; as for instance, cadmium yellow, vermilion (sulphate of mercury), sulphate of indigo, etc., and it is especially these colors which are the most brilliant used by painters. If these colors are mixed with an oil or dryer, or covered with a varnish containing lead, they certainly must go to pieces; for the sulphur will unite with the lead and form black sulphite, and through this will darken the color, or change it and destroy the luster.

It is often the case that a painter can work a certain color with one dryer, while he cannot begin to use it on another. This is simply because the one or the other color contained the opponent ingredient of the dryer used with it, and the sulphur or lead will unite, and the color instead of liquefying becomes thick as mud.

The same might be said of varnishes.

There is no doubt but every respectable house in the country manufactures good varnishes, which are appreciated and liked, where they are used on the articles and colors for which they were intended.

It is very often the case, that the poor varnish manufacturer is pounded down by reason of the want of chemical knowledge of the consumer of paints, oils and varnishes. Too often the dullness and cracking have nothing to do with the varnish, but lead and sulphur do it all.

Take for instance vermilion (sulphite of mercury) and its compounds, colors largely used by our different manufacturers. Why is it that so few varnishes will stand the test to retain color and brilliancy? Simply because they are destroyed by combining them either with other colors containing lead or with a dryer containing lead, or are mixed with a coloring varnish containing lead, or are finished with a finishing varnish containing lead.

The painter stands dumbfounded, and don't know what in the world did the mischief, for nothing but the lack of the knowledge of the different actions of one color, dryer or varnish on the other.

Therefore I would say:—

That all dryers and varnishes made with oil boiled with any lead compound are not fit to go on a color compounded with sulphur, and *vice versa*.

To be on the safe side, it is better to use neither one, but to adopt the so-called liquid manganese dryers.

They will mix with any raw oil, do not alter the colors, and are the best guard against the action of sulphuret of hydrogen.

W. ZEISS.  
Akron, O. Practical Chemist.

**Cracks in Varnish.**

ED. JOURNAL RAILWAY APPLIANCES:—

We have not (and do not now) manufactured varnishes for some years, and therefore have never had the question regarding the cracks presented to us. We should say, however, that the varnish-filling in the pores and grain of the wood has a certain reserve to draw on when it comes to any expansion, while laterally there is no such reserve, and the cracks are formed in consequence.

D. F. TIEMANN & Co.

New York.

**Cost of Working English Steam Tramways.**

Engineering gives the following particulars of the working cost for twelve months of the engines referred to, in use on the Dewsbury Tramways, where they have been running for the past 4½ years. The line is equipped with nine Merryweather engines:

	Cost per Mile run.
Coke .....	0.72
Oil and waste.....	0.11
Water.....	0.02
Firewood, etc., for lighting...	0.02
Locomotive repairs.....	0.59
“ drivers.....	0.83
Coke, watering and relief man.	0.11
Cleaners.....	0.17

Total cost of working per mile 2.57

Our exchange believes that these figures are the best yet shown by any makers of steam tramway locomotives, and says: “It will be noticed that the renewals and repairs only amount (after over 4 years’ work) to 5 per cent. per annum on the cost of the engines. It may be interesting also to note that the weight of coke consumed throughout the year has averaged 6.54 lb. per mile run, the number of miles traveled being 141,065.”

**Personal.**

— R. J. Wylie, Superintendent of the Forty-second Street, Manhattanville and St. Nicholas Avenue Railway, was for two years identified with the Cable Railway in Chicago.

— H. C. Simpson, Secretary of the Lewis & Fowler Mfg Co., will make a western trip about the first of January, taking in Pittsburgh, Columbus, Cincinnati, St. Louis, Chicago, Kansas City, St. Joseph, Omaha and Denver.

**The Hind Roost.**

In these days of heated cars, many persons find the rear platform more comfortable than the inside of the car; and, in fact the crowded condition of the cars at many times makes platform riding a necessity. This being the case, the action of these companies is commendable which give a four inch strip as a cover for the hind rail instead of compelling the open air passengers to sit on “hex” nuts.

**Frequent Stoppages.**

In our “Kicker’s Column” is a squib about frequent and unnecessary stoppages. Unreasonable passengers who call for stoppages every ten feet, especially on up grades, should be made to know that their selfishness, causes suffering and fatigue to the horses and loss of time to fellow passengers, to say nothing of the loss to the company. Just cipher it up and see how much shorter trips could be made with stoppages only at crossings.

**Varnishing.**

About half the trouble in car varnishing comes, not so much from purchasing poor varnish, as from improper care and unskilled use of what varnishes are bought; putting a fine grade on top of a cheap grade having different expansion and contraction under heat and cold, and so on. The varnish maker gets blamed in such a case as the last-named, because his varnish, warranted better than lower grades which had been used before, does not show up as well as when the last coat was of the cheap grade and just like the under coats.

**Hughes’ Car Gate.**

In the side wall of the car in a plate is inserted a series of tubes. The openings in the plate are made smaller in diameter than the tubes to prevent the bars from being drawn out. A gate, composed of the bars projecting through the end wall of the car into the tubes and secured at their outer ends to a vertical bar, is capable of sliding in or out over the car platform. The ends



of the bars have rollers to steady them in the tubes, and the vertical bar is provided at its lower end with a roller, which rests upon the car platform and supports the outer end of the gate. The openings in the plate, through which the bars slide, are made smaller in diameter than the tubes to prevent the rollers from being drawn out.

When the gate is closed the bars are partly withdrawn from the tubes, and when it is open the bars are pushed into them. The gate has an eye capable of being engaged by either of the hooks attached to the end of the car and to the platform rails to hold the gate in either an open or closed position. A cord, secured to an eye in the upper end of the bar, extends under a pulley attached to the side of the car and over other pulleys, which bring it within easy reach of the conductor or other person near the door of the car. By pulling this cord the gate is opened.

The patentee \* claims that “this car gate will not open by lateral pressure, consequently no accidents can happen from crowding against the gate. It is applicable to street and railway cars, platform exits and entrances from and to cars, and can be applied without material change in the cars or in the building.”

\* Dr. C. H. Hughes, 3000 Chestnut St., St. Louis, Mo.

**Notes.**

— The Third Avenue (N. Y.) Cable Railway is being rapidly pushed towards completion. A large quantity of the iron work such as that for carrying the rails, elevating sheaves, crossings, curves, etc., is being furnished by Andrews & Clooney, N. Y.

— The Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Company’s lines, when all complete, will be as follows: 42d St., East and West; East 34th St. Ferry to First Ave., to 42d St., to Seventh Ave., to 45th St.; Broadway to 59th St.; Boulevard and Manhattan St. to Bull’s Ferry; West 34th St. Ferry to 12th Ave., to 42d St., to 10th Ave., to Manhattan St., to Bull’s Ferry; 109th St. at East River, to 1st Ave., to 110th St., to St. Nicholas Ave., to Manhattan St., and Bull’s Ferry, 34th St. East and West, 42d St., 110th St. and Broadway and Boulevard Lines are now complete; 600 men are now engaged in constructing. The 34th St. track will be laid in the spring. Iron work is furnished by Wm. Wharton & Co., Andrews & Clooney and Z. S. Ayers.

— The 42d Street, Manhattan & St. Nicholas Avenue Railway now have 25 cars running; are about adding 25 more, and will, soon after the first of the year, have 80 on the road. All are built by John Stephenson Company, have super springs, White wheel, and are first-class in all respects.

— Andrews & Clooney, New York, have a new graduated spring running on several of the roads which, it is claimed, is a success. It is said to carry the cars more steadily without the ducking motion so common, and to ride equally well with empty car as with heavy load. A. & C. report good orders on hand, and the outlook for the coming year flattering.

— The Broadway & Seventh Avenue road is putting on forty new cars built by Stephenson, thirty of which are to replace old cars.

— The 42d St. & Grand St. Ferries Railroad has, during the past eighteen months, put on 30 new cars, 15 of which were built by the John Stephenson Co., and the remainder at its own shop. Other cars are being rebuilt in the Company’s shop.

— The Kansas City Cable Railway Co. has just placed on its road ten grip and ten passenger cars, built by Stephenson. They have super springs and ventilating ceiling.

— The John Stephenson Company, N. Y., have in hand large orders for different parts of South America, including four different cities in Chili. Of the first-class cars now built at these works, about nine-tenths are fitted with the super spring, and a large proportion with the perforated ventilating ceiling.

— W. Jennings Demorest, N. Y., has a factory in Norwalk for the manufacture of his fare-register and other railway supplies, including a registering punch, etc. It is claimed that his duplex register accomplishes the same without the paper dial as other registers, and admits of using the permanent record dial at any time desired.

— The Troy and Lansingburg Railway is re-laying tracks with steel, and will double portions of its track as soon as permission can be had. Six open cars have been ordered for the new Green Line of this Company.

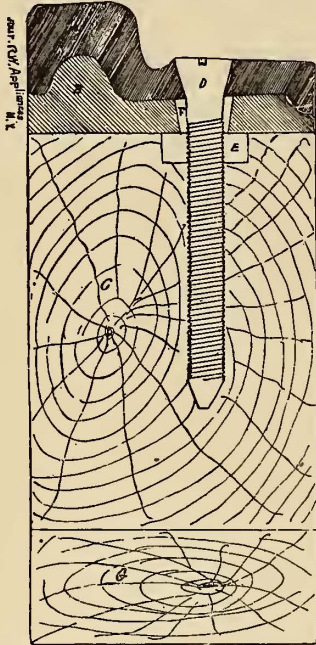
— The Troy and Lansingburg road will gain considerable new business on account of a large roller skating rink now building in Lansingburg. The company will issue tickets to the rink, and it is understood the enterprise was very materially encouraged by stockholders in the company. There may be in this a suggestion for other roads, which may be able to engineer similar enterprises to their profit. Other cases

**Railroad Joints.**

[Read before Wisconsin Society of Engineers, Sept. 2, 1884.]

The editor of the *American Journal of Railway Appliances* wrote: "A recent caller complained that he could not get any satisfaction out of the ordinary tram-rail 'joints,' that they were unstable and caused battering of the rail ends and uneven riding of the cars.

"We were not aware that on many of our tramway lines there was such a thing as 'joints' in the rails. There are periodical breaks or spaces or interruptions or something like that, but on careful examination and recollection we do not find anything which would justify us in swearing that there were 'joints.' The alleged joints remind us of a story concerning a certain

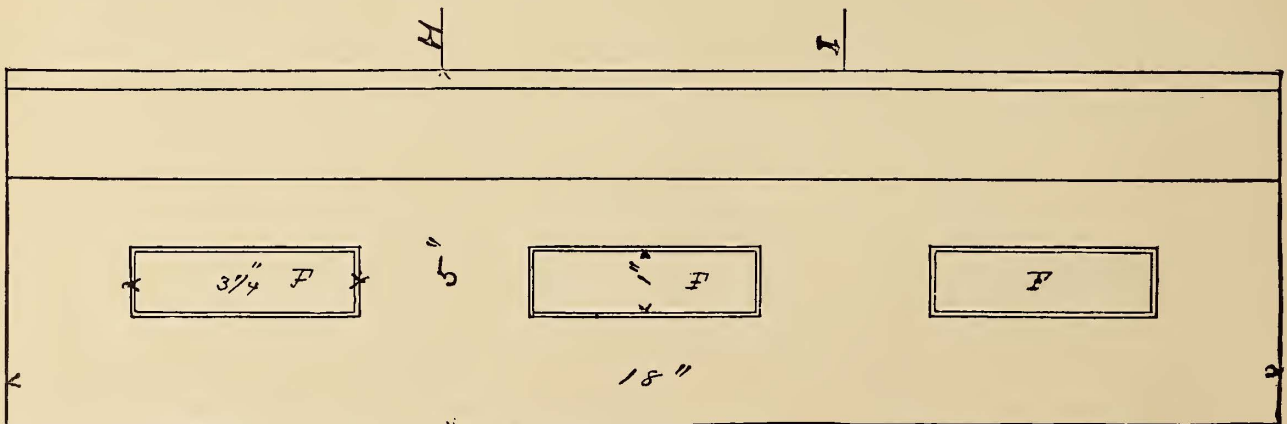
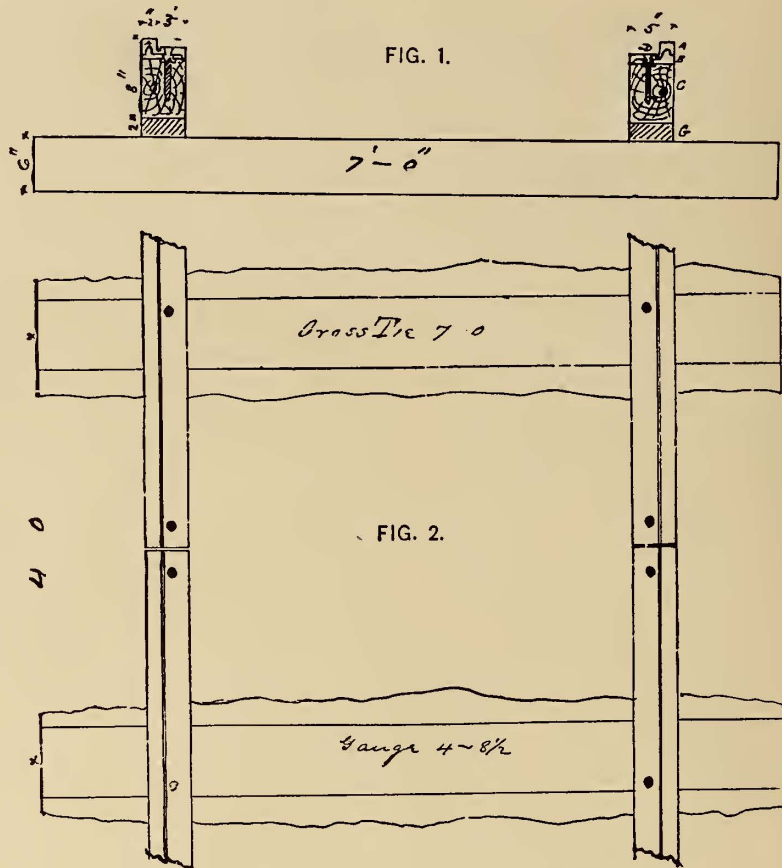


member of the theatrical profession, who was what is technically called by his fellows a 'barn-stormer' of the 'wild and terrible' variety. This individual was a witness in a legal case. Upon being sworn and asked his name he gave it as christened;

speaks of the practice then in vogue, of putting plates under the strap-rail joints. The specifications for track laying on the Utica & Syracuse R. R., contained the following: "As each joint of the iron plate (rail) end plates shall be neatly fitted into the oak ribbons, so as to bring their upper surfaces in the same horizontal plane, the end plates shall be six inches long, 2 1/2 inches broad (same width as rail) and 1/4 inch thick." This was prior to 1843.

When "street railways" for passenger service were inaugurated by the construction of the New York & Harlem, in the city of New York, 1832, operated by horse power and laid in the street, it at once

each other, and the latter the stringer and rails. The common practice in this country has been merely to spike the joints, through suitable openings in the chairs to the stringer beneath. If carefully laid this would give a reasonably smooth joint for a time, but the weight of the loaded car would press down the end of the rail upon which it rested, and no weight being upon the other rail end it would project a little. The wheel striking against this projecting end, deflects it, and bears a trifle from off the top of the chair and the bottom of the rail. This action taking place upon the passage of every car wheel soon makes a "bad joint." The chair I now show you



and when asked his profession he replied, 'I am an actor,' upon which every one of his comrades shouted by preconcerted arrangement, 'Perjury! your Honor! perjury!!' There is no good method known to us, by which the common flat street rail can be given a good, real substantial, durable, smooth acting joint."

I have given much study during some years to this question. The ordinary practice of our street railroads is practically the same that was introduced upon steam railroads with the use of "strap-rails" laid upon wooden stringers. Stevenson, in his *Civil Engineering of North America*, 1838,

became evident that to protect the general public in the use of the street, the rails should be low and offer as little obstruction as possible to the passage of vehicles. As other street railways were built the shape of the rail was fixed by ordinance. The rails have been designed, in the majority of instances, to serve merely as a protection to the timber substruction. They vary in size and shape, and joint chairs are made to correspond. When the bottom of the rail is flat, plates of sheet iron have been used at joints. Also chairs of cast iron, with tips on each side, top and bottom. The former to hold the rail ends in line with

was thus worn one quarter of an inch in four years. The spikes become loose almost from the start and rapid depreciation follows. To avoid these discomforts to the passengers, rapid destruction of the rails, wear and tear in rolling stock and horse flesh, different remedies have been proposed. In foreign countries, bolts have been used passing through the rails and stringer with a washer and nut on the bottom. Another fastening consisted of a "staple" driven into the side of the stringer, one leg passing through a suitable opening in the side of a specially designed rail. A little reflection will, I think, con-

vince you of the inutility of such joint fastenings. In the first place, unless the timber is thoroughly seasoned, it shrinks. Condit, in his work on painting, quotes the measurements of Karmasch in Germany on percentage of shrinkage of timber in seasoning. In the direction of yearly rings "pine" shrinks from 5.5% to 12.7%, white pine 4.1% to 8.13%. If no other objection existed to the bolt this would suffice, for very little, if any, track timber is thoroughly seasoned and the shrinkage will loosen the fastening and allow a little play at the joint to be soon increased by wear; but as all track men know, the water falling upon our tracks consisting of rain, sprinkling, etc., etc., follows along the flat "train-rail" until it reaches a rail joint, when it soaks through. The recess cut into the stringer for the chair beneath the rail joints, seems to retain this moisture and *this* is the first portion of the stringer to become soft and rotten. The load upon each wheel of a street railway car, upon "rush trips" at times equals *three tons*. This great weight forces the chair into the wood. If an ordinary spike has been used to fasten the joint, it does not follow, and the joint is then loose. This is also true of a bolt passing through the stringer with a nut beneath. The carpenter, who cuts into the stringer for the chair, may adze true and level, and the chair be "in wind" or have slight projections upon its lower surface, so that it does not take a firm bracing upon the wood until the weight of the loaded car wheel comes upon it. In such event, the joint will soon have play and rapid wear results. It has been proposed to fasten the rail ends to the joint chair beneath by short bolts, but this fastening bracing the joint unattached to the timber allows the whole joint to vibrate under passing trucks, and thus wear into the wood. The joint I have presented as the result of my investigation, is constructed as follows: The chairs may be of steel, wrought or cast iron. Those used by us were made of cast-iron, they correspond in width and shape with the bottom of the rail, 5 inches wide,  $1\frac{1}{4}$  deep under rail head, which is rolled hollow,  $\frac{5}{8}$  deep under train of rail 18 inches long. They are let into the stringer so that their tops project  $\frac{1}{8}$  inch, and two-thirds of their length is laid *against* the traffic on tracks, when the travel is all in one direction. The form of rail and corresponding chair is immaterial. *Under the chair*, two or more nuts are let into the top surface of the stringer flush with the latter, and beneath the holes in the rail ends. The chair is then placed on three nuts, through which holes have been bored into the stringer, less in diameter than the opening through the nuts for the bolt to pass. Suitable openings are provided in the chairs through which these bolts pass, long enough to allow contraction or expansion of the rails. The rail is placed on the chair and the bolt secured through the nut into the stringer. The nut securely fastens the chair and rail ends together and prevents wear. It is longer across the stringer than it is wide, so that the wood acts as a nut lock and prevents its unscrewing by traffic vibrations. The prolonged screw beneath the nut fastens the entire joint to the stringer. Beneath the stringer, between it and the cross ties at the rail joint, I put in a piece of timber two inches thick, same width as stringer, to compensate for the timber cut away for the insertion of the chair. This construction renders the joint fastening independ-

ent of all shrinkage in the wood. Should the chair sink from any of the aforementioned causes, the nuts beneath carry *both* rail ends with them and no jar results. The nut also forces the screw down into the solid wood, and no vibration can take place. This joint will add to the life of the rails, for they first fail at the joint. The manager of a large rolling mill told me he thought it would prolong the rail service 10 per cent. It will save horse flesh, requiring less power to keep a car in motion and less effort to start, for the car is most apt to stop at a defective joint. It will save the rolling stock that is racked and strained passing over bad joints with heavy loads; and lastly, it will add to the popularity of a railroad by affording increased comfort to its patrons. I have used it in our tracks and would be pleased to have you notice Fullerton Avenue or Garfield Avenue. The track rides as if constructed with one solid rail. My aim has been to provide a *BETTER joint*, for the various rails now in use without any expense that would be involved by changes in them. This joint fastening is inexpensive and easily applied. In the accompanying drawings, Fig. 1 shows a cross section of track; Fig. 2, a ground plan;

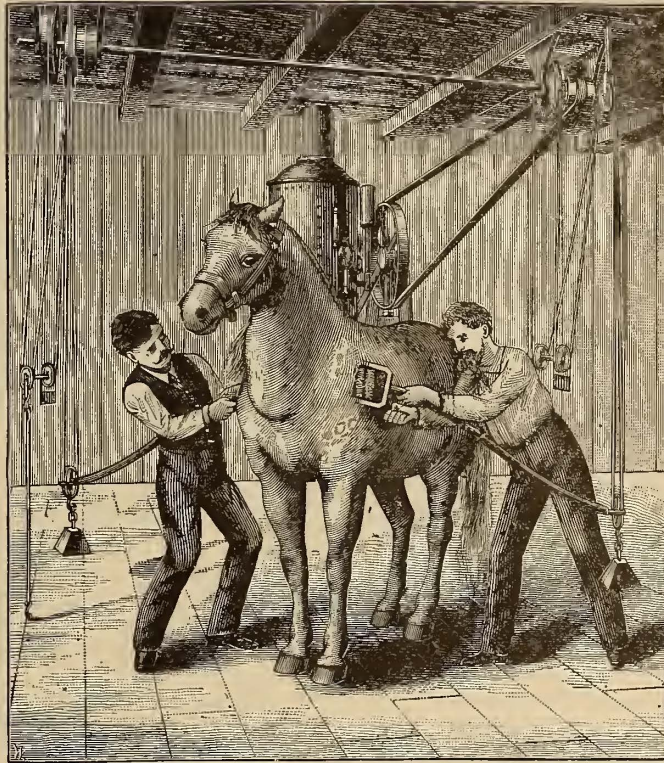


Fig. 3, top view of a chair; Fig. 4, section through the joint. *A* is the Chicago rail; *B* the chair; *C*, the stringer; *D*, the joint screw; *E*, the nut, fastening the rails to the chair; *F*, the opening through the chair for the bolt; *G*, the additional timber put under the stringer. In Fig. 3 the points *H* and *I* show where the rails join in the chair, the direction of the traffic regulating each of the tire points. This figure shows the openings through the chair *F*, for the fastening, allowing expansion or contraction of the rails.

AUGUSTINE W. WRIGHT.

#### Pennington's Grooming Machine.

The illustration herewith gives a very clear conception of a recently invented machine\* for grooming horses and cattle rapidly and easily. It consists of a cylindrical brush, held so as to revolve in a suitable frame, carrying also an actuating set of beveled gear wheels. Motion is communicated from a flexible shaft passing

through the central grip or handle shown in the cut, and actuating the gears, and through them a cross shaft, from which a small belt carries the motion to the brush. A second handle, attached to one corner of the frame, facilitates manipulation. The vertical spindle operated directly from the flexible shaft, carries two gear wheels, either of which can be made to engage with the wheel of the horizontal shaft, thus causing the brush to revolve at will in either direction. Motion is provided by hand, steam or animal power, as may be most convenient. As all belts are swung from loose weighted pulleys, and the actuating shaft itself is flexible, great latitude and freedom of motion and application are provided.

The flexible shaft is enclosed by a stout leather casing which is stationary.

\*Ellis Pennington, 204 Walnut Place, Philadelphia, Pa.

#### Rights of Street-Car Passengers.

A *Tribune* reporter mentioned to Lewis Lyon, President of the Third Avenue Railroad, the case of a man who had recently been fined \$10 for refusing to leave the car of one of the city companies, and asked his opinion upon it. The driver claimed that the man had not paid his fare, while he swore with equal vehemence that he had. Said Mr. Lyon: "The Judge must have been convinced in one way or another that the passenger's fare had not been paid. What safeguard have passengers against illegal ejection from street cars? Well, the practice on our line is this: We give our conductors the strictest orders never to turn a passenger out for non-payment of fare unless they can secure the testimony of two respectable witnesses to support them. We prefer to let a few rascals ride free rather than expose ourselves to possible lawsuits. There are some men who make a practice of provoking assaults with a view to bring suits for damages. It is the old cry: Anything to beat the corporations. If, however, a conductor should turn out a passenger for non-payment of fare and had no witnesses to support him, the jury would be obliged to decide whether they would believe the passenger or the conductor."

"What remedy would a passenger have who had been ejected after actually paying his fare?"

"He could recover whatever damages he could prove. It would be a case of assault, and the element of public disgrace and injury to the plaintiff's feelings might be used to swell the amount. There are some persons whose feelings become wonderfully delicate when they expose them to the scrutiny of a jury."

#### Car Decoration.

In future issues we shall treat of the question of car decoration, particularly as regards the production of a style and manner which shall combine beauty, appropriateness, durability and low cost. We shall show how it is possible so to decorate a car that there shall be a proper fitness and unity, and that the work shall not be expensive nor complicated, and that it shall be of a character which shall stand wear, tear and the action of heat and cold, wetness and dryness and their sudden alterations, as well as the gases peculiar to the street railway car stables or "barns."

could be sighted where the same thing is done successfully.

The Concord, N. H., Horse Railroad Co. is considering the purchase of motors to be used on the Penacook extension.

A new horse railway is under consideration at Gloucester, Mass.

Three leading lines of horse railway in Boston will reduce fares to five cents on Jan. 1st, and it is thought all other lines will adopt the same rate at that time.

H. M. S.

THE Susquehanna Avenue Line of the People's Passenger Railway Co. (Philadelphia), has been completed, and is equipped with 13 double team cars. (For route, see issue of Nov. 1884.)

THE Annual Meeting of the People's Co. (Phila.), takes place on the second Monday in January. The report will be a very favorable one; the increase for the year showing to date (Dec. 10th), an increase of 600,000 passengers carried over last year.

THE Philadelphia Traction Co's. car shops at 48th Street and Haverford Road, were burned on Saturday, Dec. 13th. All the machinery was lost (mostly new), and some cars in for repairs. Loss \$50,000, partially covered. Two of the new cars were burned, the rest being stored in a shed some distance away.

THE Hestonville & Mantua Co. (Philadelphia), is gradually getting into better shape, and it is currently believed that it will take but a short time to get the company back to its old fine condition. When accomplished it will be a fine business success; as, when the present owners took hold the road was worse than bankrupt, and no one ever expected to see it maintained in its integrity.

CABLE cars are running on Columbia Avenue, Philadelphia.

A NEW bridge is to be erected over the Schuylkill River, at Market Street, Philadelphia, wherein, we believe, provision will

be made for the conduction of the Traction Co's cable. This is possible in Philadelphia, the last draw-bridge being at South Street.  
G. B. H.

SYRACUSE (N. Y.), CITY RAILWAY CO.—Sanford D. Evans, for some ten or fifteen years Superintendent, died on the 4th inst., aged 71 years. Geo. Crampton formerly a conductor is elected to take his place.

THE Syracuse (N. Y.), & Geddes Railway has put on a number of new cars, laid new steel rail and made various improvements.

P. H. HERSEY of Hersey Brothers, manufacturers of machinery, South Boston, has been chosen President of South Boston Horse Railway Co.

THE Metropolitan Street Railway Co., of Boston has just opened a new line from Temple Place to Coolidge corners, a distance of four miles, cars every fifteen minutes; six cent fares.

## POWER.

A practical Journal devoted entirely to the Generation and Transmission of Power. Specimen Copies Free.

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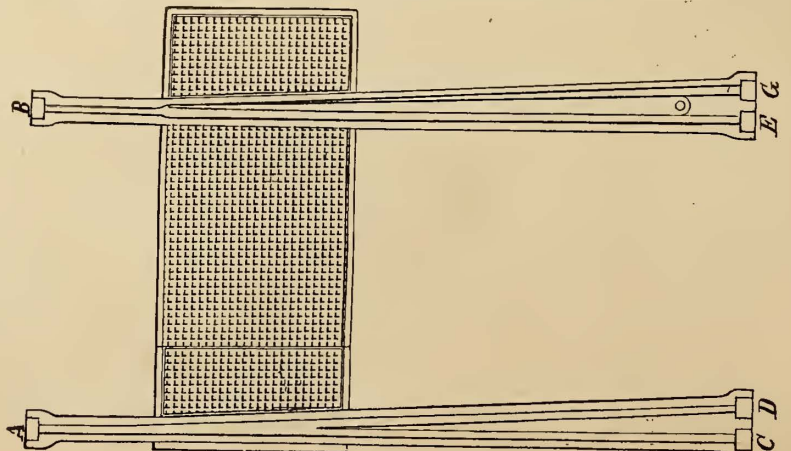
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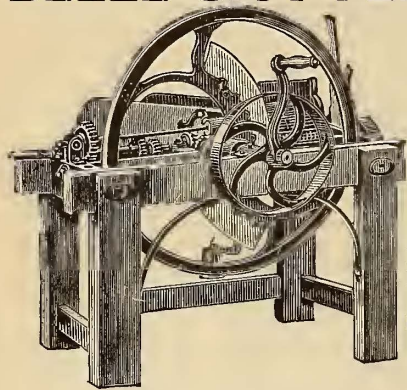
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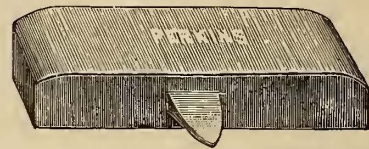
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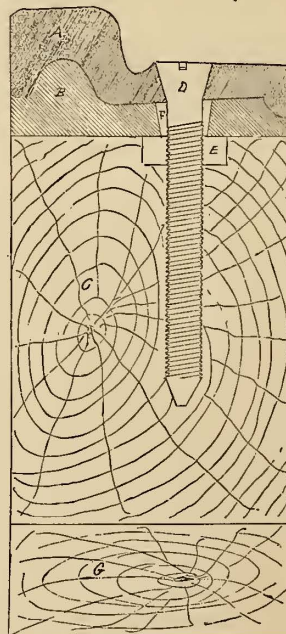
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**WRIGHT'S**

**PATENT JOINT FASTENING.**



The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent screw fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

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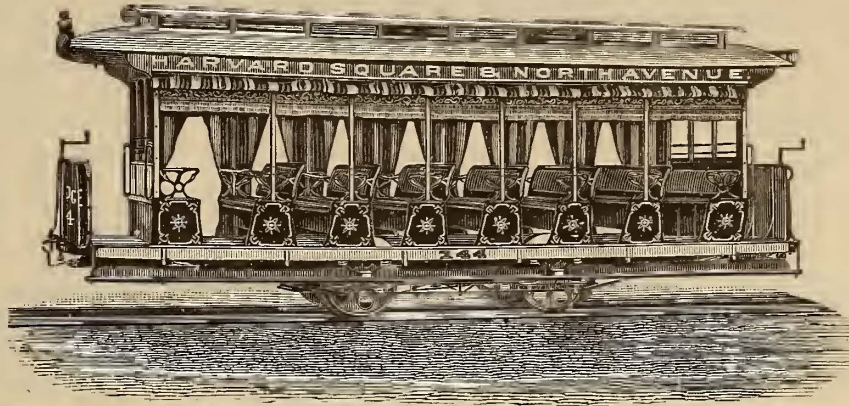
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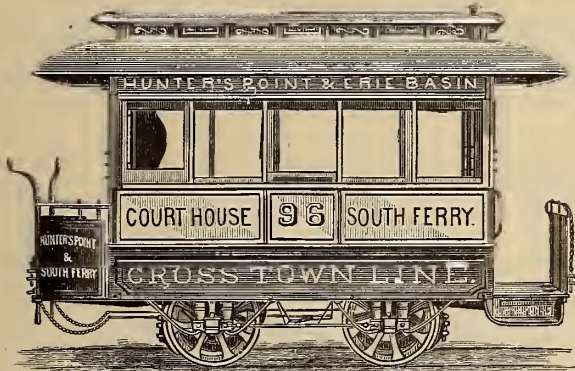
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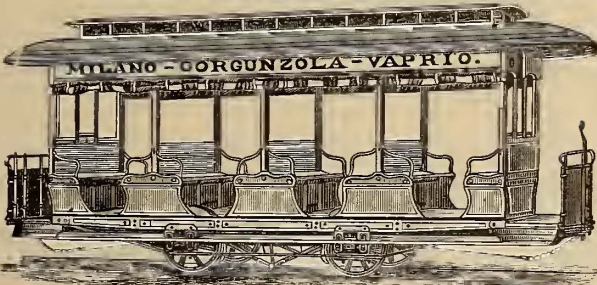
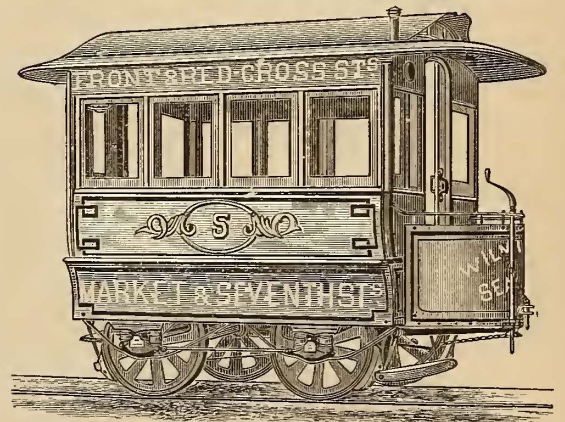
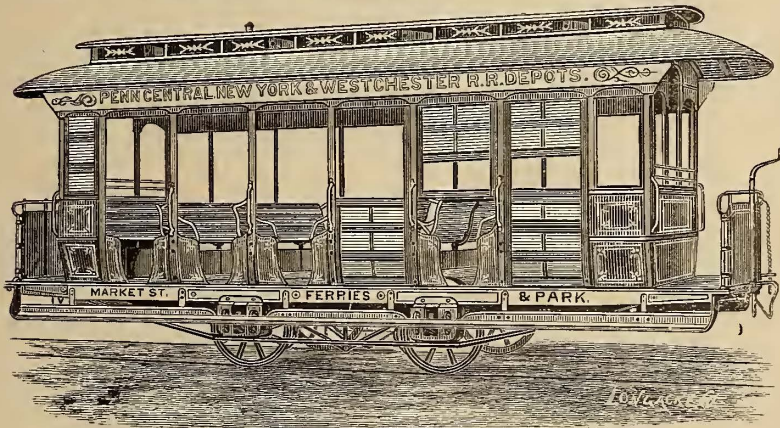
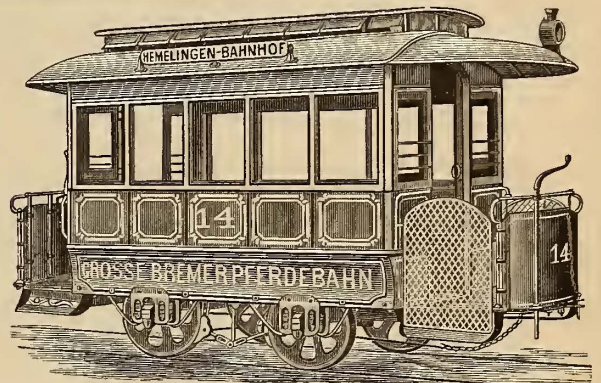


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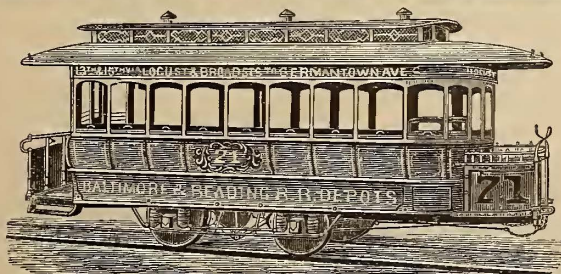
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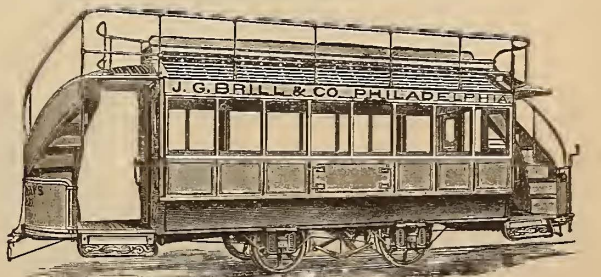
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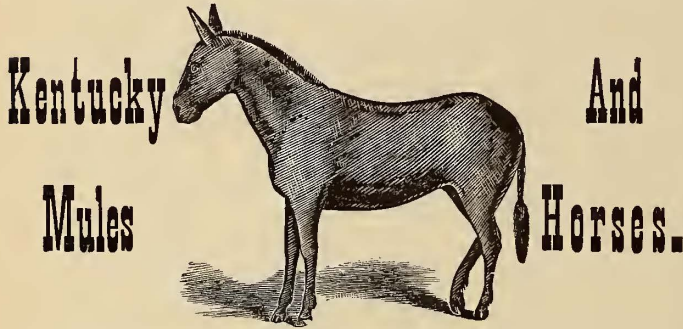
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This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

The Curry Comb and Hand Process Superseded! Economy of Labor! Perfection of Work!

Three Hundred Head of Stock Thoroughly Groomed with Each Machine every Ten Hours.

This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Payn, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

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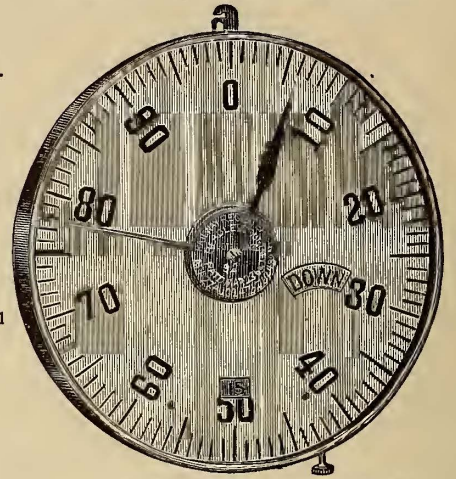
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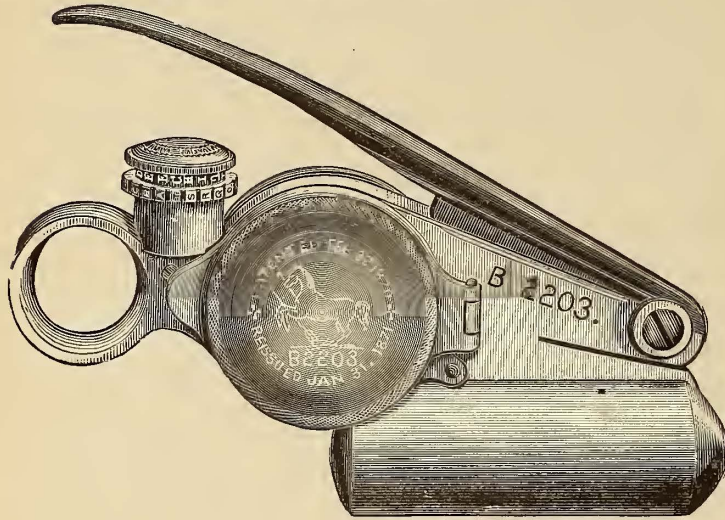
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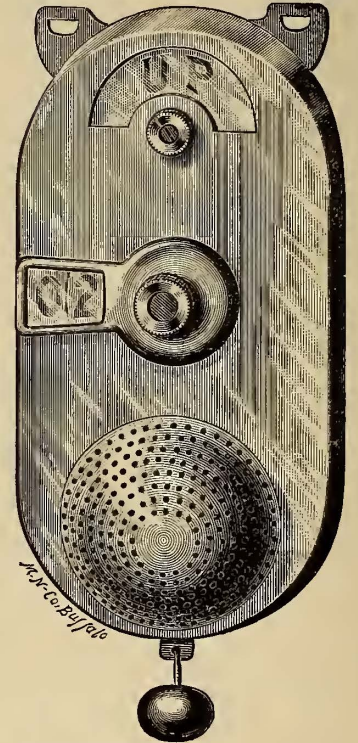
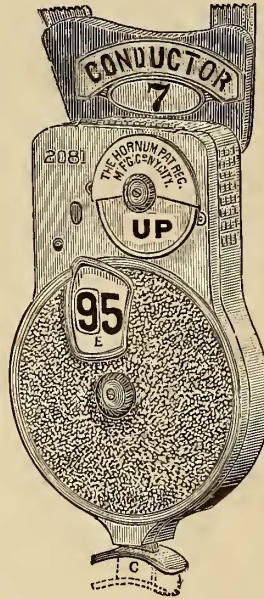


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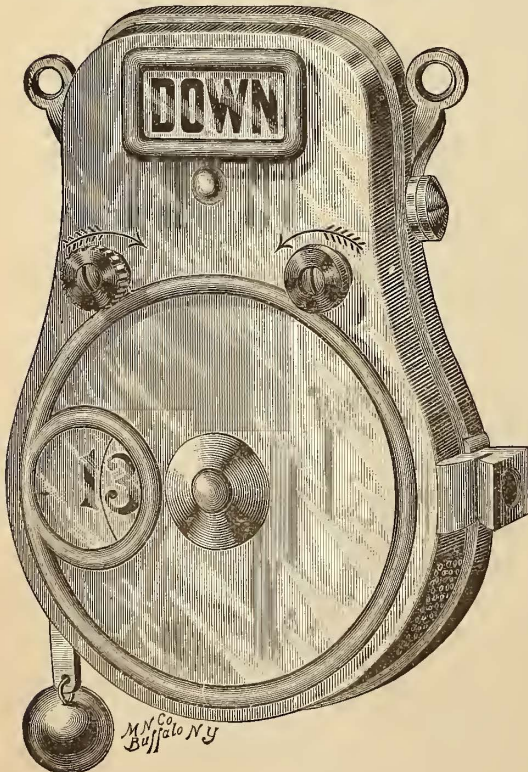
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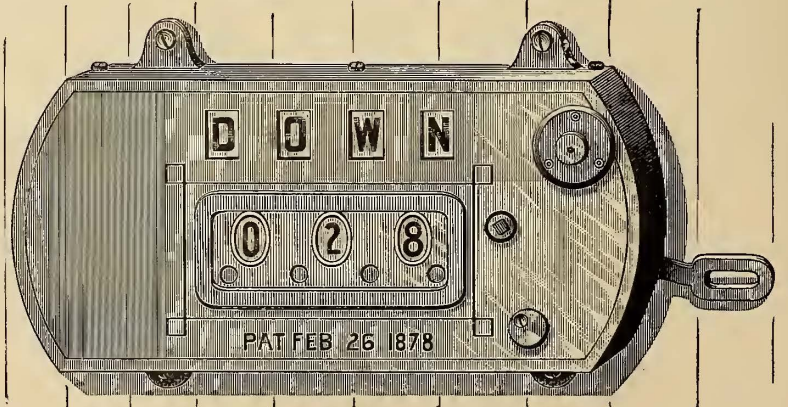
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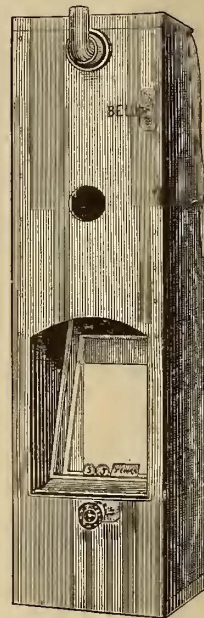
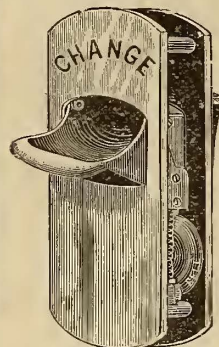
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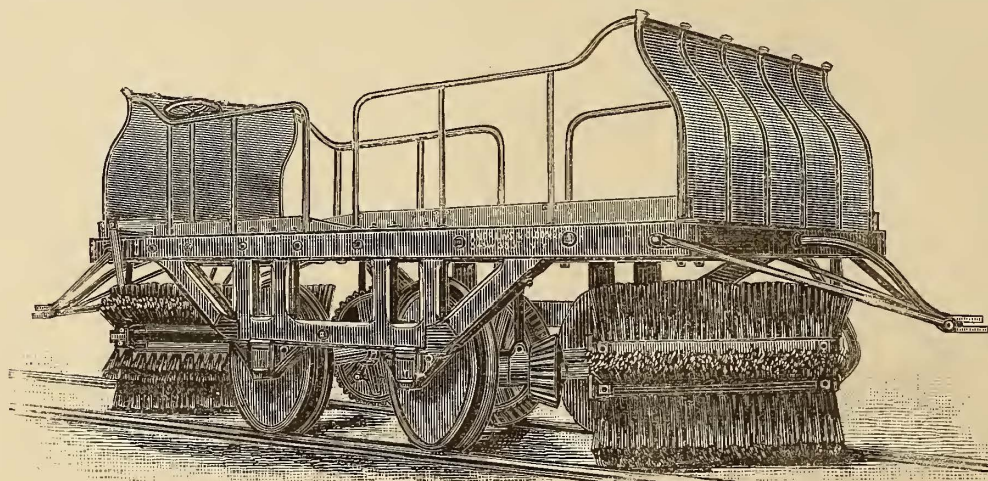


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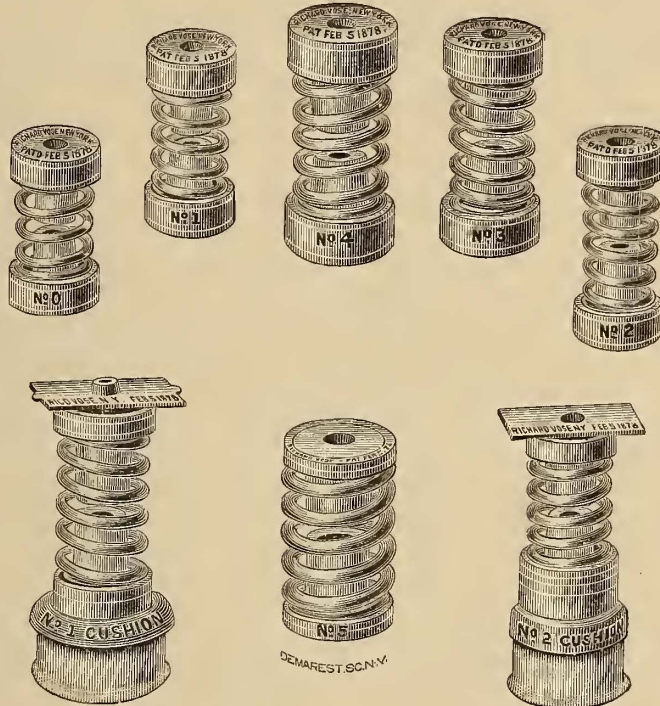
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 No. 5, for 16-ft. Cars.  
 (Single Pedestal.)  
 No. 1, Cushion, for 16-ft. Cars.  
 No. 2, Cushion, for 12 and 14-ft. Cars.

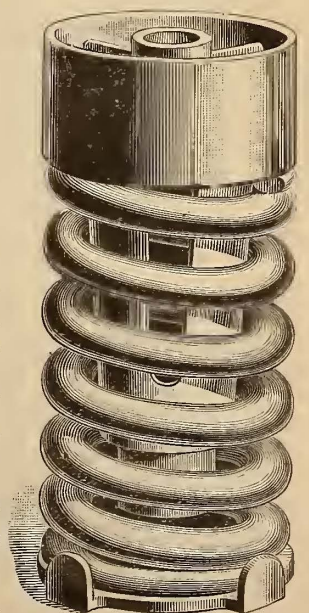
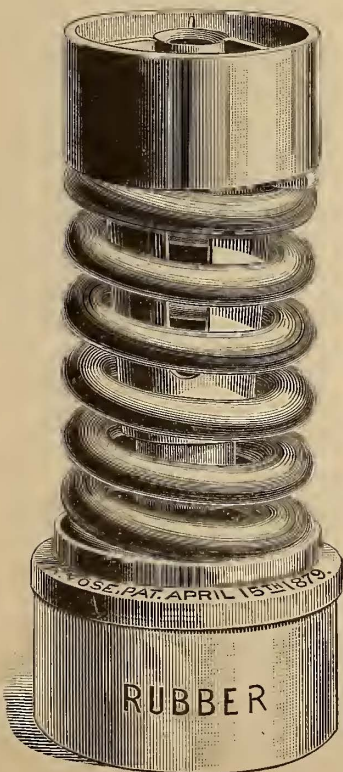
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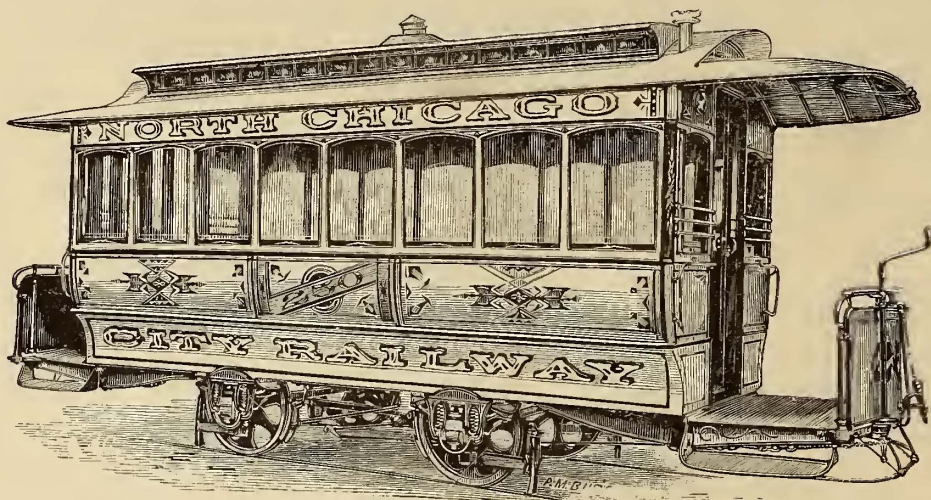


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