

J. S. WALSH.

Snow-Plows for Street Railways.

No. 154,775.

Patented Sept. 8, 1874.

Fig. 1.

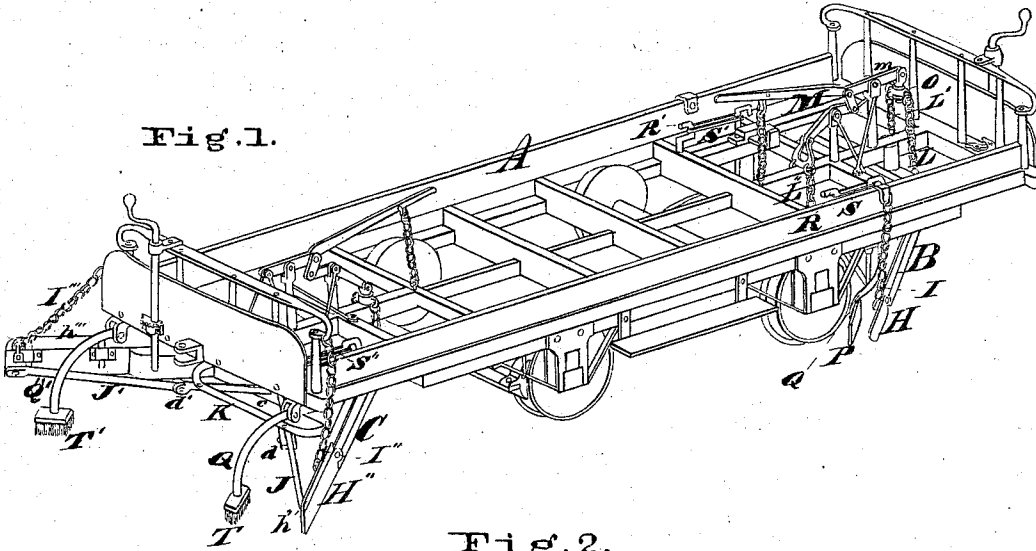


Fig. 2.

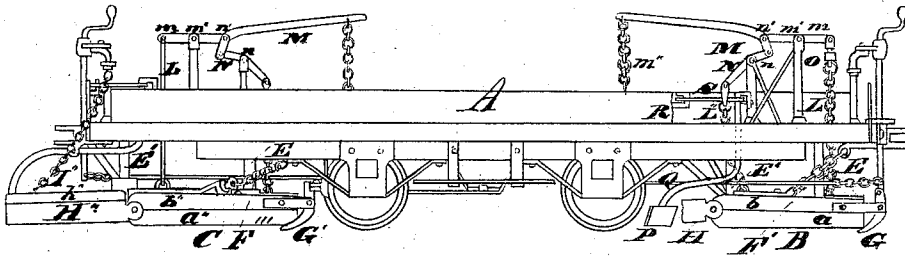
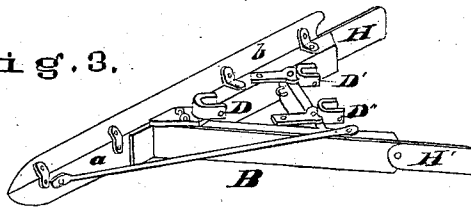


Fig. 3.



WITNESSES.

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IMPROVEMENT IN SNOW-PLOWS FOR STREET-RAILWAYS.

Specification forming part of Letters Patent No. **154,775**, dated September 8, 1874; application filed June 2, 1874.

To all whom it may concern:

Be it known that I, JULIUS S. WALSH, a resident of the city and county of St. Louis, State of Missouri, have made new and useful Improvements in Snow-Plows for Street-Railways, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a perspective view of the invention; Fig. 2, a side elevation, part of the frame at the forward end being broken away; Fig. 3, a view of an attachment; Fig. 4, a perspective of the forward plow; Fig. 5, a perspective of the rear plow; Fig. 6, a view of a runner used at the forward end or nose of the plow; and Fig. 7, a side elevation of an auxiliary scraper, showing its mode of attachment to the car-frame.

Like letters indicate like parts.

To provide an efficient means for removing snow and other obstacles from street-railways is mainly the object of my invention. It consists in the peculiar method of supporting the plows while in use. It further consists in the construction provided for plowing a wider or narrower furrow, as occasion may require, and for directing the snow either to both or to one of the sides of the track, or more to one side than to the other; also, in the means employed in adapting the plows to the irregularities of the track and the adjoining roadway. It also consists in the provision for enabling the plows to readily surmount any unusual or permanent obstacle in the trackway—such as a crossing—and for concentrating the scraping power of the plows upon any desirable point or points. It further consists in the peculiar construction of the rear plow. It further relates to the provision for relieving from strain those parts which immediately sustain and guide the plows; also, to the means used in raising the plows when not in use; also, to the provision for elevating or depressing the apex of the plow, to enable the plow to act upon a particular portion of the trackway, or, when elevated, to relieve the draft.

In the accompanying drawings, A, Figs. 1, 2, represents a car of ordinary construction. B, Figs. 1, 2, 3, represents a plow arranged at

the forward end of the car, in front of its forward wheels, and C represents another plow, arranged at the rear end of the car, behind its rear wheels. Both of these plows are, in general outline, triangular, and are similarly connected to the car-frame, and in the following manner: At or near the three corners of the plow are arranged, respectively, three forked guides, D D' D'', &c., Figs. 3, 4, 5, and at each end of the car is a system of guide-rods, E E' E'', Fig. 2, arranged vertically, and in a position corresponding to that of the guides D, &c. By means of the guides the plow is attached to the rods. This attachment, however, is not a rigid or a fast one, the rods serving chiefly to hold the plow in its proper position, laterally considered, for when in use the plow rests mainly upon the ground, and the main portion of the draft of the plow is, by means of the chains F F' F'', &c., Figs. 2, 4, 5, sustained immediately by the body of the car; and when not in use the plow is, by means of mechanism herein-after described, elevated by sliding it upward upon the rods. Swivels *f f'*, &c., are introduced in the draft-chains F, &c., to enable thereby the draft to be regulated. The chains F, &c., are fastened to the plow near the rear corners, respectively, thereof, and, crossing each other, as shown in Figs. 4 and 5, are carried forward and fastened to the car-frame. In this manner the plow is effectually held in position, and in such a manner as will enable it to rise and fall and accommodate itself to the trackway without straining its connections with the car. The apex or nose of the plow is supported by a runner, G, Figs. 2, 4, 5, 6, which is pivoted to the apex, and extending downward and backward and slightly underneath it. The runner is flattened at its lower end, and its connection with the plow is adjustable vertically, to enable the apex of the plow to be elevated or depressed.

The snow-cutters *a a'*, &c., or under facings of the plow, can be shaped to conform to any kind of street-pavement. They are preferably arranged with relation to the upper facings *b b'*, &c., so as to give a concave face to the plow. H H' H'', &c., represent wings, which are, respectively, pivoted to the rear ends of the main plows. When let down,

they are arranged to form an extension of the plow proper. By means of chains I I', &c., which extend from the rear ends of the wings upward to the car-frame, the wings, or either of them, can be raised when desired, and by loosening their chains the wings are enabled to drop below or rise above the level of the main plow, according to the surface of the adjoining roadway. The extension-wings of the rear plow are longer than those of the forward plow. When it is desirable to direct the snow entirely to one side, the forward plow is shaped as shown in Fig. 3—that is, the irons forming one side of the plow are extended far enough to come opposite the other side of the car. The rear plow is expected to clear more of the adjoining roadway than the forward plow, and for this purpose its extensions, as above stated, are longer. To sustain the thrust upon these extensions, braces J J' extend from the ends of the extensions forward and inward, crossing each other, and are fastened to the cross-bar *c*, Fig. 5, of the plow, immediately, or nearly so, at the points of attachment of the draft-chains F² F³. But, as the extensions H'' H''' are pivoted to the main plow, and are arranged to rise and fall, the braces J J' must be constructed to conform thereto. Accordingly, I arrange another cross bar or rod, K, Fig. 5, in rear of the bar *c*, and nearly in line with the rear of the main plow. The braces are fastened to this rod K, and also, just in rear of it, are pivoted, as shown at *d d'*. The upper facings *h'' h'''* of the extensions H'' H''' are arranged so that they can be drawn up from the lower facings when it is desired to use the plow in deeper snow. The arrangement for raising the entire plow is as follows: Chains L L' L'' L''', Figs. 1 and 2, extend from the three corners of the plow upward to a system of leverage, M, which is fastened to the car-frame directly over the plow—that is to say, two chains, preferably, lead from the nose of the plow to the forward end of the lever *m*, whose fulcrum is at *m'*. Two other chains, L'' L''', lead, respectively, from the rear corners of the plow to the forked ends of a secondary lever, N, whose fulcrum, *n*, is between such connections and the connections *n'* of the lever N with the main lever *m*. This last-named connection, *n'*, is on the other side of the fulcrum of the main lever from that of the first-mentioned chains leading from the nose of the plow. Thus arranged, a downward movement of the arm of the main lever raises the plow evenly. All of the chains are long enough to allow the plow, when in use, to rest upon, and move freely over, the ground. A swivel, O, is inserted at the connection of the chains leading from the apex of the plow, by means whereof the apex can readily be adjusted vertically. The above-mentioned arrangement of levers and chains is used in connection with the forward plow. A similar system is employed to operate the rear plow, saving that the arrangement of leverage is reversed, the secondary lever being

connected with the chains leading from the nose of the plow, and in place of chains at the rear of the plow, I prefer to use rods. P P' represent auxiliary plows or scrapers, arranged, respectively, immediately before the forward wheels of the car and behind the forward plow. They are supported by arms Q Q', which, midway or thereabout in their length, are, on either side thereof, pivoted at *e e'* to the car-frame. R R' represent upright rods fixed to the floor of the car opposite to and in front of the upper ends of the arms Q Q'. S S' represent elastic bands connecting the upper ends of the arms Q Q' and rods R R'. The object of such connection is to assist the weight of the scraper in holding it down upon the rail, and at the same time provide a relief for the plow in meeting an unusual obstacle.

The elastic connection is also of service in case the scraper encounters an obstacle (such as a person) which it is desirable to remove without injury thereto. To bring the upper end of the scraper-arm into the proper position above, it is preferably formed somewhat like the letter S. T T' represent brushes arranged in rear of the rear plows, and hung and operated in manner similar to that of the scrapers P-P'.

In operation, when it is desired to throw the snow from the track to either side, as in case of a single line of railway, the plows and extensions are let down similarly on both sides. When double tracks occur in the same street the wings on the track side are raised. In case of a double track and a deep snow it is sometimes desirable to use the form of plow shown in Fig. 3. In such event it takes the place of the forward plow. The wings being pivoted, and their connections with the car-frame being flexible and of suitable length, the plow conforms to the varying surface of the ground. It is well known that along the line of a street-railway the ground is generally lower both inside and outside the rails than directly at the rails, and these depressions inside and outside the track usually differ in depth, and are unlike in form. To effectually clear such a track it is frequently desirable to operate as follows: By means of the swivel at the forward end of the lever at the forward end of the car, or by means of a suitable adjustment of its runner, raise the nose of the forward plow. This causes this plow to clear the trackway just inside the rails, and also to remove the principal portion of the snow from the rails. At the same time, the wings of the plows being free to move up or down, the ground outside of the trackway is cleared. The nose of the rear plow is meanwhile depressed, and the inner portion of the track is also cleared. In certain events it is desirable to elevate the wings of the two plows differently. The runner under the apex of the plow can be adjusted vertically, and both enable the plow to easily pass a street-crossing, and also to cause the rails to be

scraped more efficiently. To effectually clean the rail the under edge of the auxiliary scrapers is made to conform to the peculiar shape of a street-railroad rail. It is obvious that this last-named feature can be used on ordinary passenger-cars, both to remove such obstacles as stones, and also to prevent injury to persons falling upon the track. By virtue of the elastic connection less shock is imparted to the car, or part thereof, or to the obstacle encountered. Should the plows and scrapers fail to remove any lesser obstacle the brooms at the rear of the car will effectually do so.

It will be observed a distinguishing characteristic of the construction throughout is its pliability. Each part of the plows moves freely upon the rest, and the plows themselves are not rigidly connected to the car. The draft-chains F F', &c., being provided with swivels, the strain upon the guide-rods can be easily relieved.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The plow B, composed of the irons *a* and *b* and extension-wings H H', attached to a suitable frame, all combined substantially as shown and described.

2. The plow B, with the irons *a* and *b*, and provided with the runner G, all combined substantially as and for the purpose set forth.

3. The combination of the plow B with the guides D D', &c., guide-rods E E', &c., chains F F', &c., and car A, substantially as described and shown.

4. The combination of the plow B, car A, guides D D', &c., guide-rods E E', &c., compound lever M, and connecting-chains L L', &c., substantially as described and shown.

5. The combination of the car A, plow B, guides D D', &c., rods E E', &c., lever *m*, chain L, swivel O, fulcrum *m'*, and chain *m''*, as and for the purpose set forth.

6. The plow C, composed of the irons *a''* *a'''* and *b''* *b'''*, attached to a suitable frame, wings H'' H''', braces J J', pivots *d* *d'*, cross-bar K, and chains I'' I''', all combined substantially as described and shown.

7. The combination of the car A, plow B, extensions H H', and chains I I', substantially as described and shown.

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Witnesses:

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CHAS. D. MOODY.