No. 754,832. PATENTED MAR. 15, 1904.

J. H. AKERS.

ELECTRIC RAILWAY PLOW.

APPLICATION FILED AUG. 8, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

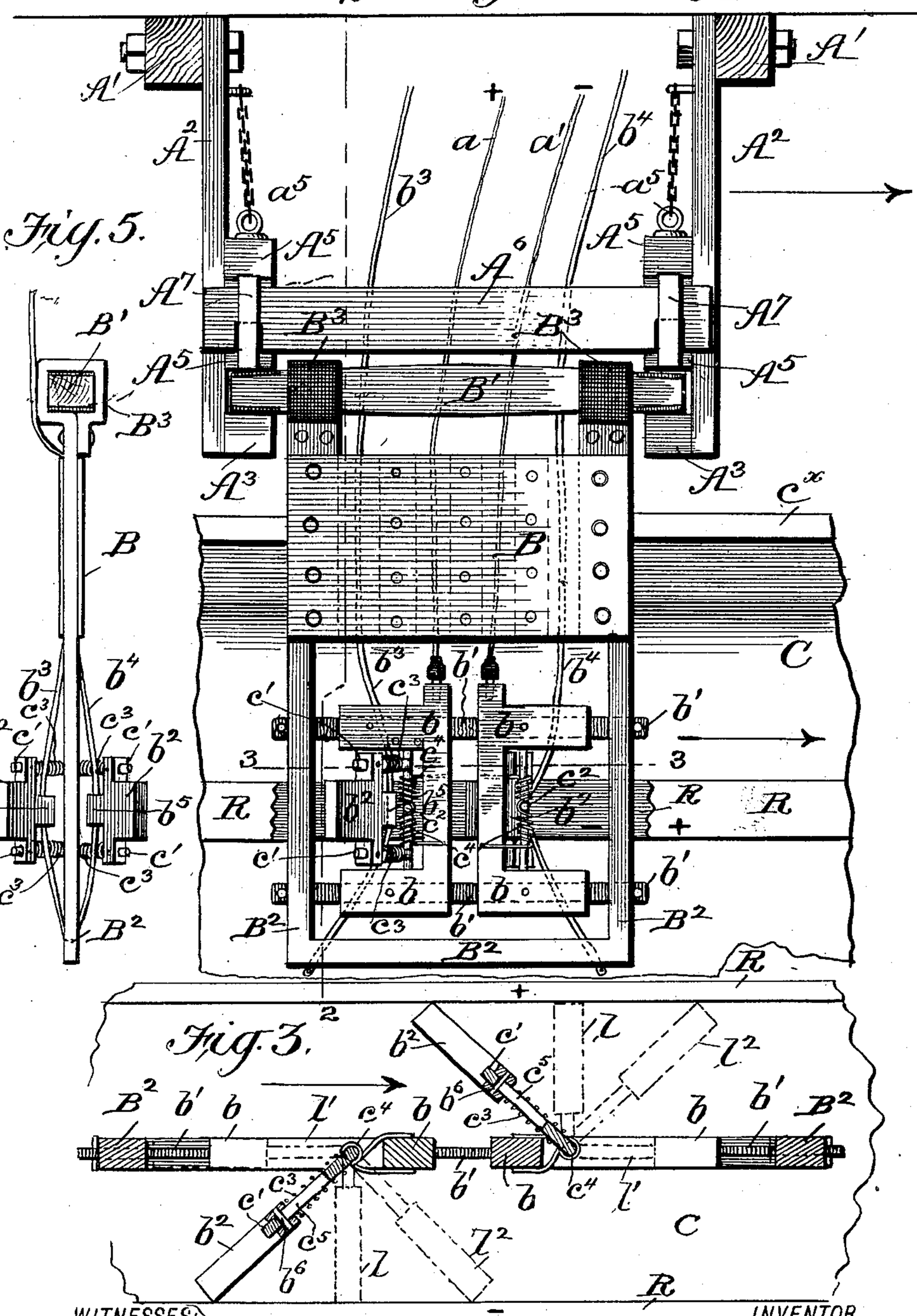

Fig. 5.

Fig. 3.

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Fig. 2.

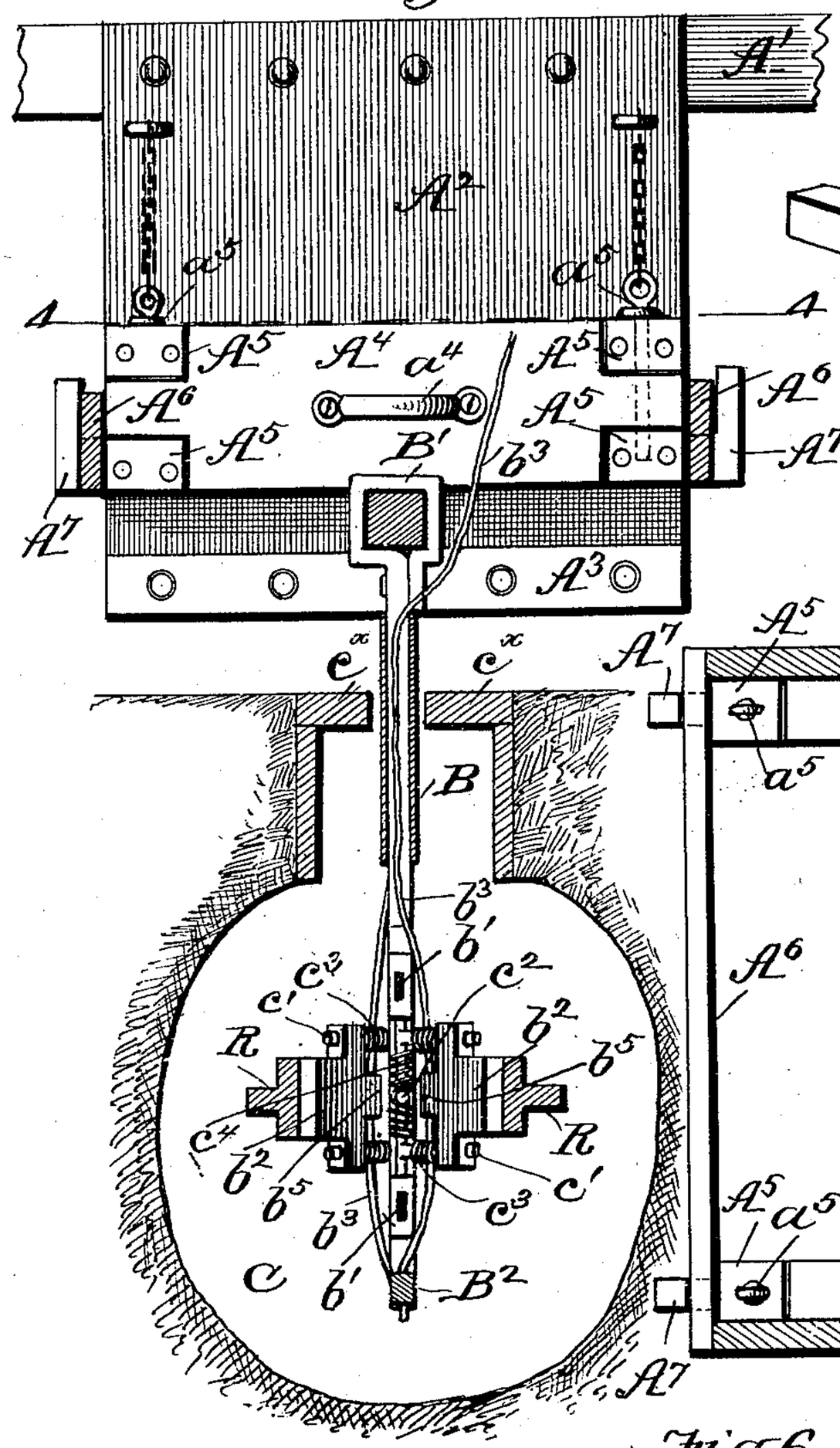


Fig. 7.

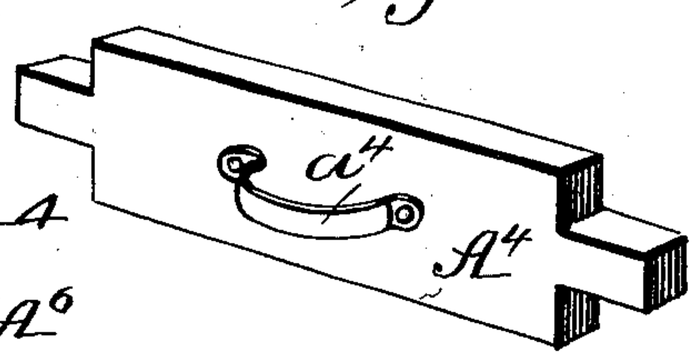


Fig. 4.

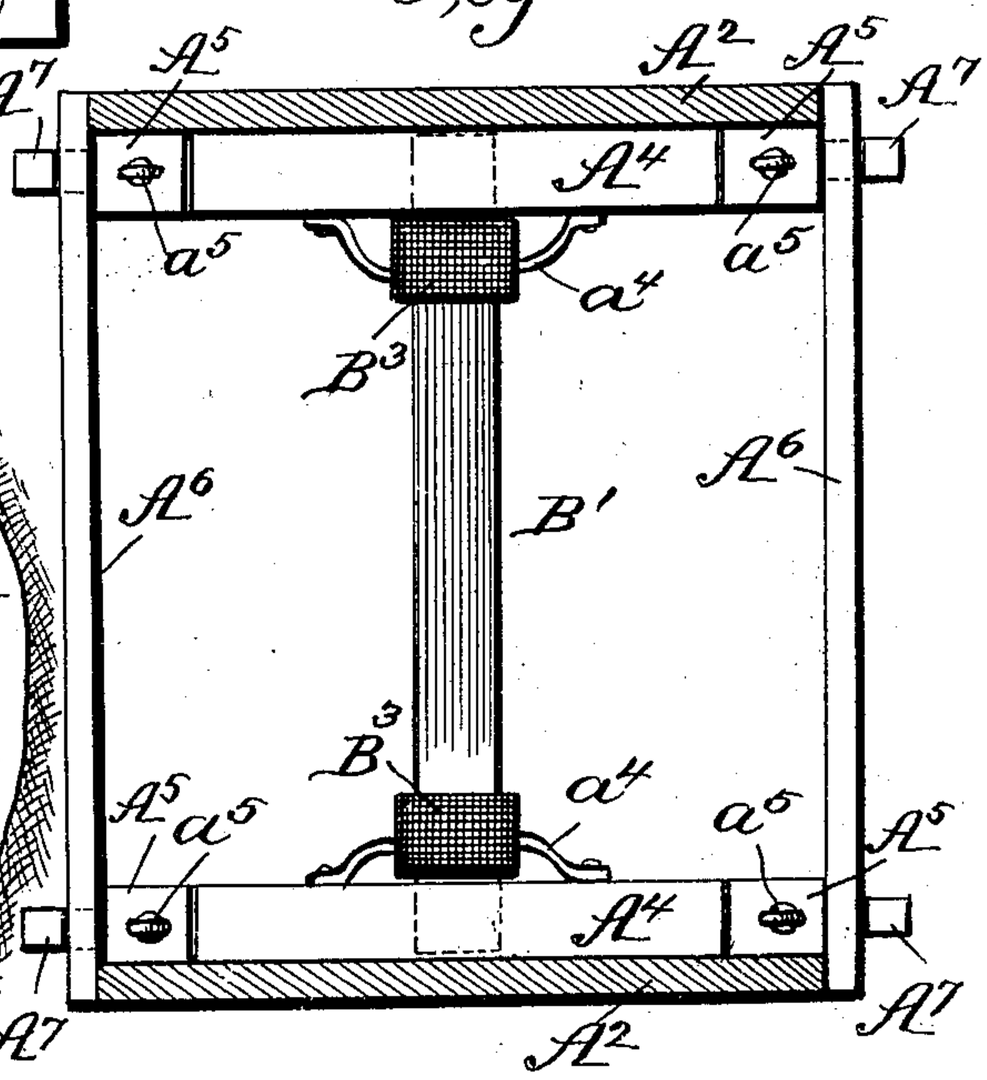
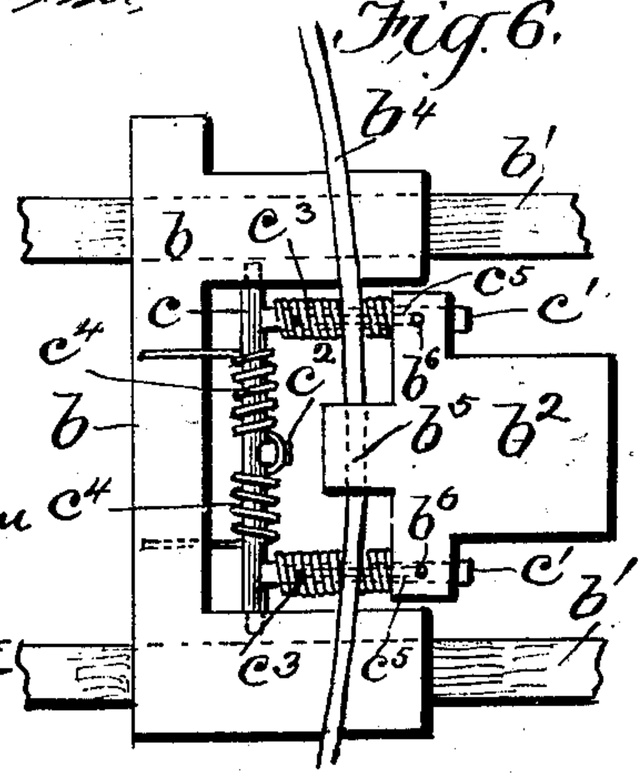


Fig. 6.



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No. 754,832. Patented March 15, 1904.

UNITED STATES PATENT OFFICE.

JOHN H. AKERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

ELECTRIC-RAILWAY PLOW.

SPECIFICATION forming part of Letters Patent No. 754,832, dated March 15, 1904.

Application filed August 8, 1903. Serial No. 168,786. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. AKERS, a citizen of the United States, residing at Washington city, in the District of Columbia, have invented a new and useful Improvement in Electric-Railway Plows, of which the following is a specification.

My invention is in the nature of an electric-railway plow designed with reference to securing the following desirable results—viz., a plow which can be inserted into or withdrawn from the slot of the underground conduit at any point along the slot, so that it may be examined and repaired at any point without having to wait until the car is run over a pit; also, one which provides for the movement of the car forward or backward and which will also be adapted to pass over breaks in the conductor-rails at crossings without damage to the plow and in which the plow may be conveniently and safely lifted into or taken out of the slot and at the same time preserving its freedom of movement for turning curves.

My invention comprises certain novel constructions and arrangements of parts for securing the above-named results, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a side view of the plow in the conduit, the view being taken at right angles to the line of travel of the car. Fig. 2 is a vertical transverse section taken on line 2 2 of Fig. 1. Fig. 3 is a sectional plan view on line 3 3 of Fig. 1, on a somewhat larger scale, showing the relation of the plow-shoes to the conductor-rails. Fig. 4 is a sectional plan view on line 4 4 of Fig. 2. Fig. 5 is an edge view of the plow. Fig. 6 is a detail in side view of the swinging frame carrying one of the plow-shoes, and Fig. 7 is a detail in perspective of one of the retaining-bars for holding the plow in the car-hangers.

In the drawings, Figs. 1 and 2, C is the underground conduit in which are contained the horizontal and parallel conductor-rails R R, spaced apart and insulated, as usual, and oppositely charged with the electric current. Between these rails the plow travels and carries the current to and from the motor on the car. The top of the conduit is closed with the exception of a narrow slot by the parallel slot-rails $c^{\times}$ $c^{\times}$. Through this slot the plow travels, and the entire plow may be passed through it or taken from it at any point along the length of the track.

B is the plow, which has a broad but thin shank portion in the middle carrying the rub-plates for the slot and below these plates has a rectangular frame B^2, carrying the plow-shoes and accessories, while at the upper end a cross-head B′, of wood, supports the plow in hangers from the car. This cross-head has the metal connections of the side bars of the plow covered by insulation, as shown at B^3, to avoid accidents, and the cross-head forms a handle for lifting the plow from or putting it into the conduit, while the outwardly-projecting ends of the cross-head form the plow-supports.

The cross-head B′ is arranged lengthwise the car and must have a free lateral movement for turning curves. To accommodate this, the ends of the cross-head, which are covered with metal to take the wear, are held in transverse ways or channels in the lower end of the hanger-plates A^2 A^2. These hanger-plates are securely bolted to cross-timbers A′ A′ beneath the car A and at their bottom edges have inwardly-facing ribs or flanges A^3 A^3, upon which rest the ends of the cross-head.

To hold the cross-head down, there is on the inner face of each hanger-plate a detachable retaining-bar A^4, provided with a handle a^4. The ends of these retaining-bars are tenoned or reduced and are received between inwardly-projecting lugs A^5 A^5 on the hanger-plates and are locked therein by pins a^5 passing through the lugs and the tenoned ends of the retaining-bar. It will thus be seen that the ends of the cross-head of the plow have free lateral play in the channels between the ribs A^3 and the detachable retaining-bars A^4 above, and yet by means of the detachable character of the retaining-bars and the handles a^4 and pins a^5 the retaining-bars may be conveniently removed and the entire plow lifted out by the cross-head.

The two hanger-plates A^2 A^2 are supported entirely from above and hang free at their

lower ends. To brace or stiffen them against lateral deflection and the possible dropping out of the cross-head and plow, the two hanger-plates are locked together on each side by tie-bars A^6, which (see Fig. 1) have notched ends that drop down over hooks A^7 A^7, fixed to the edge of the hanger-plates. This forms a secure connection and brace and is far superior to bolts and nuts, as the latter are liable from the jolting of the car to work off and drop the plow, while my hooked or notched tie-bar always gravitates of its own weight to the locked position.

I will now describe the plow-shoes and their accessories.

In the side pieces of the rectangular frame B^2 (see Fig. 1) there are fixed two horizontal parallel leather straps b' b'. Instead of leather any material which is a non-conductor of electricity may be used. On these two straps are suspended the shoe-frames b b, the straps being run through holes in the frames and the latter riveted to the straps, so that the shoe-frames cannot come in contact with each other and are suspended in insulated relation. These two shoe-frames are connected, respectively, to the lead-wires a and a', which lead the current to the motor on the car above, said lead-wires extending up between the rub-plates of the shank of the plow. The shoe-frames are each made with an upright portion having two horizontal arms projecting outwardly, through which latter the supporting and insulating straps pass. In each shoe-frame between its pair of arms is hinged a shoe b^2, constructed as a metal plate adapted to bear on one of the conductor-rails R. These shoe-plates are spring-seated in two ways—that is to say, they are made to work against a spring in turning on their vertical pivots and they are made to slide in the direction of their own planes inwardly against springs, as seen in Figs. 3 and 6. A vertical stem c, Fig. 6, has two horizontal arms c' c', slotted longitudinally at c^5. This stem and arms form a hinge-frame. On these arms there slides the shoe-plate b^2, a pin b^6 extending through the shoe-plates at top and bottom and passing through the slots c^5 of arms c'. Spiral springs c^3 are wound around the arms c' behind the shoe-plates, so that the shoe-plates may slide in their own planes in straight lines up along the arms c', compressing the springs c^3. Another spiral spring c^4 is wound around the stem c of the hinge-frame and bears in the middle against lug c^2 on the shoe-frame and at the ends finds a bearing against the shoe-frame b. The tension of this spring tends to swing the shoe and its hinged carrier-frame c c' about the vertical pivots of the stem c, which are seated in sockets between the arms of the shoe-frames b. The tension of spring c^4 serves to keep the shoes against the conductor-rails in trailing position, as seen in Fig. 3. Now if the car be going in the direction of the arrow in Fig. 3, and it is desired to back the car, it will be seen that the shoes would gouge into the rails R R, except for the rectilinear yielding of the shoe-plates inwardly in the direction of their length. When, however, constructed as described and the car is to be backed in the opposite direction to the arrow shown in Fig. 3, the shoe-plates b^2 b^2 slide longitudinally up on the arms c' c', thereby becoming shortened, as seen at the dotted lines l l, and finally move back far enough to trail in the opposite direction, as seen at the dotted position at l^2 l^2. For this purpose the springs c^4 are so adjusted as to press the shoes outwardly against the rails when trailing in either direction.

I will now describe how the plow and its shoes can be brought within such narrow limits as to be easily passed through the slot between the slot-rails.

The plow-frame, shoe-frames b, and shoes b^2 are all made thinner than the slot between the slot-rails. Through the two shoe-plates b^2 b^2 there is formed a vertical hole, passing through an inner horizontally-projecting tongue b^5 of the shoe. Through these holes there pass leather straps b^3 b^4, which (see Fig. 5) are fastened at the lower end to the frame of the plow and at the upper ends extend through the hollow shank of the plow to easy reach from the bottom of the car. Now the normal tendency of the shoes when in the conduit is to trend outwardly against the conductor-rails, as seen in Figs. 3 and 5, which bows the leather straps b^3 b^4, as in Fig. 5. If, however, a strong tension is put upon the leather straps b^3 b^4, they are straightened vertically, so that the shoe-plates are drawn into the spaces between the arms of the shoe-frame b, so that they lie in the same plane with the shoe-frames and plow-frame, as seen in dotted lines at l' l', Fig. 3, and when in this position the whole plow and all of its accessories are brought into the limits of the narrow slot of the conduit, and the plow may be lifted out. In the place of the leather straps b^3 b^4 any flexible non-conducting cords or lines may be used.

I am aware that it is not broadly new to provide a plow with spring-pressed shoes held against the conductor-rails in a yielding manner and that such shoes have been arranged to pass through the slot, and I do not claim this broadly.

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

1. An electric-railway plow having vertically-hinged frames with horizontally-projecting arms, shoes mounted on said arms to slide thereon and springs to force the shoes out and allow them to yield inwardly substantially as described.

2. An electric-railway plow having spring-hinged frames and spring-pressed shoes

mounted to slide on the frames substantially as described.

3. An electric-railway plow comprising resilient shoes hinged about vertical axes, shoe-frames carrying the shoes, insulated supports for the shoe-frames consisting of horizontal supporting-straps extending from side to side of the plow-frame substantially as described.

4. An electric-railway plow comprising resilient shoes hinged about vertical axes, shoe-frames having channeled horizontal arms, and non-conducting supporting-straps passing through said arms and secured to the sides of the plow substantially as described.

5. An electric-railway plow comprising a main frame having flexible non-conducting supporting-straps, shoe-frames hung upon the said straps and yielding shoes pivoted in said frames substantially as described.

6. An electric-railway plow comprising a main frame, resilient shoes hinged within the same about vertical axes and flexible non-conducting operating-lines attached at their lower ends to the plow-frame, extending through the shoes at a point outside the axial center and then extended up through the hollow shank of the plow substantially as and for the purpose described.

7. An electric-railway plow comprising a main frame with resilient shoes made of less thickness than the slot, and flexible operating-lines for throwing the shoes into the plane of the plow-frame substantially as described.

8. An electric-railway plow having a cross-head at its upper end, combined with hangers attached to the car and bearing supporting ribs or flanges at their lower edges, detachable retaining-bars and means for locking them above the ends of the cross-head substantially as described.

9. An electric-railway plow having outwardly-projecting supports at its upper end combined with hangers having inwardly-facing transverse channels carrying the plow-supports, and detachable retaining-bars to prevent the plow from rising substantially as described.

10. An electric-railway plow having outwardly-projecting supports at its upper end combined with hanger-plates having transverse inwardly-projecting ribs or flanges along their lower edges for sustaining the ends of the plow-supports with a free lateral movement, detachable transverse retaining-bars arranged above the plow-supports, and seats and locking devices for holding the retaining-bars substantially as shown and described.

11. An electric-railway plow having outwardly-projecting supports at its upper end combined with two hanger-plates having transverse channels for the plow-supports to work in and two hook-seats on each hanger-plate, and two parallel tie-bars having notched or hooked ends fitting in said seats and holding the hanger-plates against spreading apart substantially as described.

JOHN H. AKERS.

Witnesses:
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T. O. MCCORKLE.