

(No Model.)

2 Sheets—Sheet 1.

L. E. WALKINS.

THIRD RAIL UNDERGROUND ELECTRIC RAILWAY SYSTEM.

No. 605,066.

Patented May 31, 1898.

Fig: 1.

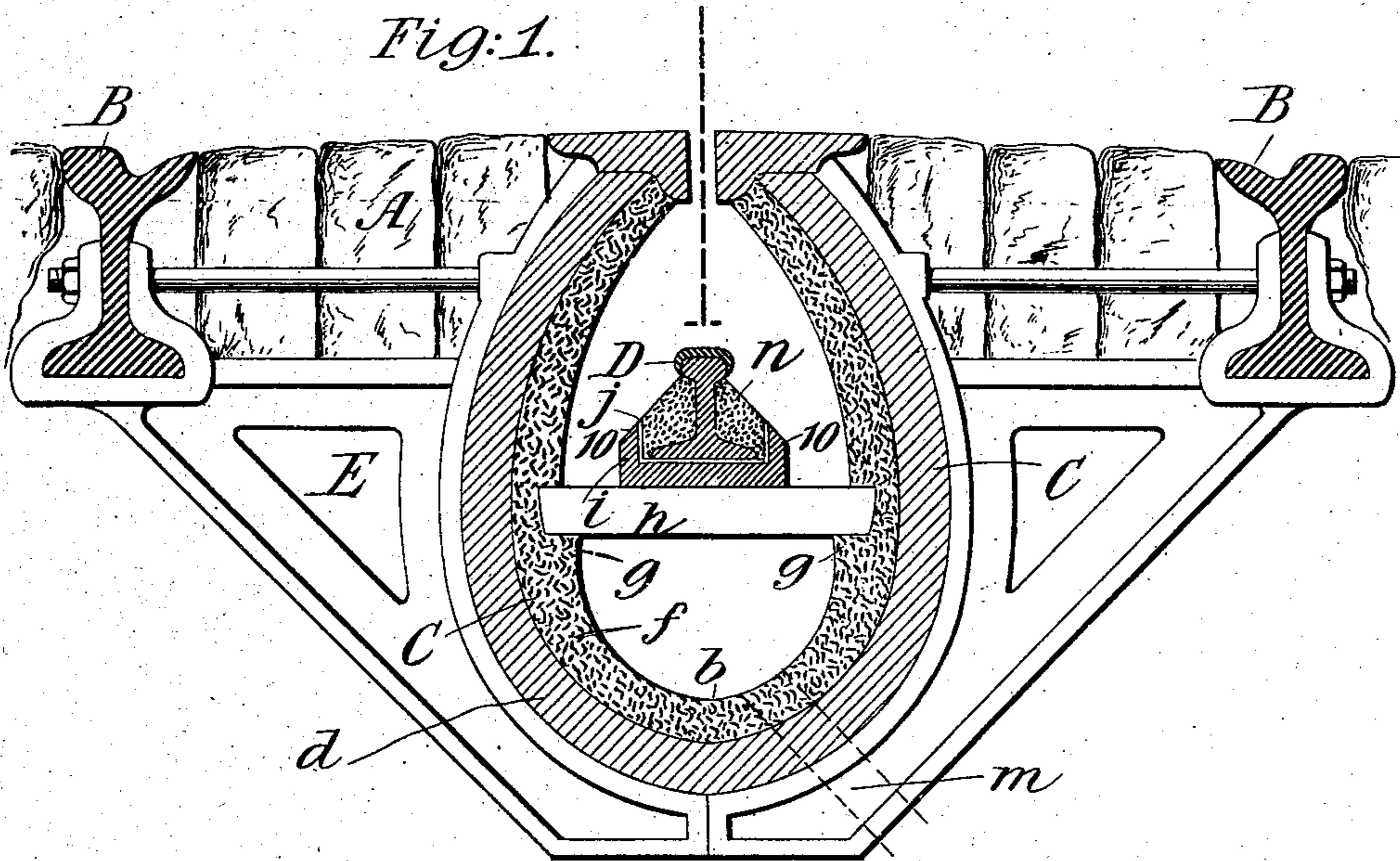
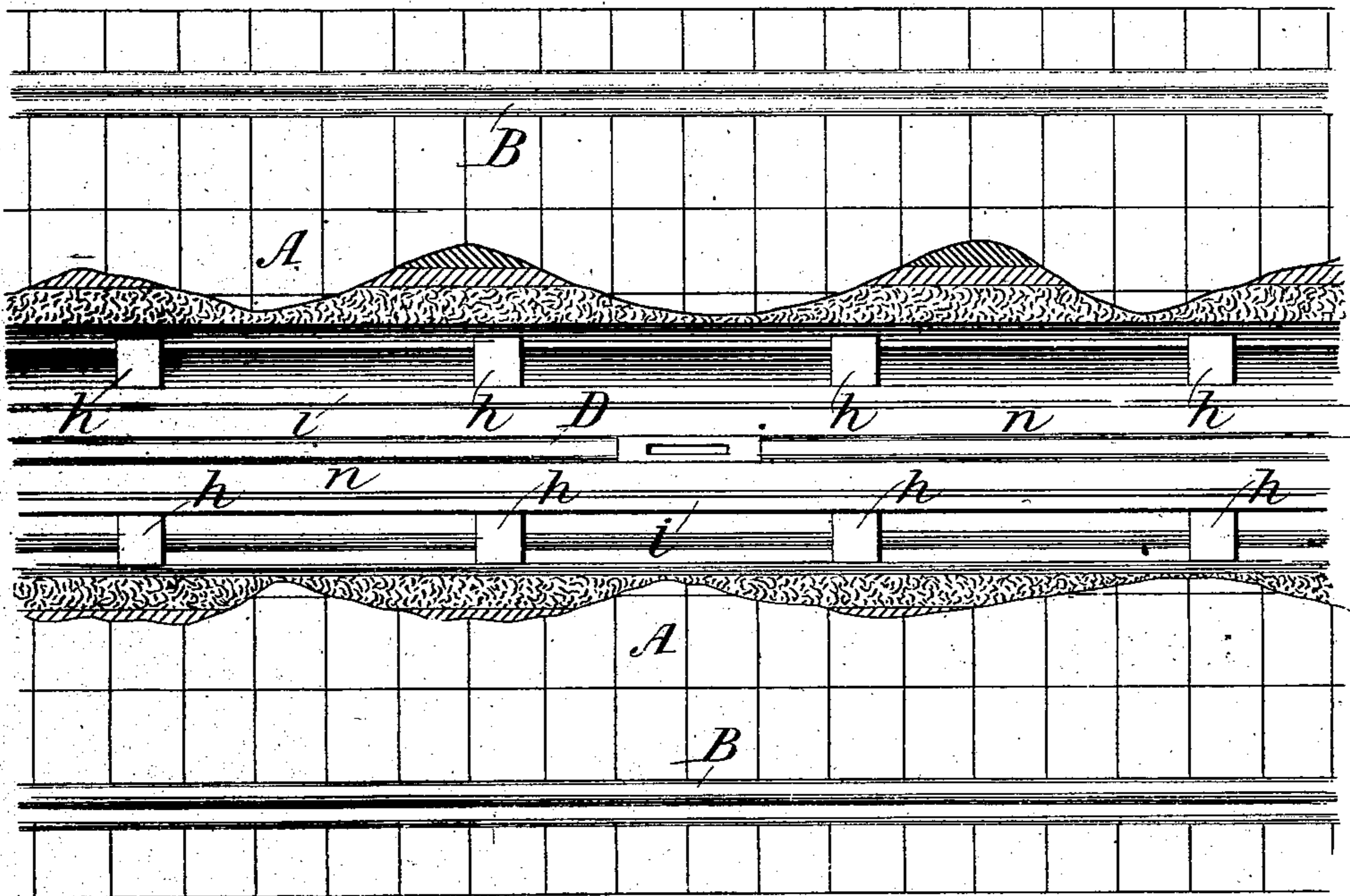


Fig: 2.



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(No Model.)

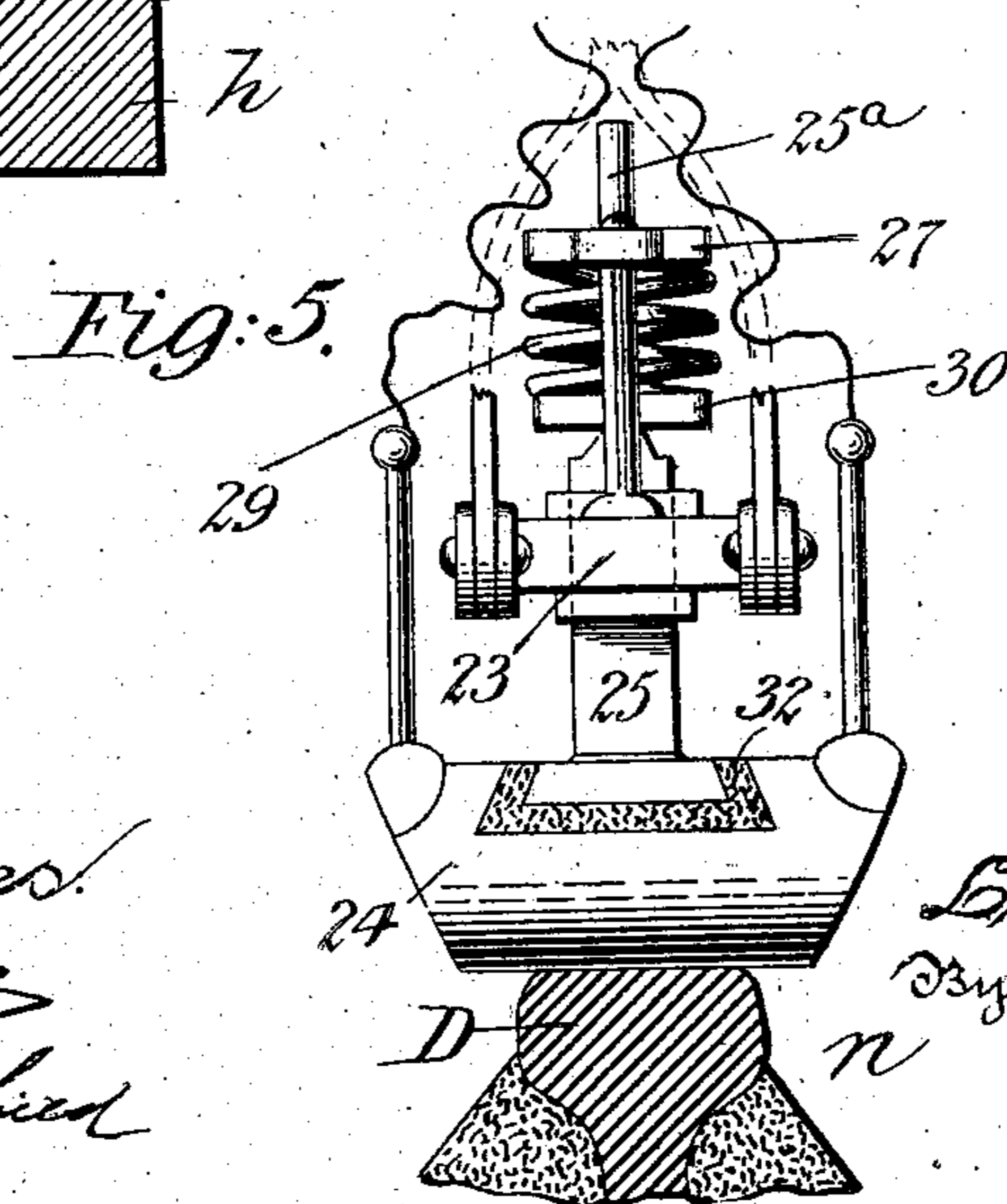
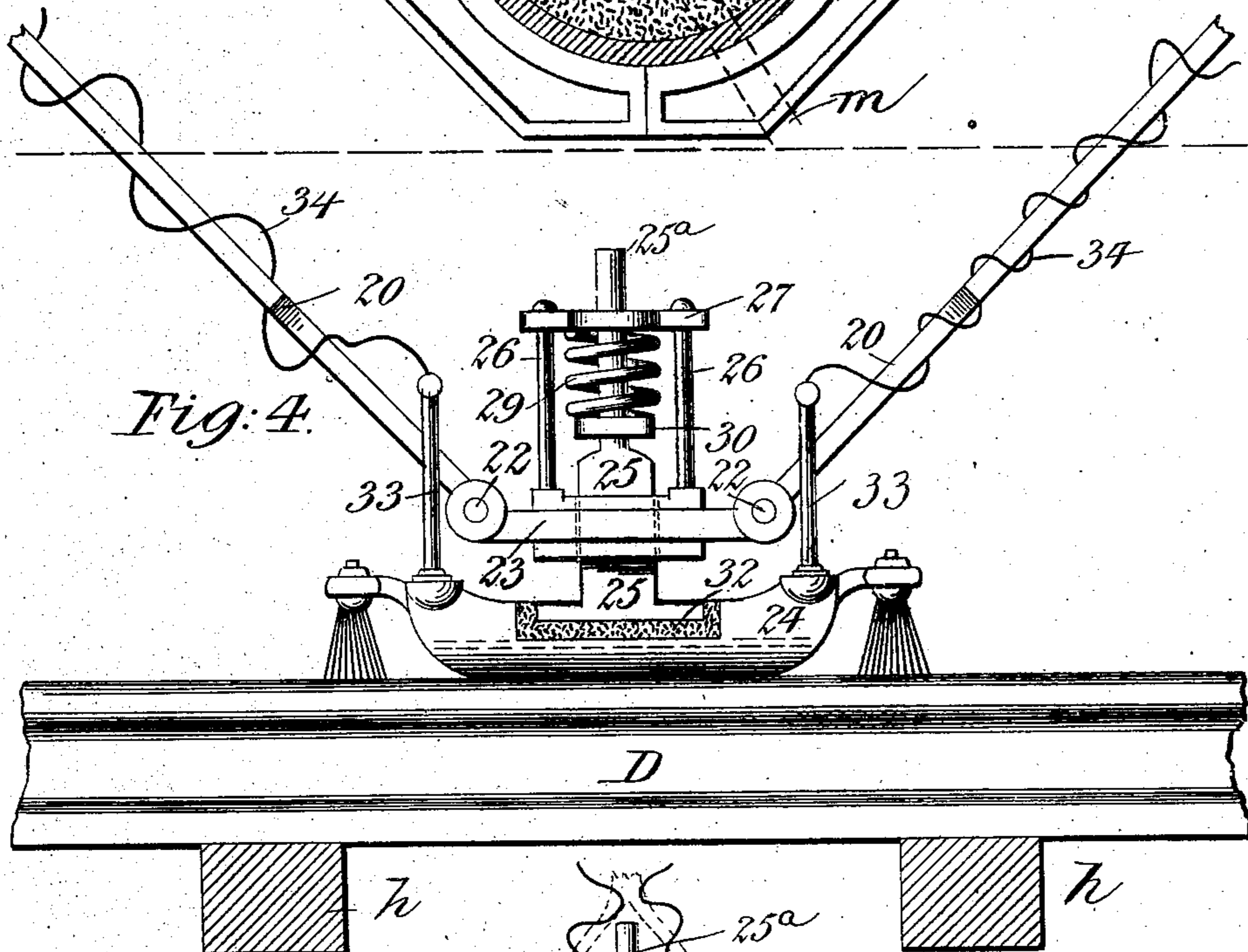
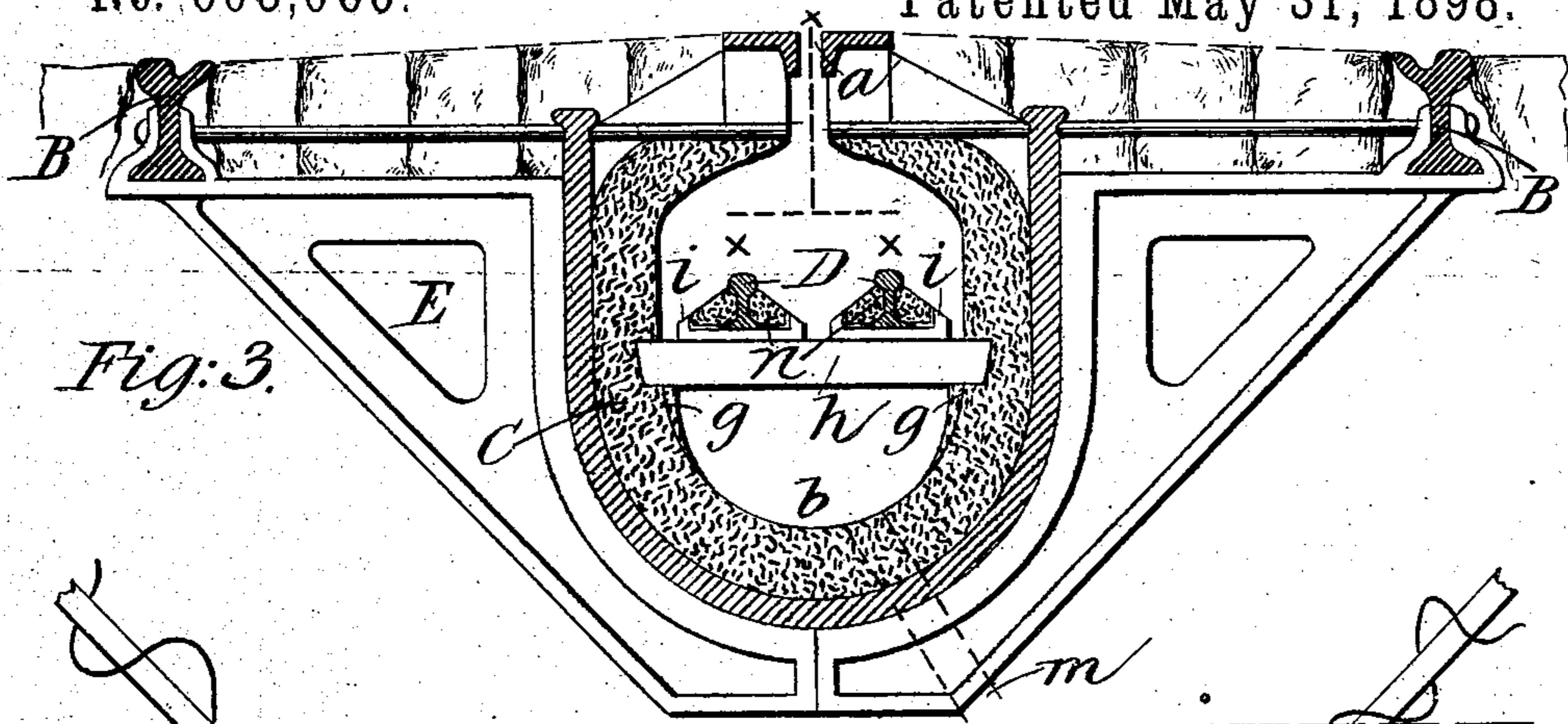
2 Sheets—Sheet 2.

L. E. WALKINS.

THIRD RAIL UNDERGROUND ELECTRIC RAILWAY SYSTEM.

No. 605,066.

Patented May 31, 1898.



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# UNITED STATES PATENT OFFICE.

LOUIS E. WALKINS, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO FRANCKE W. DICKINSON, OF SAME PLACE.

## THIRD-RAIL UNDERGROUND ELECTRIC-RAILWAY SYSTEM.

SPECIFICATION forming part of Letters Patent No. 605,066, dated May 31, 1898.

Application filed August 21, 1897. Serial No. 649,038. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS E. WALKINS, a citizen of the United States, and a resident of Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Third-Rail Underground Electric-Railway Systems, of which the following is a specification.

This invention relates to what may be characterized as a third-rail underground electric-railway system; the object of the invention being to support the third rail used as a conductor for the motor-current within an underground top-slotted conduit, all in such manner that the rail is readily accessible to be reached and contacted upon by the trolley or shoe of and depending below the motor-car and that the rail is stably and firmly supported and perfectly insulated, so that the rail is maintained away from any water accumulations in the conduit and so that the insulating material for the rail constitutes a shed for any water which may enter the conduit.

The invention consists in the combination, with the underground conduit, of the supporting and insulating means for the third rail and other and further devices, all substantially as will hereinafter fully appear, and be set forth in the claims.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a cross-sectional view of the railway, inclusive of the underground third rail and its inclosing conduit and the supporting and insulating means therefor. Fig. 2 is a plan view of the same. Fig. 3 is a cross-sectional view substantially like Fig. 1, but showing the current-conducting rails and supporting and insulating means therefor. Fig. 4 is a side elevation of the current-conducting "third" rail on a larger scale and of the shoe or trolley in running contact thereon, and Fig. 5 is an end elevation of the same.

Similar characters of reference indicate corresponding parts in all of the views.

In the drawings, A represents the road-bed of a railway, B B being the usual car-track rails, and C represents the central longitudinally-running top-slotted underground conduit, supported in a usual manner in the cast-iron yoke-frames E, provided at suitable in-

tervals, and D represents the third rail located within the conduit, the same being supported below the slot or mouth *a* thereof and above the bottom *b* thereof.

The conduit, as shown, is oval, or approximately that form, and comprises the outer section *d* of hard cement and an inner section *f* of an insulating material hard in its nature and also a good insulator, which closely adheres to and is as one with the outer cement conduit-section. The lining portion *f* of insulating material may be composed of a mixture of sawdust, comminuted rock, and a binder, solidified while in a plastic condition by hydraulic pressure. This material in itself I do not claim. The conduit has midway between its base and top, at opposite sides, the rests, sockets, or ledges *g g*, on which are supported the transverse ties *h*, of wood, preferably. On these ties is supported the longitudinally-running trough *i*, which has, preferably, a lining *j* of mica. The conductor-rail D is mounted with its base in this trough *i*, its tread portion being somewhat above the top edges of the trough sides. The top edges of the trough sides, as seen at 10 10, are downwardly and outwardly beveled. There is a filling *n* of cement or concrete placed in the trough *i* and covering the base and neck of the rail D and extending up under the tread portion thereof, and, as seen in the cross-sectional view, the outer sides of this cement filling, as well as the edges of the trough, are downwardly and outwardly inclined, whereby a watershed is constituted and a provision also for the falling away from the third-rail conductor of any dirt or other substances. This conduit, as usual in underground conduits, is provided with an outlet or drainage passage, such as indicated by the dotted lines *m*.

In Fig. 3 substantially the same equipments are illustrated as in Fig. 1, with the exception that two longitudinally-running current-conducting rails are shown instead of one, together with the corresponding troughs and cement or concrete flank bases for the rails.

In Figs. 4 and 5 I have illustrated an improved shoe or depending trolley for contact on the underground third-rail conductor, which embodies features of improvement and

advantage in that the shoe which receives the current from the rail or conveys the current to the rail, as the case may be, is in a sense independent of the arms or carriers by means of which the shoe derives its support from the motor car or truck, provision being made for the more direct connection of the current-wires with the shoe than has heretofore been practiced where the current had connection with the shoe through the supporting-arms for the latter, and, referring to the drawings, Figs. 4 and 5, 20 20 represent the supporting-arms, understood as having supporting connections with the motor car or truck and having pivoted thereto and between their depending ends at 22 22 the carrier-plate or shoe-holder 23, the shoe 24 being yieldingly supported by and suspended through said plate. The shoe has the upstanding squared shank 25, which passes through a squared aperture therefor in the carrier-plate 23, and said shank is further upwardly continued in the stem 25<sup>a</sup>. The holder-plate has the pillars 26 26, supporting the top plate 27 above the carrier-plate 23, through which the stem 25<sup>a</sup>, extended above the shoe, has a sliding fit. The spring 29 is under pressure between the top plate 27 and the shoulder 30, provided on the stem, which imparts the yielding pressure to the shoe. The shoe is connected to its shank 25 through the medium of insulation, (indicated at 32.) This shoe has at its ends the contact posts or terminals 33 33, to connection with which the wires 34 34 are brought, these wires, as is understood, being covered with insulating material, and they may, in approaching the binding-posts or terminals 33, have their running support thereto down on the afore-said arms 20, or they may be brought to their connection with the shoe entirely independently of said arms.

I claim—

1. In a third-rail electric-railway system, the combination with the track-rails and the top-slotted conduit, of the cross-ties supported within the conduit above the base thereof, the trough *i* of wood, mounted on said ties and longitudinally extending, the rail *D* set in the trough, and the filling of insulating material provided in the trough and covering the base and neck of the rail, the upper portion of said rail extending above said filling of insulating material which is downwardly and outwardly

inclined from its junction with the exposed portion of the rail, substantially as and for the purpose set forth.

2. In a third-rail electric-railway system, in combination, the track-rails *B B* and the underground top-slotted conduit *C*, of cement, comprising the inner wall thereof composed of a solidified insulating substance and molded with the rests or ledges *g g*, the wooden cross-ties *h h*, supported on said ledges above the base of the conduit, the trough *i* of wood having its top edges downwardly and outwardly inclined, and the third-rail conductor supported in the trough and having its top portion extending higher than the side walls of said trough, the cement or concrete filling covering the base and neck of the rail having the upper portion thereof exposed, which filling together with said trough edges by being downwardly and outwardly inclined constitute a watershed and guard for the rail, substantially as described and shown and for the purposes set forth.

3. In combination with a rail conductor, a trolley or shoe having terminals or binding-posts, a holder-plate for the shoe, on which the same is vertically yieldingly supported, arms for the holder-plate, whereby the same may be supported from the motor car or truck, and wires running to connection with the binding-posts of the shoe, independent of the holder-plate and its supporting-arms, substantially as described.

4. In combination with the third-rail conductor of the shoe 24, having the squared shank 25, and stem 25<sup>a</sup>, and having the connection-posts or terminals 33, the arms 20, and holder-plate 23, having the pillars 26 and top plate 27, the squared shank of the shoe playing through a socket therefor in the holder-plate and having its stem guided through the top plate, the spring 29, between the top plate and said collar, and an independent current-conductor running to one of said connection-posts, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 13th day of August, 1897.

LOUIS E. WALKINS.

Witnesses:

WM. S. BELLWS,  
J. M. BELLWS.