

May 28, 1935.

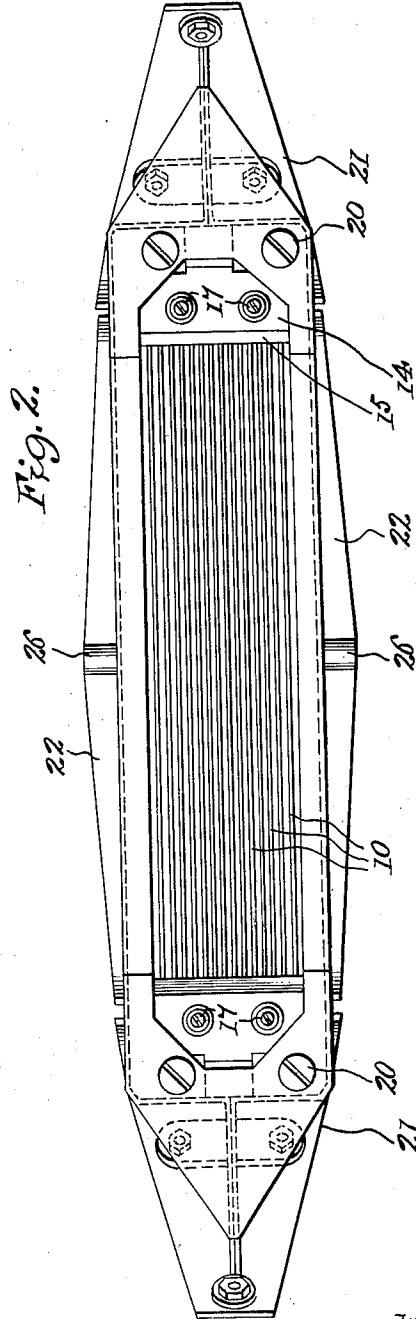
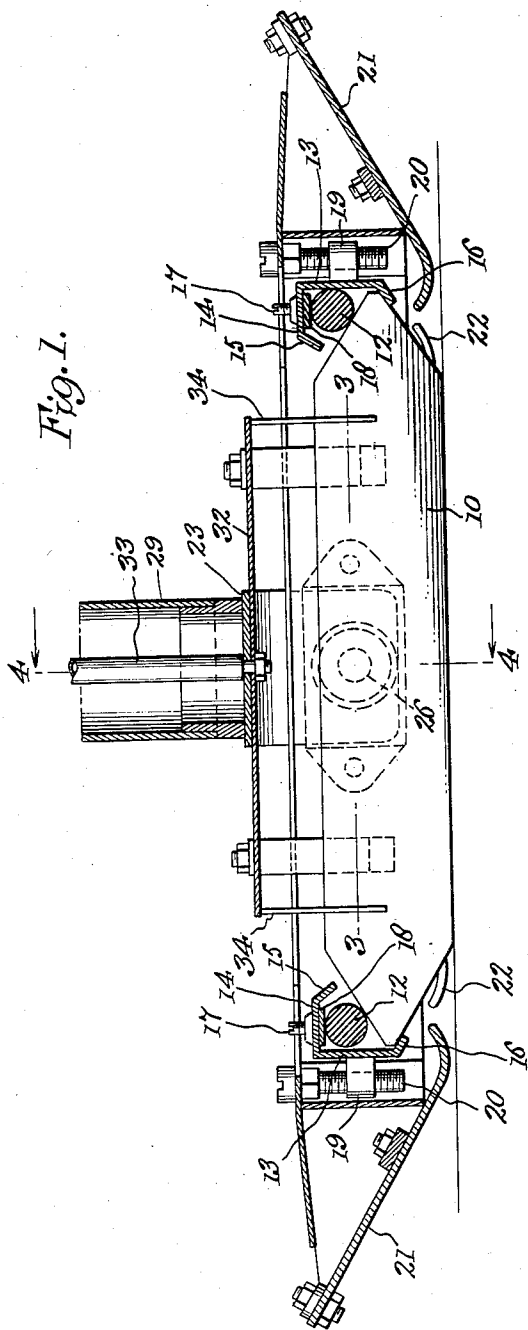
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2,003,209

FLOW FOR ELECTRICAL SIGNALING OF RAILWAYS

Filed Sept. 8, 1933

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

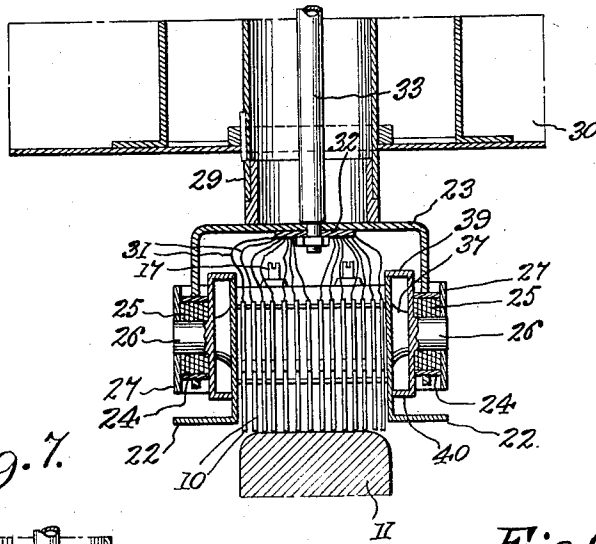
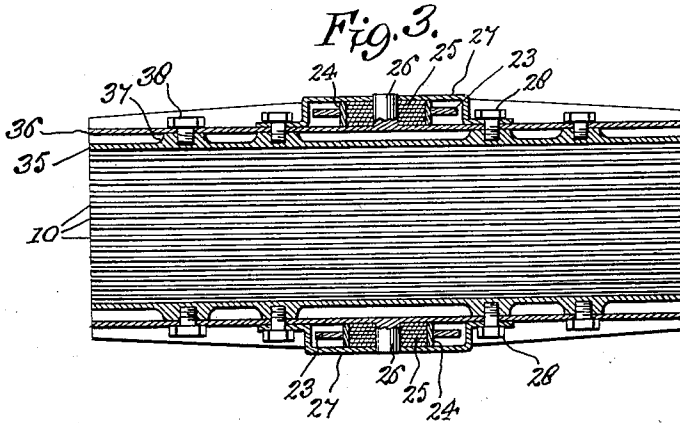


Fig. 7.

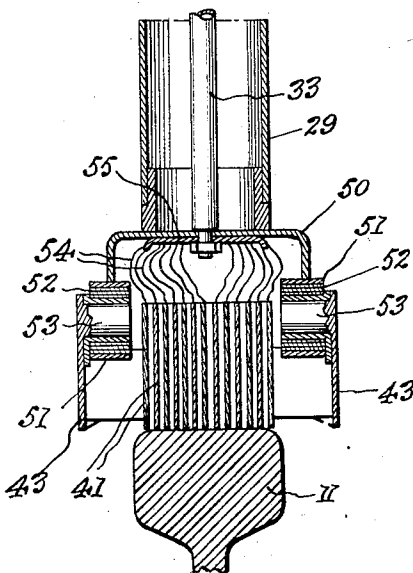
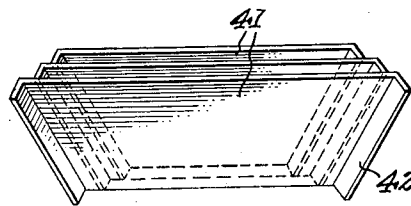


Fig. 6.



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3 Sheets-Sheet 3

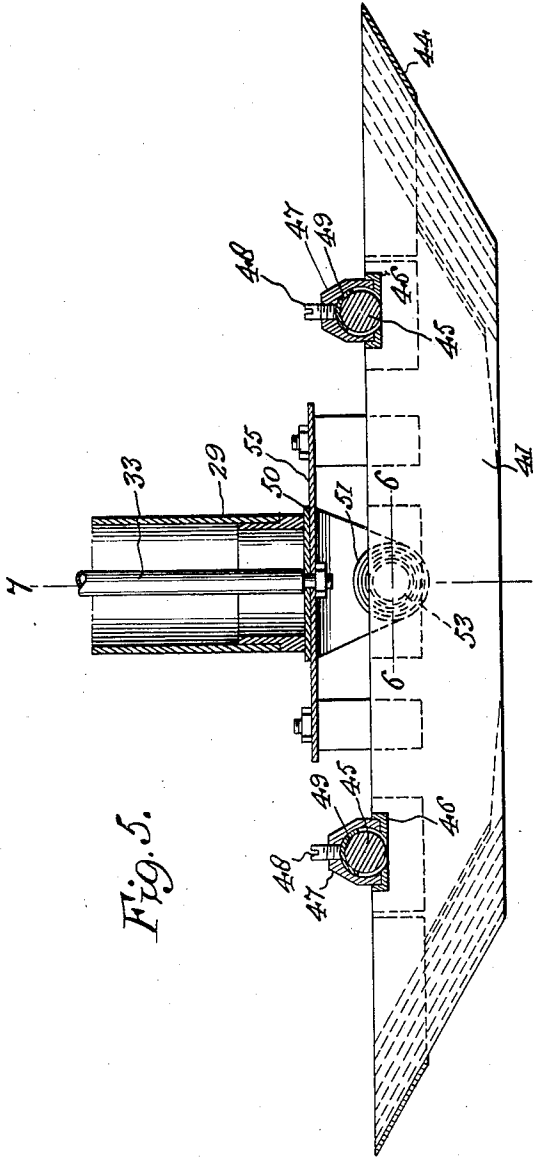


Fig. 5.

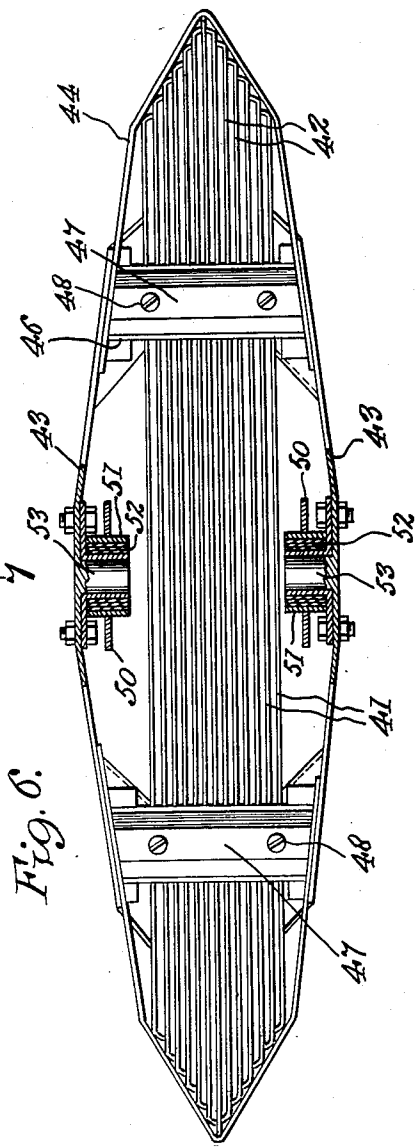


Fig. 6.

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UNITED STATES PATENT OFFICE

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PLOW FOR ELECTRICAL SIGNALING OF RAILWAYS

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12 Claims. (Cl. 246—193)

The present invention relates to improvements in plows for electrical signaling of railways.

The tracks of railroads comprise sections insulated from one another for purposes of electrical signaling in which the two lines of rails are placed in electrical connection when the section is occupied by a vehicle. This electrical connection is ordinarily established through the metallic axles of the ordinary rolling stock. The present invention has for its object to provide a plow for establishing electrical connection when, for any reason, the axles do not establish it; for example, when the vehicles are supported on pneumatic tires which bear directly on the rails; or in case the electrical connection is insufficiently established, for example, when the cars or locomotives with metallic wheels are too light.

The conditions involving operation of the signaling circuits demand that the connection between the two lines of rails be a short circuit as perfect as possible.

The usual arrangements employing brushes, rollers and plows of the type of those used for taking current by electric vehicles, or for the repetition of signals by electrical contacts, do not give satisfactory results for the track circuits.

The present invention has for the further object to provide a plow formed by one or several plates of relatively great length, much narrower than the rail and bearing edgewise on the rail to the end that the surface of contact between the plate and the rail is a rectangle greatly elongated in the direction of motion. With this disposition, any given point on the rail continues in contact with the plate during a considerably longer space than in the case of brushes or rollers. Sand, water or foreign bodies found on the rail are removed from the point of contact and the rail is cleaned by the passage of the plate at the point of contact, which is not the case with brushes, rollers or plows having an extended transverse dimension.

In order that there may always be contact despite lateral movements of the vehicle, and to multiply the points of contact, it is advantageous to use several parallel plates resting individually on the rail.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a vertical central section of an improved plow constructed in accordance with the present invention.

Figure 2 is a top plan view with the cap removed.

Figure 3 is a horizontal section taken on the line 3—3 in Figure 1.

Figure 4 is a vertical section taken on the line 4—4 also in Figure 1.

Figure 5 is a vertical central longitudinal section taken through a modified form of device.

Figure 6 is a top plan view with parts broken away and with the cap removed.

Figure 7 is a transverse vertical section taken on the line 7—7 in Figure 5, and

Figure 8 is a perspective view of the disposition of the plates.

Referring more particularly to the form of invention shown in Figures 1 to 4 inclusive, 10 represent plates of any metal, making good electrical contact with the rail, indicated at 11 in Figures 4 and 7, and being resistant to wear. Such plates 10 are each applied to the rail by the pressure of rubber blocks 12. These rubber blocks are confined by brackets 13. Such brackets are formed with vertical walls designated at 13, with top plates 14 and upper diagonal flanges 15. Lower diagonal flanges 16 extend inwardly from the vertical walls 13 in order to catch beneath the diagonal end portions of the plates 10. Adjusting screws 17 are mounted in the brackets for moving adjusting plates 18 up and down in order to impose greater or less tension on the rubber blocks 12, or to adjust the vertical height of the plates 10 in the plow frame.

The brackets carry internally threaded eyes 19 for traveling up and down with the brackets upon adjusting screws 20 which adjusting screws are mounted in an appropriate part of the plow frame.

The plow frame carries at each end a removable inclined lip plate 21 to assist the plow in passing over rail joints, turn tables, and other points of different level or over obstacles. At each side of the plow frame is a removable shoe 22 for allowing the passage over switch points, crossings, cross-overs and in general over all gaps or interruptions in the rails.

The plow frame is secured to the vehicle by a cap 23, of which the eyes 24 extend about rubber rings 25 for deadening shocks and noise, and serving as bearings for the trunnions 26. These trunnions 26 project out laterally from opposite sides of the plow frame. The eyes 24 are maintained in place by metal or other straps 27, which are secured to the plow frame as by the screws 28

shown in Figure 3 or in any appropriate manner.

The cap 23 is suspended from a tube 29 which is mounted upon the railway car or other vehicle, indicated at 30 in Figure 4, said tube 29 being fitted to the car for vertical movement but being restrained against turning in the car. In this way movements of the vehicle up and down with respect to the railway are permitted without disturbing the position of the plow upon the rail.

The plates 10 project below the lip plates 21 and the shoes 22 so that, normally, said plates alone ride on the rails 11. The plates are held to good electrical contact with the rails by the weight of the other parts of the device acting through the rubber blocks 12. The lip plates 21 do not come into contact with the rail piece except where important level differences occur, such as at rail joints, turn tables, etc.; and the shoes 22 do not bear upon the rail except at switch points, crossings, cross-overs and other gaps and interruptions in the rail.

Each plate 10 is connected at its medial portion by an electric wire or conductor 31 with a common conductor plate 32, which in turn is connected to the supporting or assembling shaft 33. Spacing fingers 34 extend down from the plate 32 and between the contact plates 10 to keep these plates parallel and properly spaced. The plow or plows placed at each side of the vehicle are connected together by any connection whatever of low electrical resistance. In proportion to wear, the plates 10 may be lowered by adjusting the screws 17 or 20. The plates 10 have oblique end portions at each extremity for the purpose of enabling them to easily ride over the rail joints, and also to permit the plates 10 to be rotated about their horizontal axes whereby they may be inverted for use on both longitudinal edges to double the life of the plates.

The removable lip plates 21 and shoes 22 are easily replaced after use.

The plow frame may be made up in any suitable manner, for instance, of the two side members each composed of spaced plates 35 and 36 held in spaced relation by spacing lugs 37 which may be formed upon the exterior surfaces of the inner plates 35 and provided with screw sockets to receive the screws 38 by which the two plates are held together. These two plates are joined by top plates 39 and by bottom plates 40 whereby to form substantially rectangular enclosures.

The trunnions 26 project from the outer plates 36. The contact plates 10 are placed between such hollow frame members and are subject to vertical adjustment in the frame by means of the screws 17 and 20.

It will be understood that the construction described and illustrated may undergo various changes without departing from the spirit of the invention; also various changes may be made in the method of mounting the device upon the vehicle, the construction illustrated being only by way of one embodiment. The trunnion arrangement permits of a rocking movement of the plow frame with reference to its support in the cap thereby enabling the longitudinal edges of the contact plates 10 to accommodate themselves to the tread surface of the rail and also to have a longitudinal rocking movement enabling a freer passage over irregularities in the rail and overrail joints, etc.

Referring more particularly to Figures 5 to 8 inclusive, these figures show another form of the device in which wear does not necessitate frequent adjustment. In this case 41 designates the

contact plates, which plates have diagonal end portions formed with lateral flanges 42 extending obliquely and adapted to engage the adjacent plates in order to space the plates apart. As shown in Figure 6 the ends of the plates terminate short of one another so that the flanges 42 may impinge upon the body portions of an adjacent plate and the plate ends will preferably present the V-formation indicated.

The group of plates arranged in this fashion present, at each end, a continuous array of inclined edges which permit passage over joints and similar obstructions.

The group of plates 41 is held in position by two side frame plates 43 which are spaced apart and held in spaced relation at each end by end pieces 44 on which rest the diagonal or inclined end portions of the plates 41. The contact plates 41 are forced downwardly into contact with the diagonal end pieces 44 by rubber blocks 45. These rubber blocks are seated in strips 46 mounted in cut-away portions in the upper edges of the contact plates 41. Above the blocks are transverse beams 47 carried by the frame members 43. Set screws 48 are threaded in the beams 47 and act through arcuate caps 49 to impose pressure on the rubber blocks 45. The socket strips 46 prevent longitudinal movement of the plates 41 with respect to the beams 47 but they permit within limits a vertical movement which is cushioned by the rubber blocks 45.

The cap 50 is used to connect the plow frame to the vehicle. Such cap carries eyes or bearings 51 containing rubber rings 52 for lessening shocks and noise and serving as a joint between the vehicle and the trunnions 53 which project inwardly from the side frame members 43. The cap 50 is connected to the vehicle in the same manner as previously described or in any other appropriate manner.

Also each plate 41 is connected by electric wires or connections 54 with the common contact plate 55, such wires 54 being flexible.

As in the former case the plow or plows at each side of the vehicle are connected electrically by low resistance connections.

The pieces 43 rest on the rail only in passing over great obstructions, such as rail joints, turn tables, or in passing over switch points, crossings, cross-overs and in general gaps or interruptions in the rails.

When the plates 41 become worn, the action continues the same without having to make an adjustment. When the wear becomes very great, it may be necessary, if there is much inequality between the central plates and the longitudinal plates, to equalize the height of the plates by shortening the higher ones.

It will be understood that various changes and modifications may be made in the device as illustrated and described without departing from the spirit of the invention and I reserve the right to make all such changes and modifications as may fall within the spirit of the appended claims.

What is claimed is:

1. A plow for electric signaling on railroads comprising a plow frame, a cap, trunnions between the cap and the medial portion of the frame, the axes of the trunnions being transverse to the railroad, and contact plates in the frame having long thin edges contacting the rail head for distances in advance and in rear of the trunnion axis.

2. A plow for electric signaling on railroads comprising a plow frame, brackets adjustably

mounted therein, rubber blocks in the brackets, and contact plates having V-shaped ends for reversal mounted in said brackets against the blocks.

5 3. A plow for electric signaling on railroads comprising a plow frame including side frame members having trunnions, resilient rings about the trunnions, a cap having bearings embracing the trunnions and rings, confining means to hold the bearings and rings on the trunnions, and contact means in said frame.

10 4. A plow for electric signaling on railroads comprising a plow frame having inclined end pieces, long thin contact plates having inclined ends fitting downwardly upon the end pieces, said plates having cut-away portions, socket strips lying across the plates and in the cut-away portions, rubber blocks bearing on said socket strips, and adjustable backing means for the blocks above same and supported on said frame.

15 5. A plow for electric signaling on railroads comprising a long thin plate bearing edgewise on the rail, means for adjustably suspending said plate from a railroad vehicle, an electric connection from the plate to the signaling circuit of the vehicle, and separate lip plates for raising the contact plates to assist said plow in passing over obstacles.

20 6. A plow for electric signaling on railroads comprising a plow frame, a plurality of long thin contact plates held in said frame with their long narrow edges exposed beneath the frame for contact with the rail, electrical connections from the plates to the signaling circuit of the vehicle, means adapted to vertically adjust said plates in the frame, separate lip means for each end of said plates adapted to assist said plow in passing over obstacles.

25 7. A plow for electric signaling on railroads, comprising a plow frame on the railroad car, long thin contact plates in said frame and their lower thin edges exposed below the frame for contact with a rail, yieldable means for urging said plates downward with reference to the frame, means adapted to regulate the tension of said yieldable means, and separate lip means at each end of said plow frame adapted to assist said plow in passing over obstacles.

8. A plow for electric signaling on railroads, comprising a plow frame, a plurality of contact plates held side by side in said frame and being long and thin with their lower long edges exposed below the frame for contact with a rail head, elastic means in said frame for urging the plate downwardly, adjustable means in said frame for vertically adjusting said plates and elastic means and separate lip plates at each end of said plow frame adapted to assist said plow in passing over obstacles.

9. A plow for electric signaling on railroads, comprising a plow frame, a plurality of long thin contact plates, means to hold the plates yieldably and in parallel relation in the frame with the edgewise dimensions of the plates substantially vertical, spacing means to hold the plates a predetermined distance apart and separate lip plates at each end of said plow frame adapted to assist the plow in passing over obstacles.

10. A plow for electric signaling on railroads comprising a plow frame, and contact plates therein disposed edgewise in a substantially vertical direction side by side, said contact plates having flanges turned at their opposite ends to engage an adjacent plate and thereby space the plates apart.

11. A plow for electric signaling on railroads comprising a plow frame, a tube fitted for vertical movement but restrained against turning in the car, a cap suspended from the tube, pivotal connections between said cap and plow frame, elongated thin contact plates in the frame bearing at their edges upon the rail, and separate lip plates at each end of said plow frame adapted to assist said plow in passing over obstacles.

12. A plow for electric signaling on railroads comprising a plow frame, contact plates in the frame having long thin edges contacting the rail head throughout substantially their entire length, a cap connecting the plow frame to the vehicle, pivotal connections between said frame and cap intermediate the ends of the frame, the axes of said pivotal connections being transverse to the railroad, and separate lip plates adapted to assist said plow for passing over obstacles.

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