

No. 719,057.

PATENTED JAN. 27, 1903.

D. J. SULLIVAN.
SAFETY SWITCH CLOSING MECHANISM.

APPLICATION FILED MAY 5, 1902.

3 SHEETS—SHEET 1.

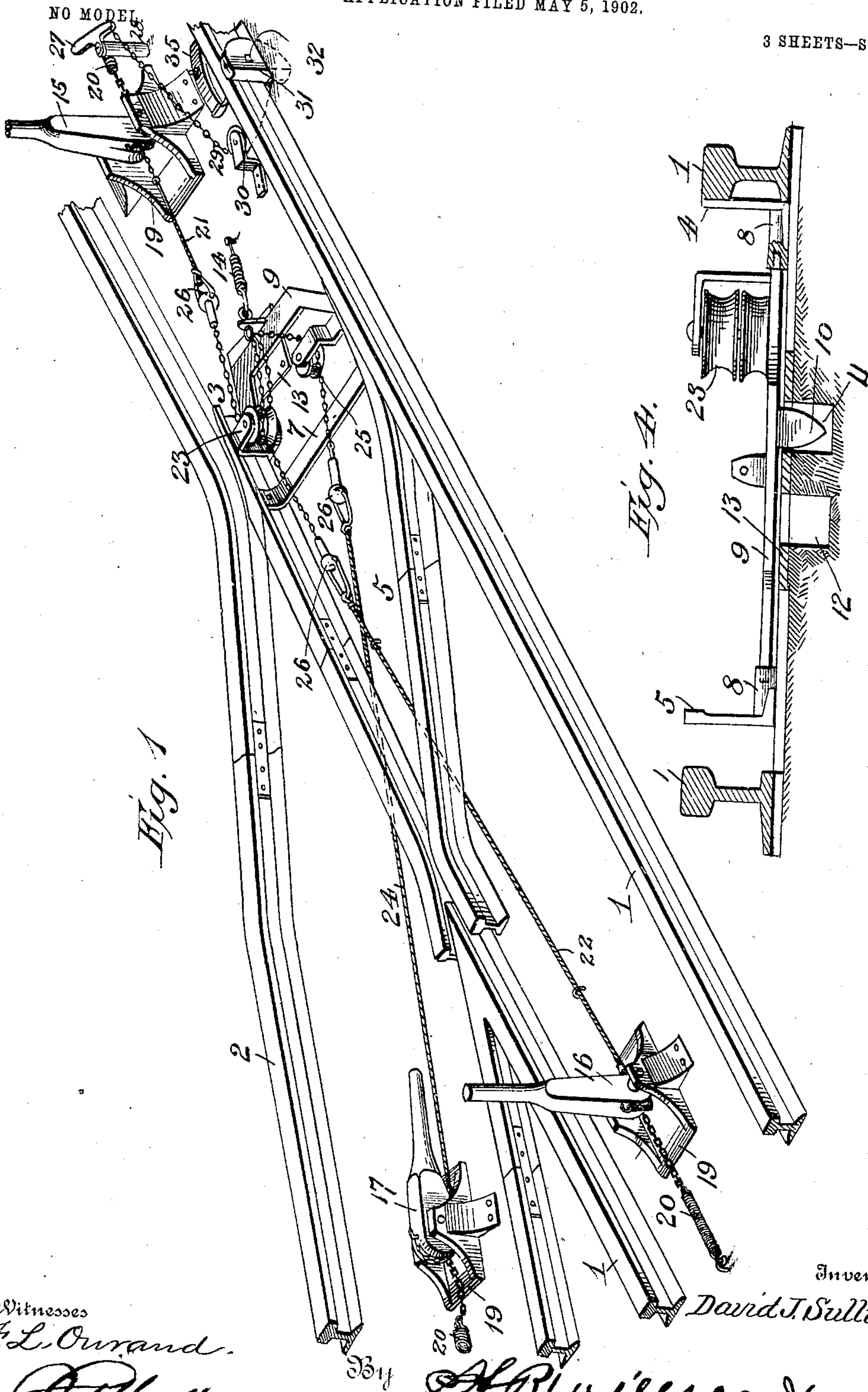


Fig. 1

Fig. 4.

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NO MODEL.

3 SHEETS—SHEET 2.

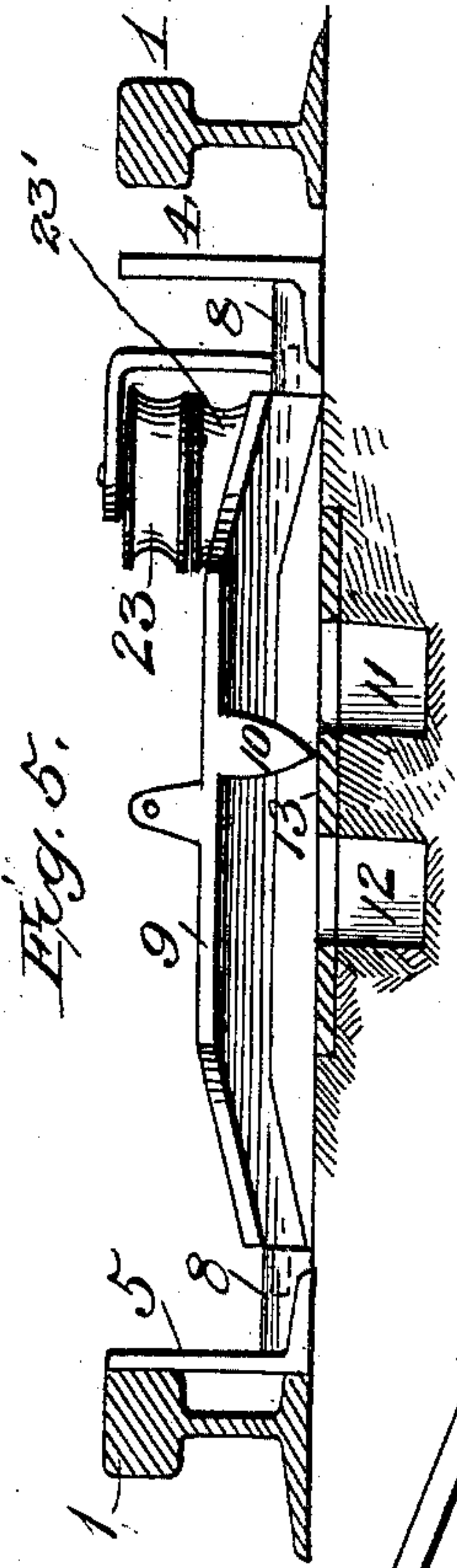


Fig. 5.

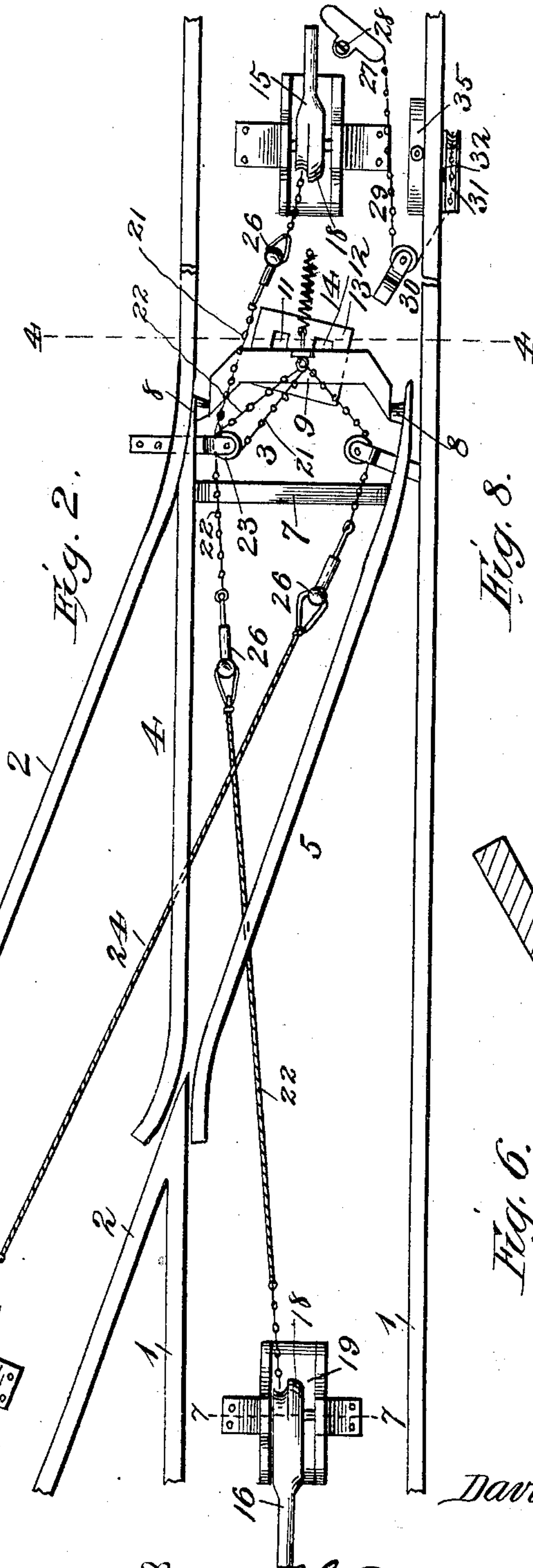


Fig. 2.

Fig. 8.

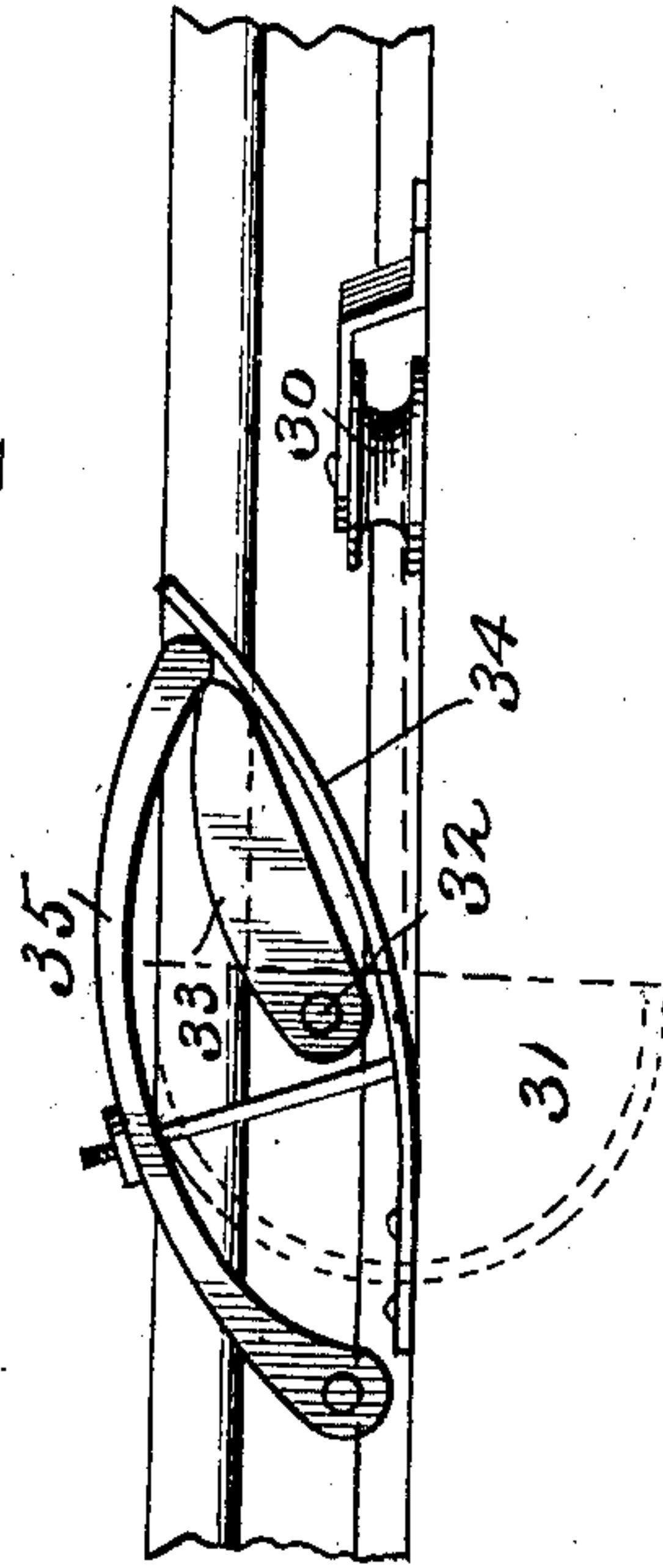
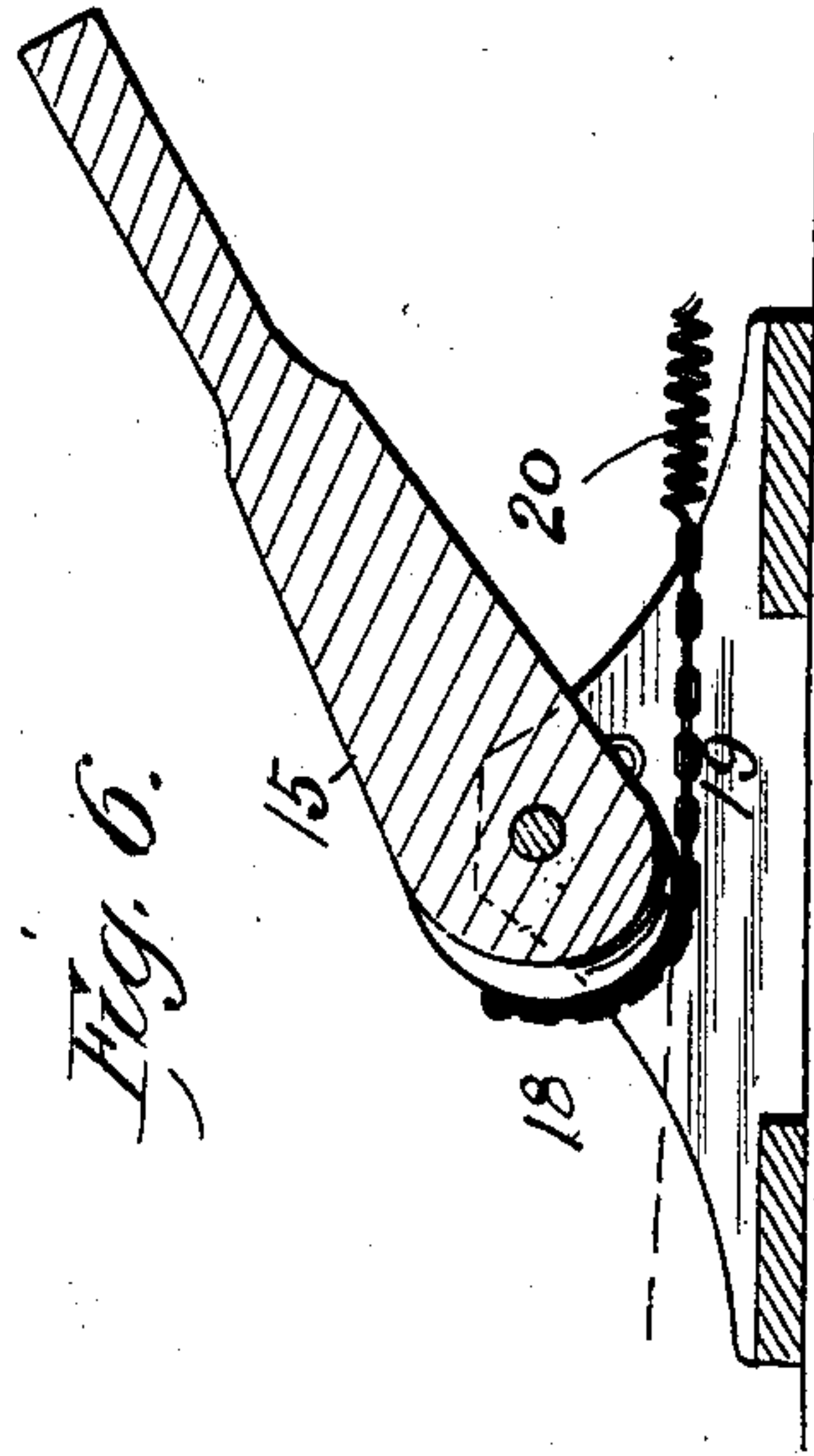


Fig. 6.



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NO MODEL.

3 SHEETS—SHEET 3.

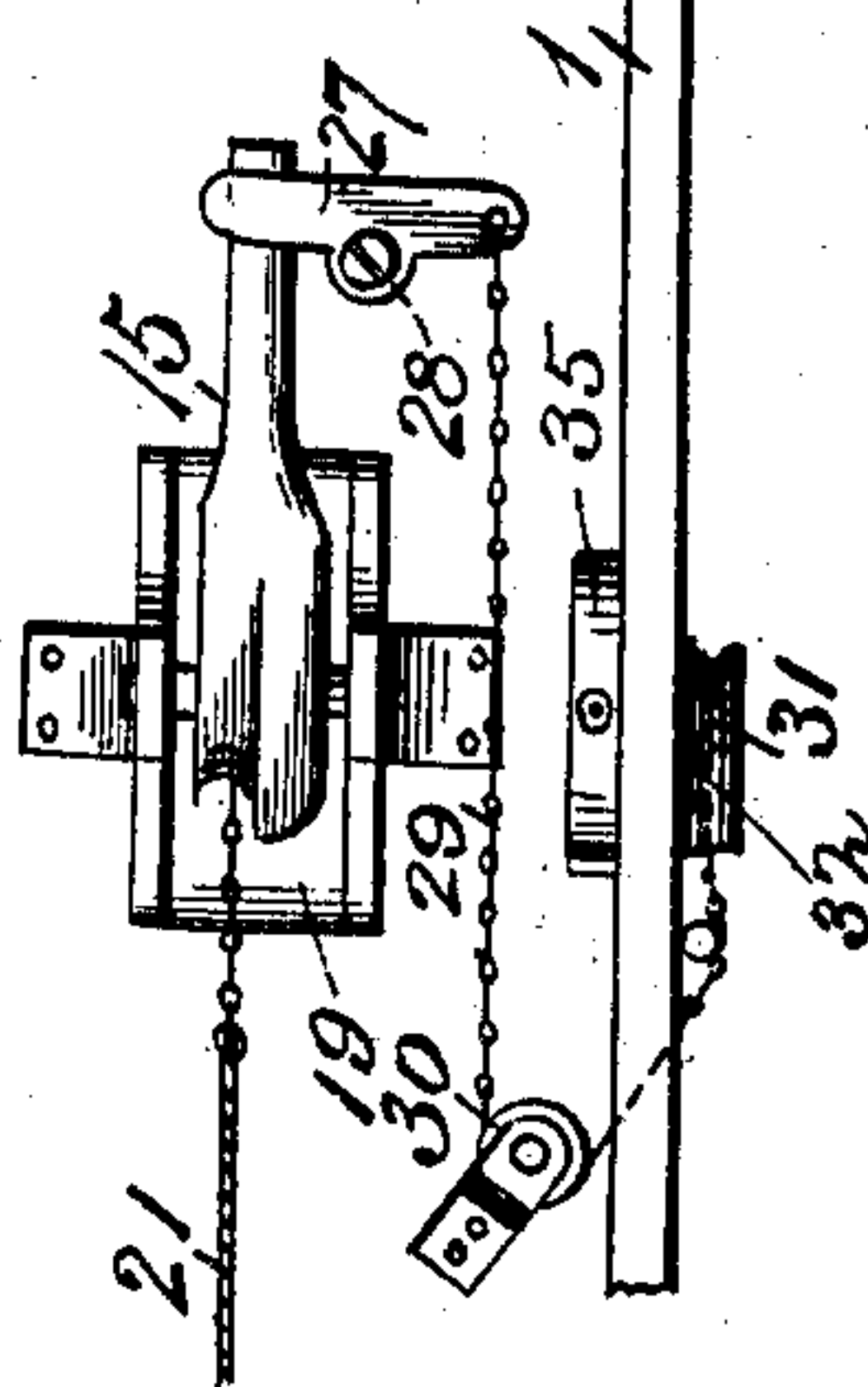
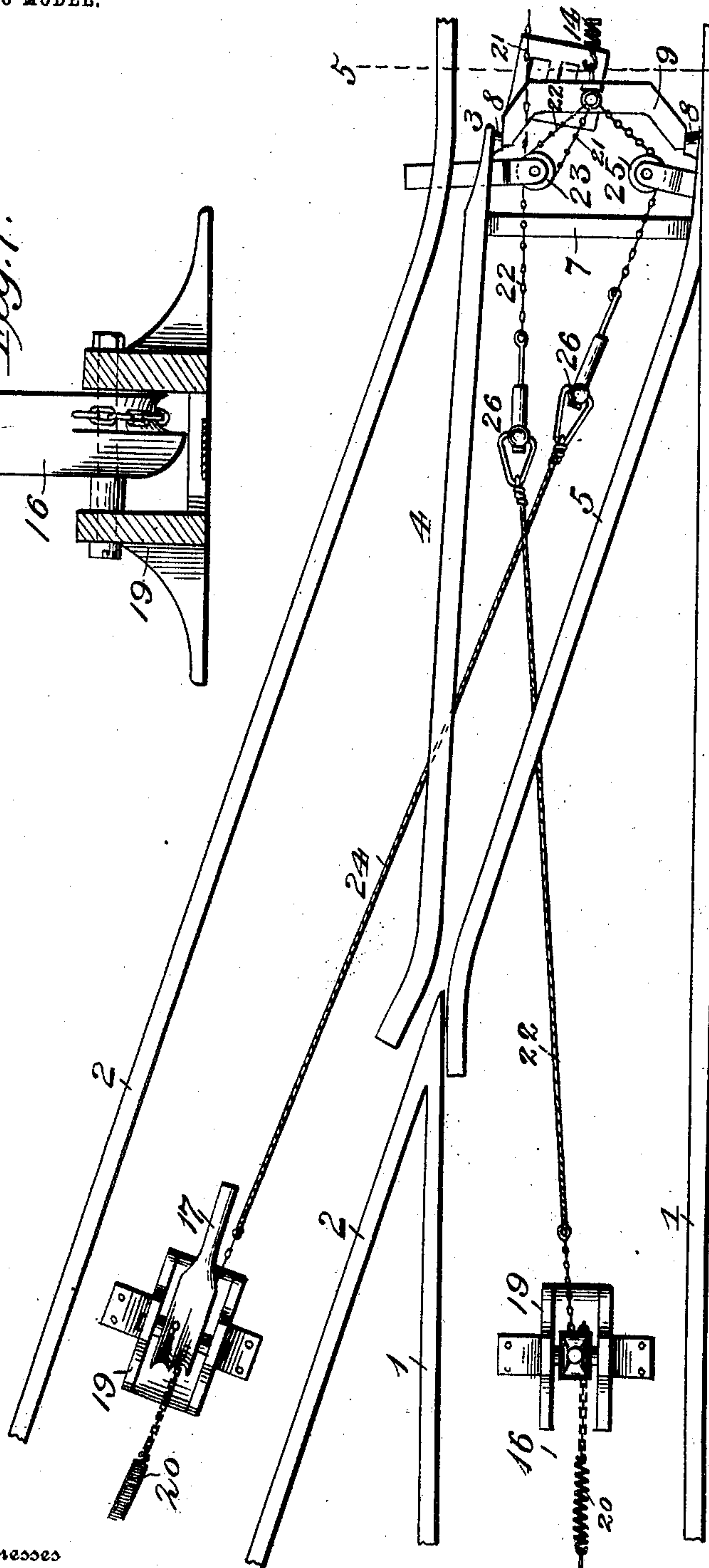
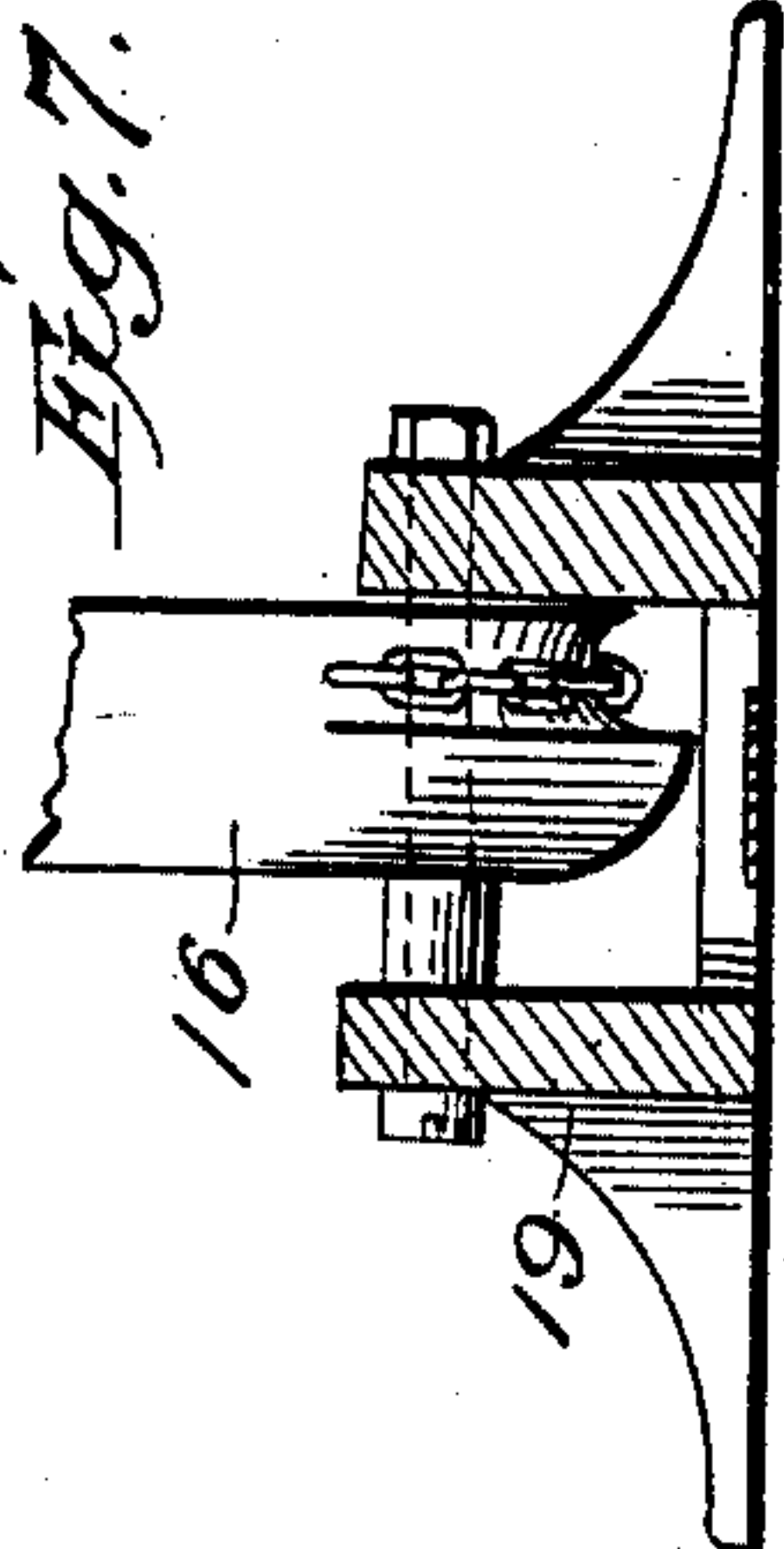


Fig. 3.

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UNITED STATES PATENT OFFICE.

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SAFETY SWITCH-CLOSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 719,057, dated January 27, 1903.

Application filed May 5, 1902. Serial No. 106,014. (No model.)

To all whom it may concern:

Be it known that I, DAVID J. SULLIVAN, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Safety Switch-Closing Mechanisms; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to switch-operating mechanism, and particularly to mechanism for automatically closing railway-switches which have been accidentally or intentionally left open when in the operation of the road the conditions are such as to require them to be closed.

The object of the invention is to provide safety switch-operating mechanism by means of which when a switch which should be closed for the passage of a train over, say, a main track is left open the closing of the switch will be automatically effected by the approaching train, thus securing freedom from the accidents ordinarily resulting from open switches.

A further object of the invention is to provide simple and effective means for automatically locking the switch-tongue in either of its positions to prevent casual displacement thereof.

A still further object of the invention is to provide means whereby the switch-operating mechanism may be made temporarily inoperative for local switching between a main and branch track and also whereby in case of the failure of the trainmen to reset the mechanism and close the switch the mechanism will be automatically reset and the switch closed by the train.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view showing the

application of the invention in connection with main and branch tracks and the switch-tongue at the intersection of said tracks, the switch being open to connect the branch track with the main track. Fig. 2 is a top plan view of the same, showing the switch closed. Fig. 3 is a similar view showing the switch open and one of the trip-levers depressed for local switching. Fig. 4 is a sectional view on line 4 4 of Fig. 2, showing the locking-bar and keepers. Fig. 5 is a cross-section through the bar on line 5 5 of Fig. 4, illustrating the action of the bar in shifting from one keeper to the other. Fig. 6 is a detail sectional view of one of the trip-levers and its support. Fig. 7 is a section on line 7 7 of Fig. 2. Fig. 8 is a detail side elevation of the trip device and coacting parts for resetting the depressed switch-lever for action.

Referring now more particularly to the drawings, the numeral 1 represents the main-track rails, 2 the branch-track rails, and 3 the switch-point arranged at the intersection of said rails to open or close the main track to the branch track.

Switch-point 3 is the same as on all railroads, either stub or split switches, and is adapted to swing between the two rails of the main track in the usual manner.

The point-rails 4 and 5 are suitably connected and braced by one or more braces or cross-bars 7 and are provided at their rear ends with bearings 8 to receive journals upon the opposite ends of a tilting locking-bar 9, which bar is provided at an intermediate point with an inclined or V-shaped projection 10 to engage either one of two sockets 11 and 12 in a double keeper 13, suitably fixed at a point intermediate between the two main-line rails 1. A coil-spring 14 is fixed at one end to one of the ties or to an iron plate attached to two or more ties or to some suitable part of the road-bed and is connected at its opposite end to the bar 9 to normally hold the same in a horizontal position and to maintain the projection 10 in engagement with the socket in which it is seated. When the switch-point is shifted in one direction or the other to open or close the branch line to the main line, the bar 9 is tilted in order to release the projection 10 from the socket to allow the switch-

point to have freedom to swing, and in moving from one socket to another the projection 10 is adapted by the inclination of the bar and the movement of the switch-point to ride across the intermediate surface of the keeper 13, as indicated in Fig. 5. When the switch-point is arranged in position to close the main line to the branch line, the projection 10 engages the socket 11 and holds said switch-point against movement, so that accidental shifting of said point cannot possibly occur. When the switch-point is shifted in the reverse direction to open the main line to the branch line, however, the projection 10 engages the socket 12 and acts in a similar manner to prevent displacement of the switch-point, whereby absolute safety against movement of the switch-point in either of its two operative positions is insured.

Located in the center of the main track at suitable distances from the switch-point are trip-levers 15 and 16, and located in the center of the branch track is a similar trip-lever 17. The two trip-levers 15 and 16 are located on opposite sides or in opposite directions beyond the switch-point and are adapted to be actuated by the pilot or cow-catcher of the locomotive of a moving train to shift the switch-point in the same direction, so that in either case when one of these levers is operated the switch-point will be swung to a closed position to cut off communication between the main and branch tracks. The trip-lever 17 is employed for moving the switch-point in the reverse direction for opening communication between the two tracks. Each of these levers is provided with a curved or cam-shaped end 18 and is pivotally mounted upon a suitable base 19, and upon each lever acts a spring 20, which normally maintains it in a position perpendicular to the horizontal, or nearly so. When the lever is swung upon its pivot to an operative position, it is supported by the spring, which limits its movement only in one direction, while the lever is free to swing down to a horizontal position in the other direction. By this construction and arrangement of the levers they are adapted when perpendicular, or nearly so, to be struck by the pilot of a passing engine and when in an inoperative position lie in a horizontal plane, so that the pilot may clear or pass over the same in order that the cooperating parts of the apparatus will not be thrown into action.

The trip-lever 15 is connected with the locking-bar 9 through the medium of the cable or flexible connection 21, and the lever 16 is similarly connected to the locking-bar by a cable or flexible connection 22, which pass, respectively, around the pulleys 23 23', located upon one side of the center of the main track, so that said bar will be tilted and drawn upon in the proper direction to close the switch-point 3 and open opposite switch-point when either of said levers are actuated. The branch-track trip-lever 17 is also connected by a chain or flexible connection 24 with the

locking-bar, and this flexible connection passes around a pulley 25, which is located on the opposite side of the center of the main track from the said pulleys 23, so that when said trip-lever 17 is operated the locking-bar will be tilted and drawn upon to swing the switch-point 3 open, as will be readily understood. The several chains or flexible connections are provided with turnbuckles 26, whereby they may be adjusted to compensate for wear, expansion, and contraction, and said chains are connected to the locking-bar, so as to exert a pull thereon in opposition to the spring 14, which holds the locking projection 10 seated in one of the aforesaid sockets 11 or 12.

Figs. 1 and 3 of the drawings show the switch-point 3 open to connect the main line with the branch line, and in this position of the parts it will be seen that the two trip-levers 15 and 16 are arranged in their proper positions for operation by the pilot or cow-catcher of the locomotive of a train running in either direction, while trip-lever 17 is depressed. If after the switch has been opened to permit of the passage of a locomotive or train from one track to the other and the switch should be allowed to remain open, it will be readily seen that upon the approach of a train from either direction the cow-catcher upon the locomotive would strike and throw one of the trip-levers 15 or 16, and thereby close the switch, thus allowing the train to pass along the main track without interruption or accident. If, for instance, a train should be traveling in the direction in which it would first encounter the trip-lever 16, the said lever will be depressed or thrown forward by the pilot on the locomotive and the flexible connection 22 drawn upon to tilt the locking-bar 9 and shift the switch-point 3 to close the switch, the tilting of the locking-bar in this operation causing it to become first disengaged from the socket 12 and then to engage the socket 11 to hold said switch-point locked in its closed position. If, on the other hand, the train should be proceeding to the opposite direction, the pilot of the locomotive on coming in contact with the trip-lever 15 would operate said lever in a similar manner and draw upon the flexible connection 21, thus tilting the locking-bar and shifting the switch-point in identically the same way. In the same manner the locomotive of a train coming from the branch track onto the main track would operate the trip device 17, thus drawing on the flexible connection 24, which will tilt the locking-bar and swing the switch-point 3 in the reverse direction, thereby opening communication between the two tracks. The trip-levers and their cables are so connected and arranged that when either of the main-line levers is depressed to throw the switch to the closed position the other main-line lever will be depressed and the branch-line lever will be reset for throwing the switch to the open position

and so that when said branch-track lever is operated to open the switch both of the two main-line levers which have been depressed will be reset.

5 When it is necessary to use the branch track, or where local or frequent switching between the main and branch tracks is carried on at intervals, it is desirable to provide some means to prevent the trip-lever 15 from
10 being operated and closing the switch each time the locomotive passes from one track to the other. To this end I provide a detent 27, which is pivoted to swing in a horizontal plane upon a suitable stud or boss 28 and is pro-
15 vided with oppositely-extending arms, one of which is adapted to engage the free end of the trip-lever 15 to hold it down against the tension of its spring 20, while the other arm has attached thereto a chain or flexible con-
20 nection 29, which passes around a pulley 30, located alongside the outer rail of the main track, and thence extends beneath the rail to the outer side thereof, where it is connected to an eccentric 31, mounted upon a shaft 32,
25 which in the present instance is shown as extending through and journaled in said outer rail. Fixed to this shaft upon the inner side of the rail is a cam block or head 33, which is engaged by a retracting-spring 34, which
30 elevates the free end of the cam-block and holds the eccentric in such a position that the chain or flexible connection 29 is slack and allows the detent 27 to maintain its engagement with the trip 15. This spring also
35 acts upon a trip device 35, which is pivoted upon the inner side of the rail and bears at its free end upon the cam-block to force the latter downwardly and to thereby operate the eccentric 31 to draw upon the flexible
40 connection 29 and swing the detent 27 out of engagement with the lever 15, leaving the latter free to be restored to its operative position by its spring 20. The spring 34 has connected thereto a bolt or a connecting-pin
45 which projects through the trip device 35 and receives an adjusting-nut 36, by means of which the tension of the spring and the sensitiveness of action of the trip device 35 may be regulated as desired and when desired.
50 In practice the trip device 35 is adapted to be operated by the flange of a wheel on a car or locomotive and is located some distance beyond the trip-lever 15 in a direction away from the switch, so that in the event the
55 trainmen should forget to restore the lever 15 to its normal position the trip device 35 would be operated by a wheel of the approaching train and would draw the detent 27 from its engagement with the trip-lever 15,
60 leaving the latter free to assume its normal position, in which position it would be actuated by the pilot of the locomotive and op-

erated in the manner before described to close the switch.

From the foregoing description, taken in 65 connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved switch-operating mechanism will be readily apparent without requiring a more extended 70 explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advan- 75 tages of this invention.

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

1. In automatic switch-closing mechanism, 80 the combination with a switch; of means for locking the switch in its open and closed positions, devices, operable by a moving locomotive or train, for shifting the switch and locking and unlocking said locking means, 85 means for holding one of the said devices out of operative position, and means operable by a train or locomotive for retracting said holding means and resetting said device which is out of operative position so as to adapt it to 90 be operated after the retracting and resetting means, substantially as described.

2. In automatic switch-closing mechanism, the combination with a switch; of trip mechanism having an operating device operable 95 by a moving locomotive or train for closing the switch, a detent for holding the operating device out of operative position, an eccentric, a cam acting on the eccentric, a connection between the eccentric and detent to 100 retract the latter, and a second trip device for operating said cam, substantially as and for the purpose described.

3. In automatic switch-closing mechanism, the combination with a switch; of trip mechanism having an operating device operable 105 by a moving locomotive or train for closing the switch, a detent for holding the operating device out of operative position, an eccentric, a cam acting on the eccentric, a connection 110 between the eccentric and detent to retract the latter, a wheel-operated trip device for actuating said cam, and a variable tension-spring for restoring the cam, eccentric and wheel-trip to their normal positions, substan- 115 tially as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DAVID J. SULLIVAN.

Witnesses:

LOUISE VEIT,
LULU KING.