

(No Model.)

2 Sheets—Sheet 1.

J. J. HILL.  
RAILROAD SWITCH APPLIANCE.

No. 450,329.

Patented Apr. 14, 1891.

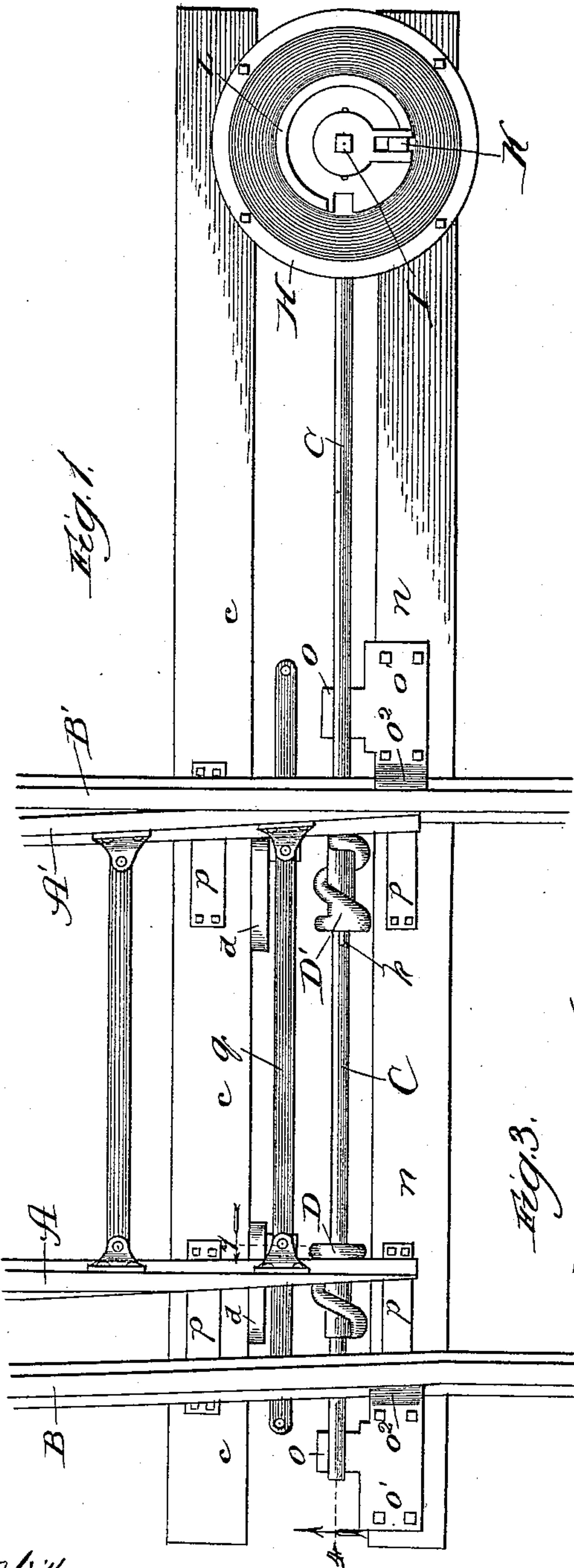


Fig. 1.

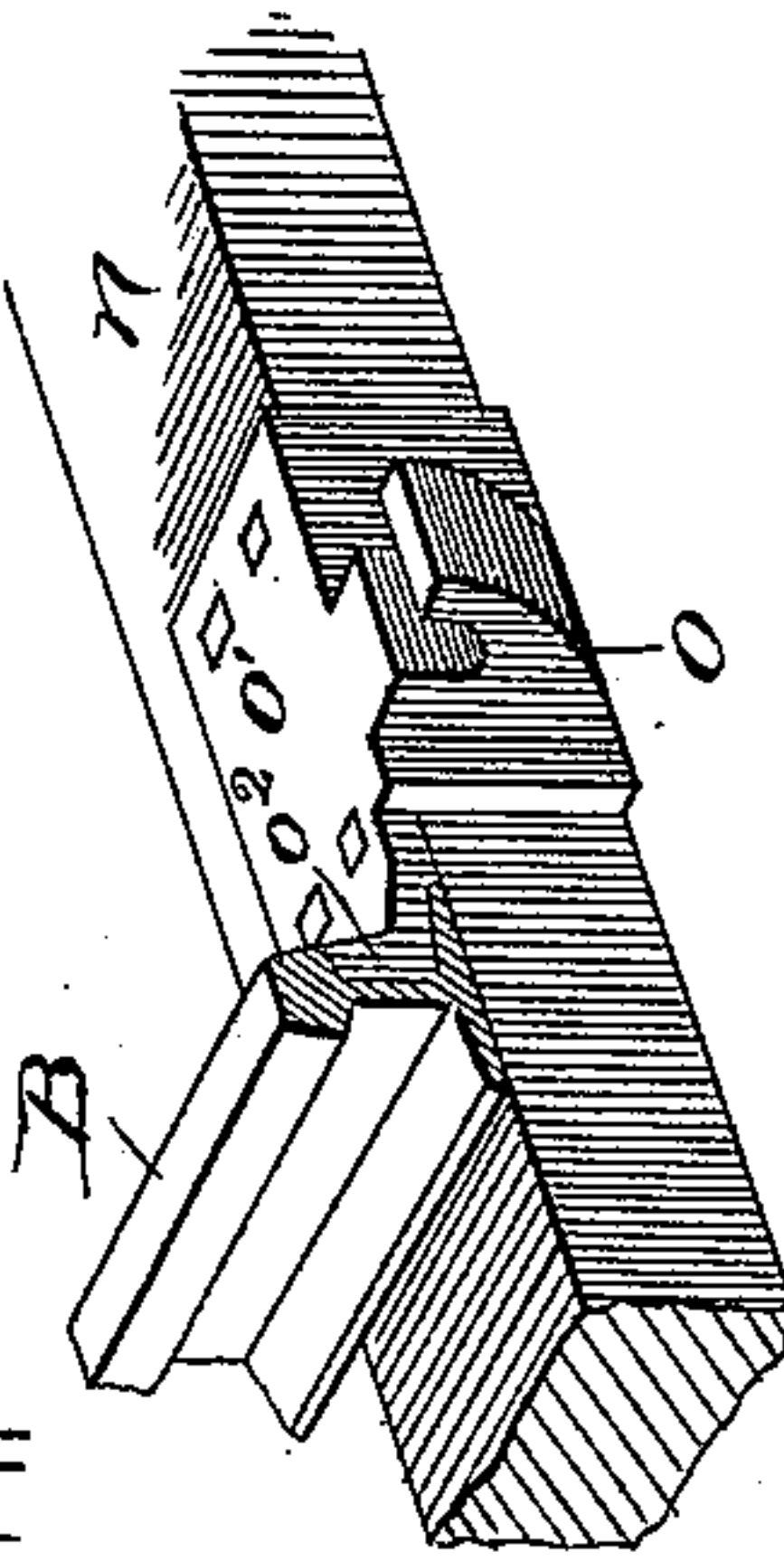
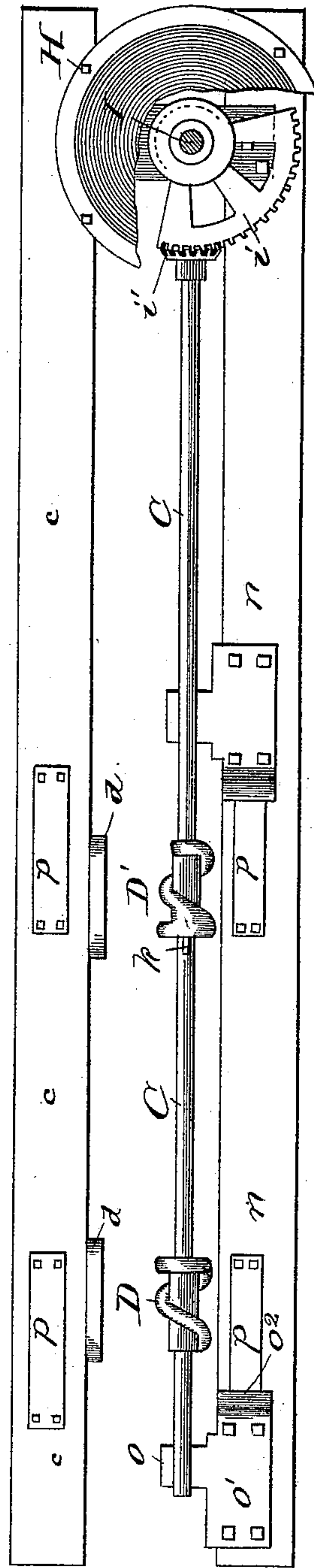


Fig. 2.



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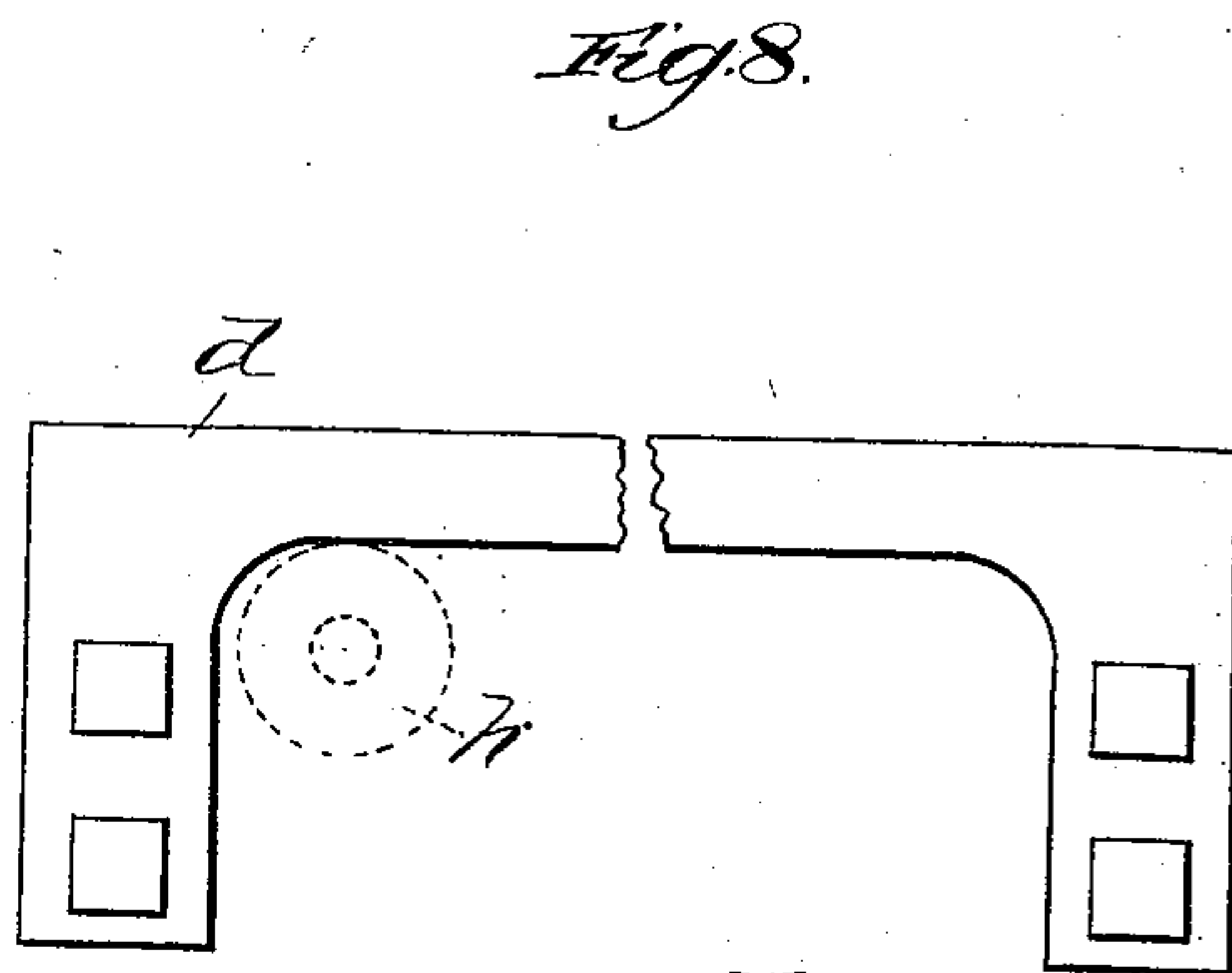
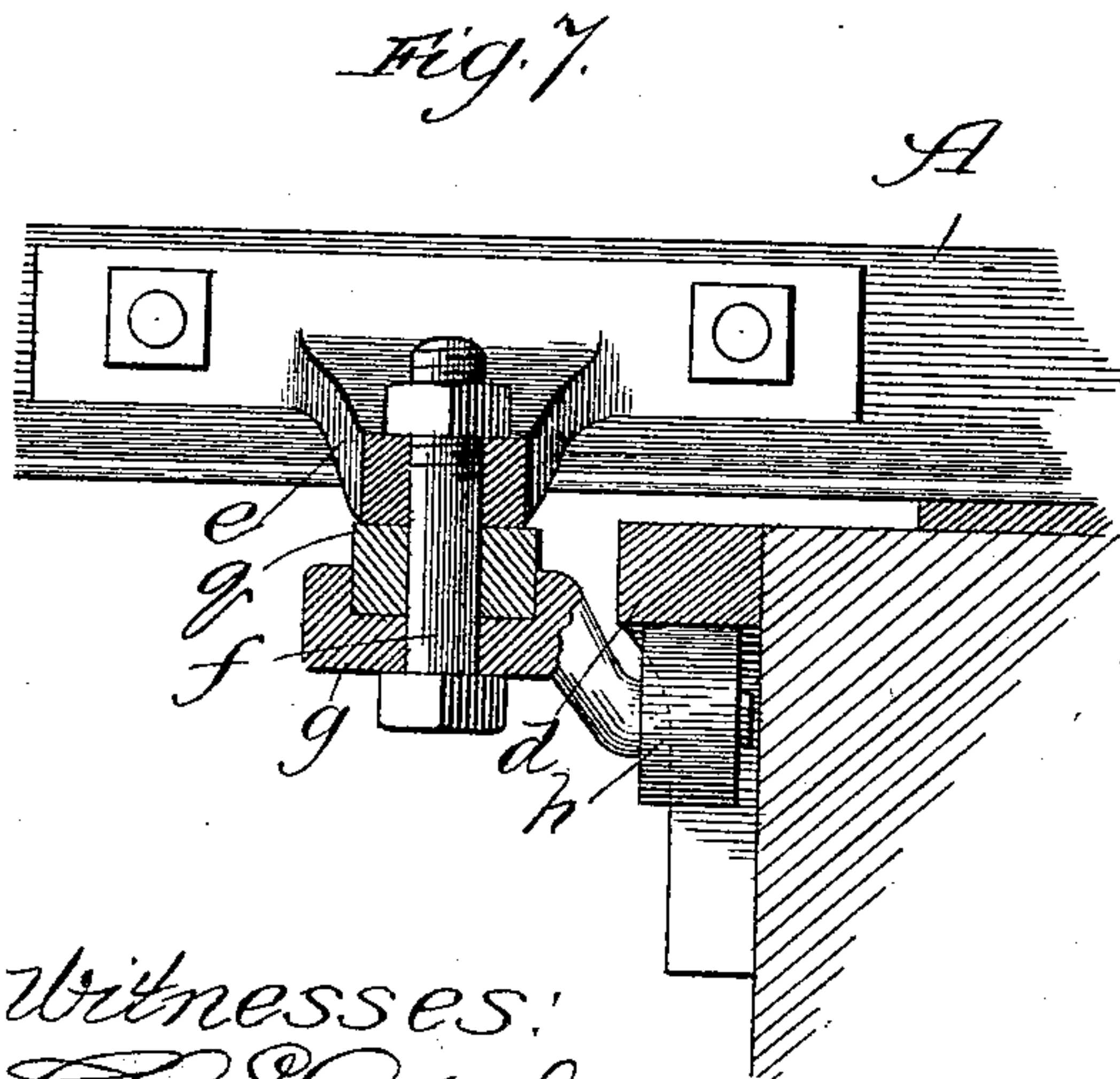
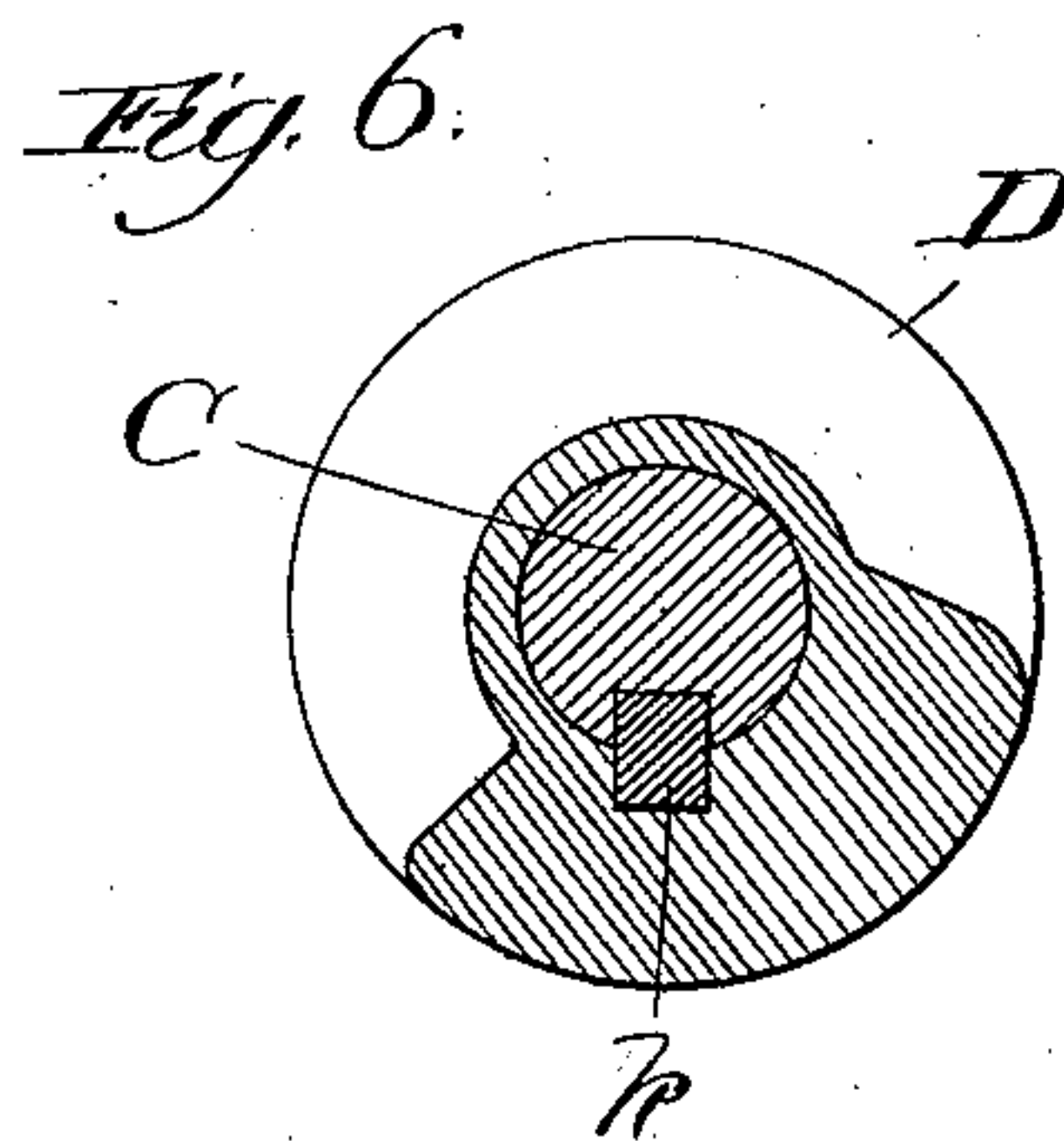
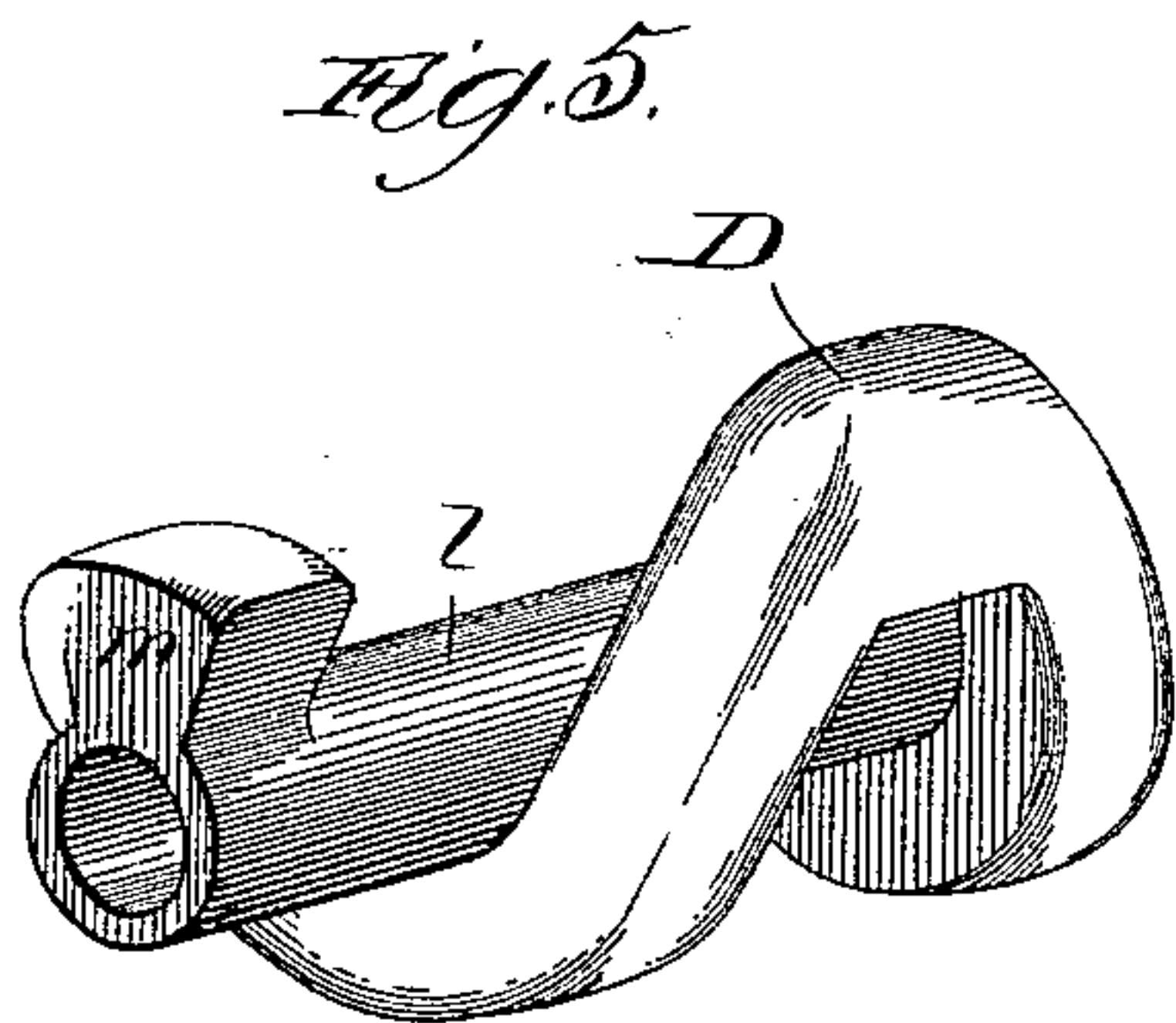
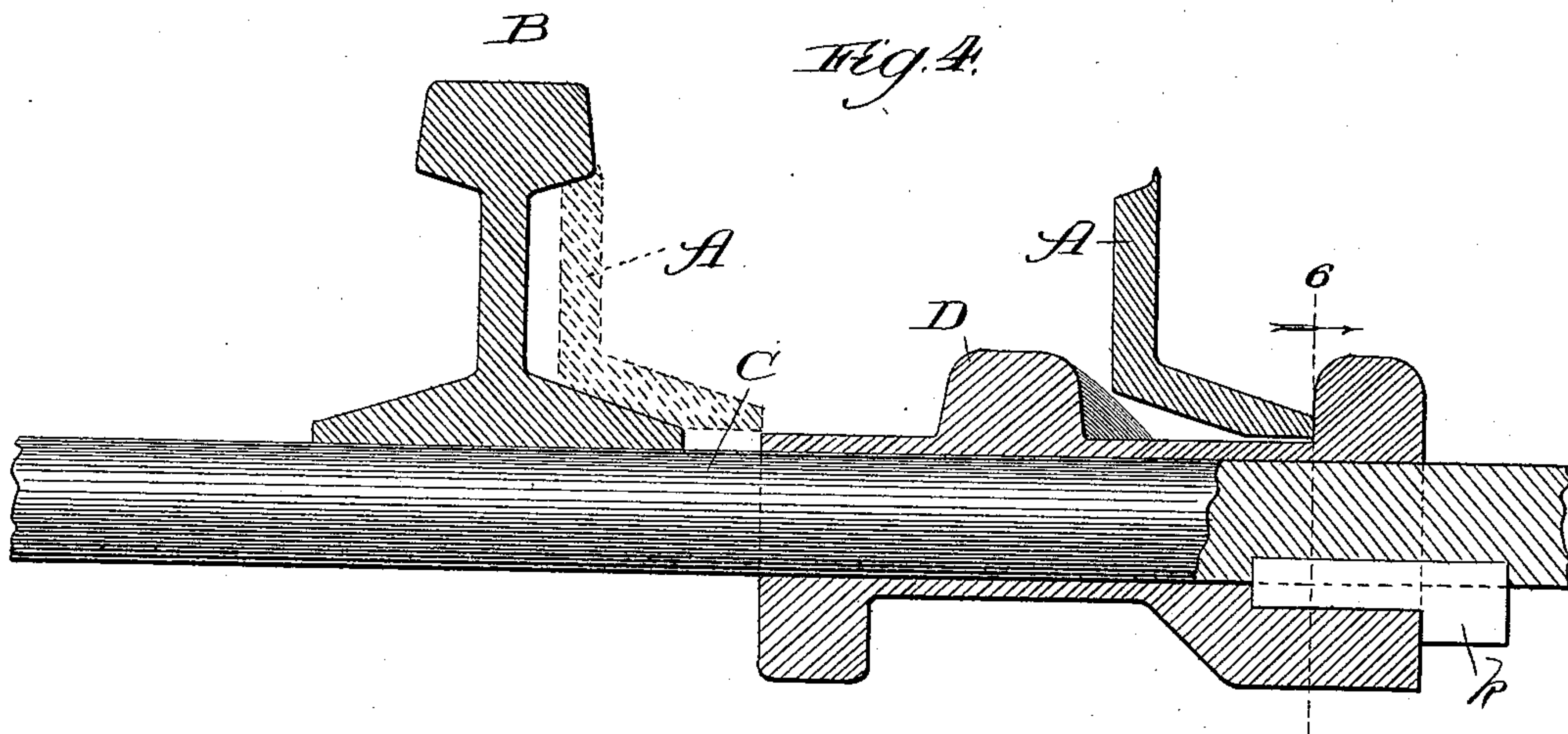
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2 Sheets—Sheet 2.

J. J. HILL.  
RAILROAD SWITCH APPLIANCE.

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Patented Apr. 14, 1891.



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# UNITED STATES PATENT OFFICE.

JOHN J. HILL, OF CHICAGO, ILLINOIS.

## RAILROAD-SWITCH APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 450,329, dated April 14, 1891.

Application filed October 21, 1890. Serial No. 368,785. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. HILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented a new and useful Improvement in Railroad-Switch Appliances, of which the following is a specification.

My invention relates to an improvement in the class of railroad-switch appliances in  
10 which the connected rails of the split switch are thrown by the engagement with them of worms on a rotary switch bar or shaft by the rotation of the shaft; and it is particularly designed as an improvement on the construction of appliance for operating switch-rails,  
15 for which Letters Patent of the United States No. 419,443 were granted me on the 14th day of January, 1890.

The objects of my present improvement are  
20 so to form the locking ends of the worms that each will bear against a portion of the base of its respective switch-rail beyond that against which the working side of the worm bears in moving the rail; to provide the worm  
25 portions of the device as separate parts to be fastened in position on the rotary switch-bar, whereby they may be readily removed and replaced by others when desired, and easily adjusted to compensate for wear upon them  
30 or upon the switch-rails, or both; to provide improved means for bracing the main rails against spreading, and thus to maintain their proper gage to prevent any space between the main rail and switch-rail when the latter is  
35 moved to the end of its throw; to prevent binding in throwing the switch of a tie-bar against the base of a main rail under which it passes, and, finally, to provide a generally-improved construction of the aforesaid class  
40 of railroad-switch appliance.

In the accompanying drawings, Figure 1 is a plan view of my improvement, shown as applied in operative position to a switch in a railroad-track, of which a broken portion is  
45 represented. Fig. 2 is a similar view of the same, but with the rails and their tie-rods removed. Fig. 3 is a broken view in perspective, showing an improved combined rail-brace and bearing for the rotary switch-bar,  
50 which may be used to advantage with the other features of my improvement. Fig. 4 is

a section taken on the line 4 of Fig. 1, viewed in the direction of the arrow, and enlarged. Fig. 5 is a view in perspective of my improved worm on a sleeve adapted to be keyed to the  
55 rotary switch-bar. Fig. 6 is a section taken on the line 6 of Fig. 4, and viewed in the direction of the arrow. Fig. 7 is a section taken on the line 7 of Fig. 1, viewed in the direction of the arrow, and enlarged. Fig. 8 is a view  
60 in broken elevation of a guide-track detail for an anti-friction roller, indicated by a dotted representation.

A and A' are the rails of a split switch, and B and B' the main rails of the track.  
65

C is the rotary switch-bar extending across the bases of the rails near the points of the switch-rails, which rest and move on the slide-plates *p*, and are connected, as usual, by tie-bars, the foremost *q* of which passes under  
70 the bases of the several rails. The rotary switch-bar C rests at the outer sides of the main rails in bearings *o*, each extending downward at the side of the head-block *n* from a plate *o'*, fastened on the upper side and having  
75 integral with it a rail-brace *o''*, bearing against the outer side of the main rail near the line of the switch-bar C.

On the rotary switch-bar, near opposite ends of the portion thereof extending between the  
80 main rails, are worms D and D', each of which should, with the gear shown in the switch-stand H, extend about once and a half around the switch-bar, the outer end of each terminating in a flat bearing-surface *m*, Fig. 5, extending at an angle to the pitch of the worm  
85 and to or toward a right angle to the length of the switch-bar, whereby it is parallel, or nearly so, with the main-rail flange, against which it is designed to lock the switch-rail it controls. The worms D and D' are formed best,  
90 most readily, and cheapest by casting them with sleeves *l*, (see Fig. 5,) which permit them to be slipped over the rod C into position and as readily removed therefrom, the sleeves being preferably fastened in place by keys *k*, to receive which recesses are formed (see Fig.  
95 6) in the switch-rod and in the ends of the sleeves, which, when the latter are in position, form the inner ends, which should be there  
100 materially thickened, as shown, to strengthen them. The pitch of each worm affords suffi-



cient width between all points thereon in a straight line from each other lengthwise of the rotary switch-bar to admit the point-rail crossing it, with the base of the point-rail extending below the height of the worm-thread, whereby in turning the rotary switch-rod in either direction the outer side of a worm-thread bears throughout its pitch against the same, or about the same point at the inner side of a point-rail. It will be noticed that the two worms are set to avoid corresponding exactly as to their relative positions on the switch-rod—that is to say, the corresponding ends should not be in direct line with each other. This is to avoid their beginning to act simultaneously, the one to unlock one of the switch-rails when the opposite one begins to throw the other switch-rail, the unlocking worm thus always having some lost motion to perform its function before the throw by the other worm is begun.

The switch-rod C leads to an operating device, which may be in the form of a switch-stand H, having its spindle I provided toward its lower end with a suitable gear, such as the segmental rack *i*, engaging with a suitable gear, such as the beveled gear-wheel *i'* on the adjacent end of the switch-rod, and toward its upper end the spindle carries the operating-lever K, (shown to be of the common drop-lever form,) which serves to lock the appliance by being permitted to swing into a notch in a table L of the switch-stand at each end of the throw.

The operation is as follows: With the parts in the relative positions shown in the drawings, the switch-rail A' is locked against the main rack B'. This condition was produced by turning the spindle I toward the right to cause the gear mechanism to rotate the switch-rod C accordingly, and thereby cause the thread of the worm D' to play against the inner side of the switch-rail A' to force it to the end of its throw. The end of the throw of the switch-rail is reached when the end of the pitch of the worm where the locking-surface *m* joins it bears against the rail. Further turning of the switch-bar brings the bearing-surface *m* against the side of the switch-rail beyond the point of contact with it of the worm-thread in moving it, so that, as will readily be seen, even if the pitch of the worm change with wear, as it may slightly by long usage, and the rail be worn away at the point of its contact with the bearing side of the worm-thread, that wear will not effect the efficacy of the locking function of the worm, the locking end thereof being always at an obtuse angle to the end of the pitch of the worm, however the latter may be changed with wear, and besides extending beyond the worm, where it bears against a portion of the switch-rail beyond the bearing-point against it of the worm. When the switch requires throwing in the opposite direction, the spindle I is turned accordingly

and effects release or unlocking by the worm D' of the rail A' before the worm D begins to bear against the inner side of the base of the switch-rail A to throw the latter, and locking of this last-named rail is produced in the same manner as described of the rail A'.

The natural tendency of a worm in moving its switch-rail is to raise the latter slightly, the effect of which on the tie-rod *q* is to force it with sufficient pressure against the bases of the main rails to entail friction which may tend to cause the working of the appliance to be undesirably hard. To obviate this I provide an anti-friction roller *h* (one of which should be provided for each end of the tie-bar) and support it from a bracket *g*, secured to the tie-rod to extend transversely therefrom by a bolt *f*, which fastens the tie-rod and its support or clip *e* together. The roller *h* extends under a U-shaped bracket *d*, fastened in inverted position against the side of a tie *c* (or the head-block) and affording, as indicated in Fig. 8, a track for the roller *h*, which, as will be seen, by bearing against its said track, prevents raising of the switch-rail and consequently, also, of the tie-rod, and materially eases the throw of the switch both by its roller-friction and by preventing binding of the tie-rod in the manner stated.

If ever it is desired to adjust the sleeves *l* to bring the worms thereon closer to the respective main rails they may readily be driven in the proper directions, and suitable washers may then be inserted between their inner ends and the key-heads to hold them in their adjusted positions.

Obviously, if but one switch-rail is to be thrown only one worm is needed on the rod C. Hence I do not wish to be understood as limiting my improvement to the two worms.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a main rail and a movable switch-rail in a railroad-track, a rotary switch-bar provided with a worm and adapted to support the switch-rail at its base throughout the movement of the said rail on the same or substantially the same plane directly in the space between points on the worm in the line of the switch-bar axis, and a locking-surface at the extreme outer end of the worm, varying in direction from the pitch thereof and adapted to bear against the inner edge of the switch-rail flange and lock the switch-rail after the latter has been moved by the worm-thread in the rotation of the switch-bar beyond the outer extremity of the worm, substantially as and for the purpose set forth.

2. In a railroad-switch appliance, a rotary switch-bar C, having worms D and D', provided on sleeves *l*, movably adjusted in position on the switch-bar to engage the switch-rails, each worm terminating at the outer end of its pitch in a locking-surface *m*, varying in direction from the said pitch and extend-



ing beyond the line of working contact of the worm with its switch-rail, substantially as and for the purpose set forth.

3. In a railroad-switch appliance, a rotary switch-bar C, having worms D and D', provided on sleeves *l*, movably adjusted in position on the switch-bar to engage the switch-rails, each worm terminating at the outer end of its pitch in a locking-surface *m*, varying in direction from the said pitch and extending beyond the line of working contact of the worm with its switch-rail and thickened at its opposite end, containing a key-recess to coincide with a similar recess in the bar, and keys in the recesses, substantially as and for the purpose set forth.

4. In combination with a railroad-switch, an appliance for operating it having a rotary switch-bar supported in bearings to extend across the bases of the rails and provided with a worm in position to engage and lock a switch-rail, a tie-rod *q*, extending under the said rail-bases, a rigidly-supported guide-track *d*, extending along the line of throw of the switch, and an anti-friction roller *h*, engaging in an upward direction with the said guide-track, substantially as and for the purpose set forth.

5. In combination with a railroad-switch, an appliance for operating it having a rotary switch-bar C, supported in bearings to extend across the bases of the rails and provided with worms in position to engage and lock the switch-rails, a tie-bar *q*, supported by clips *e* to extend across the bases of the switch and main rails, brackets *g*, fastened to the clips below the tie-bar and carrying anti-friction rollers *h*, and tracks *d*, rigidly supported over the rollers *h*, substantially as and for the purpose set forth.

6. In combination with a railroad-switch, an appliance for operating it having a rotary switch-bar C, extending across the bases of the rails, bearings *o* for the bar C near the outer sides of the main rails, each depending from a plate *o'*, secured to a head-block *n* and having a rail-brace *o<sup>2</sup>* for the adjacent main rail, and worms D and D' on the rotary switch-bar in position to engage and lock the switch-rails, substantially as described.

JOHN J. HILL.

In presence of—

J. W. DYRENFORTH,  
M. J. FROST.