

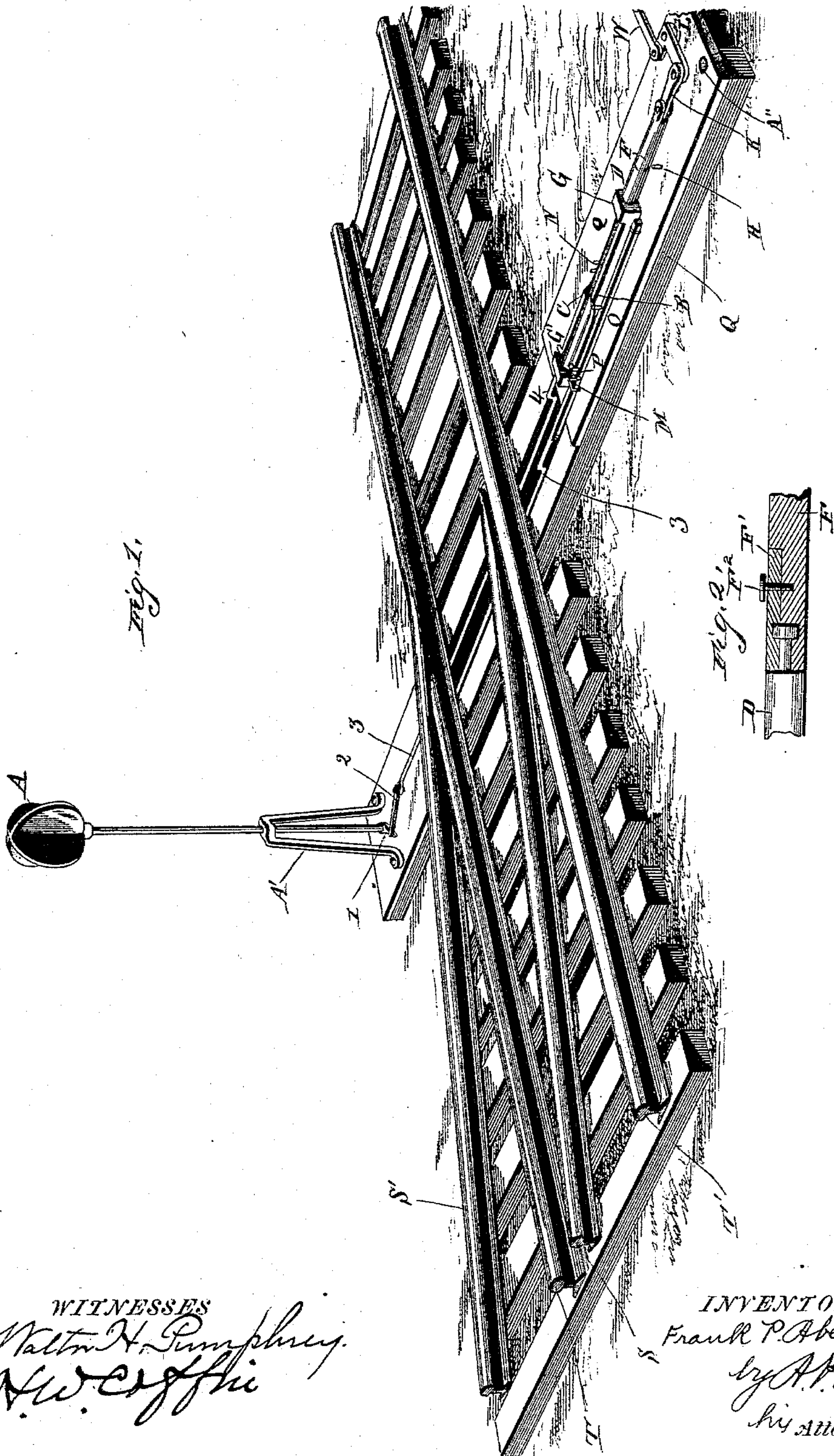
(No Model.)

3 Sheets—Sheet 1.

F. P. ABERCROMBIE.  
INTERLOCKING SWITCH OPERATING MECHANISM.

No. 411,880.

Patented Oct. 1. 1889.



WITNESSES  
Walter H. Humphrey.  
H. W. Coffin

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Frank P. Abercrombie  
by A. P. Smith  
his Attorney

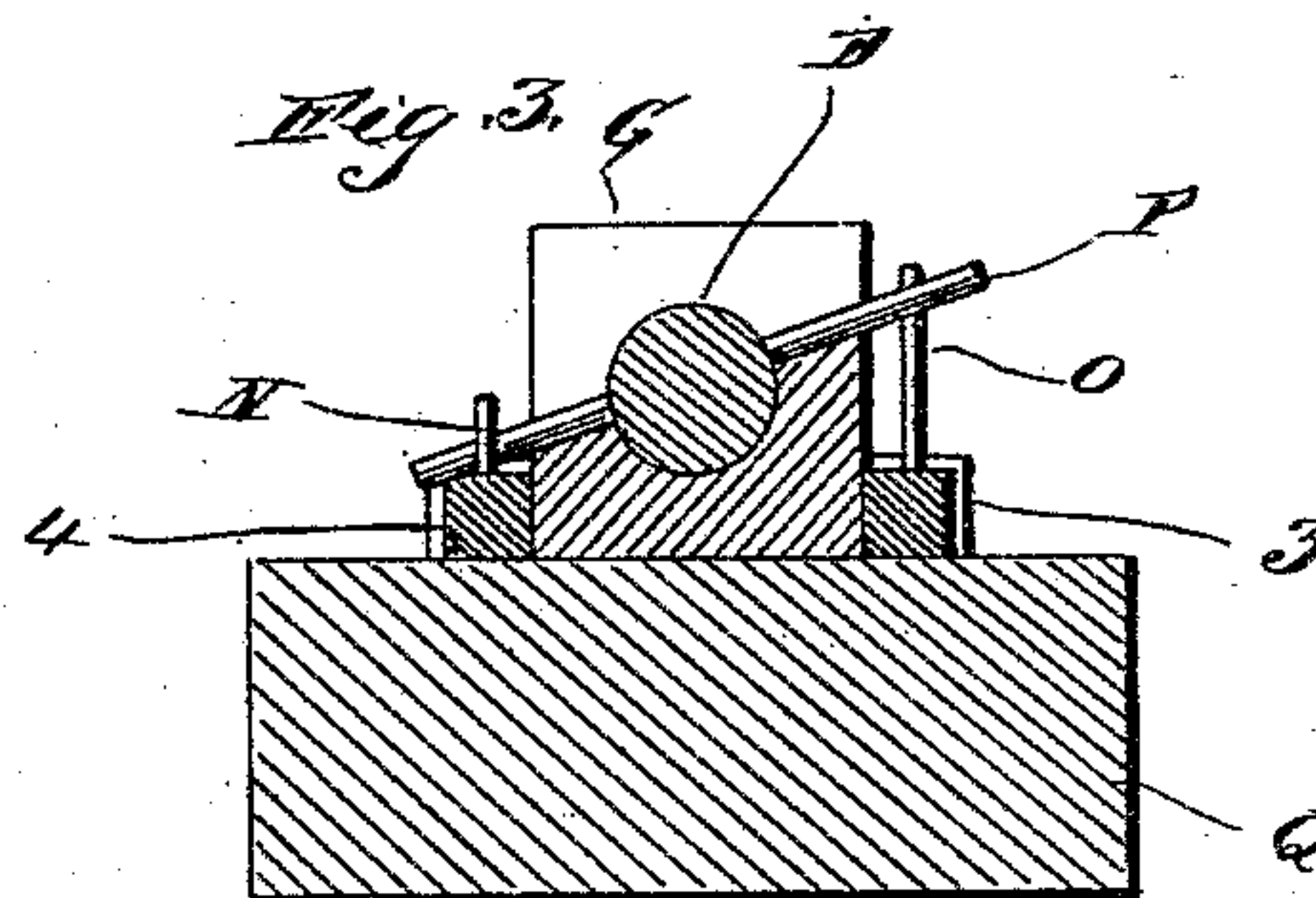
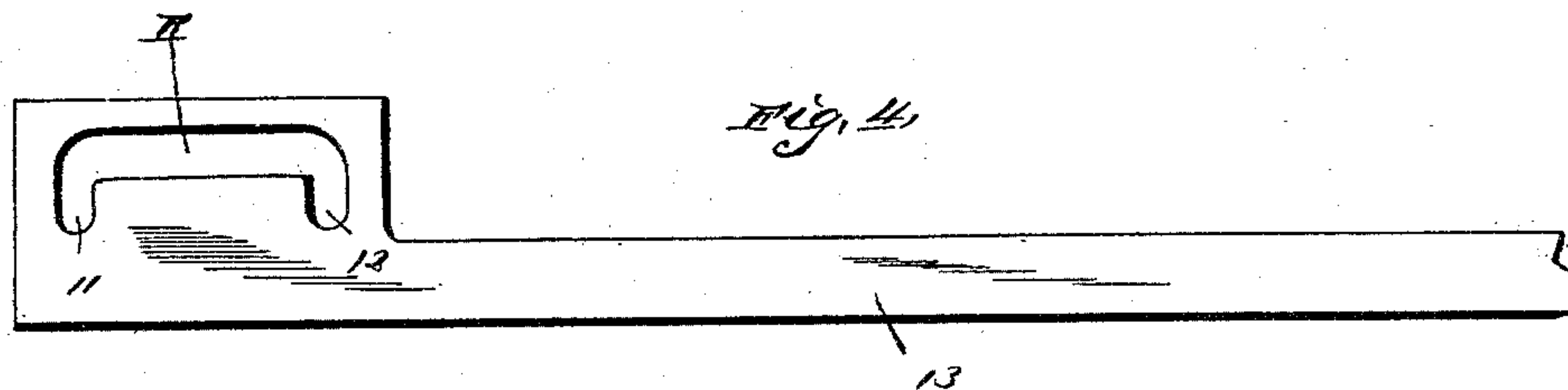
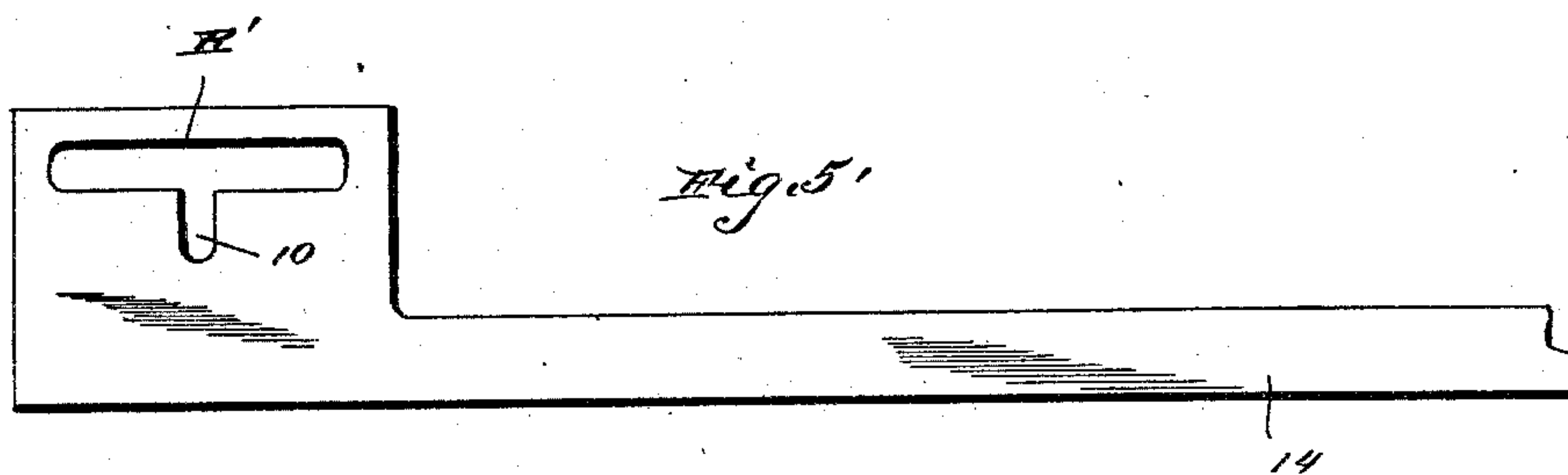
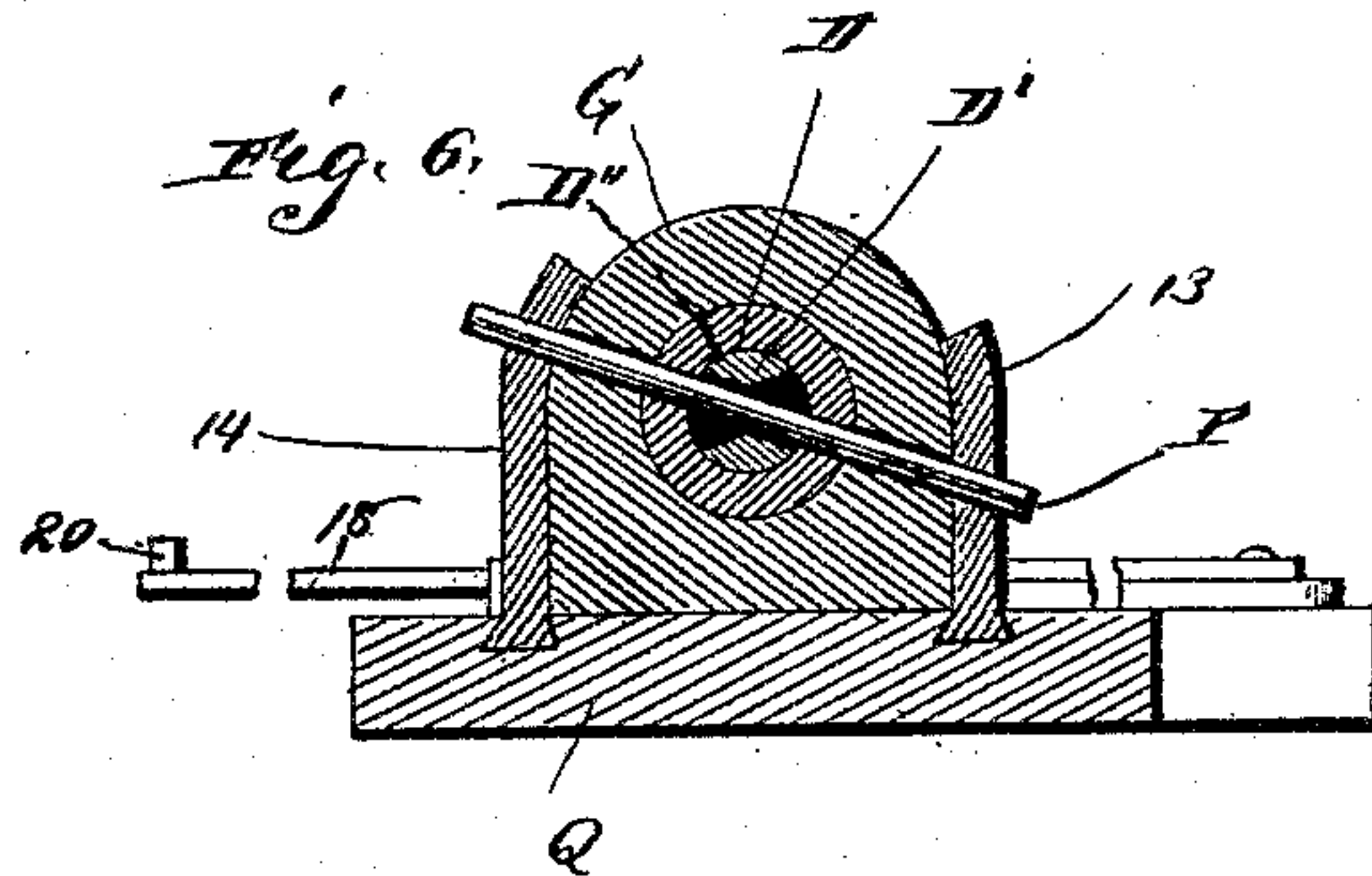
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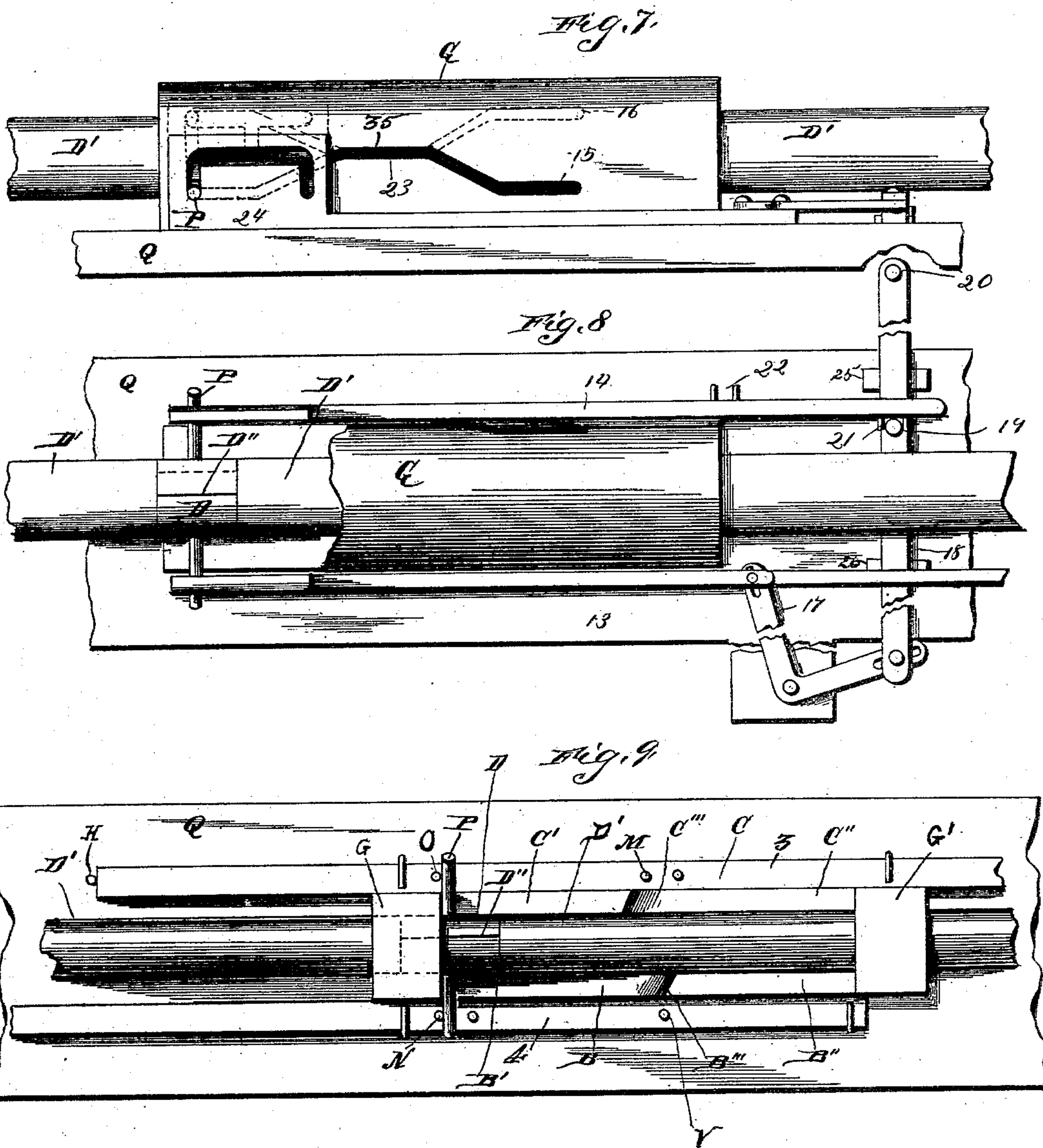
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# UNITED STATES PATENT OFFICE.

FRANK PATTERSON ABERCROMBIE, OF SUNBURY, PENNSYLVANIA.

## INTERLOCKING-SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 411,880, dated October 1, 1889.

Application filed January 9, 1889. Serial No. 295,853. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK PATTERSON ABERCROMBIE, a citizen of the United States, residing at Sunbury, in the county of North-  
5 umberland and State of Pennsylvania, have invented certain new and useful Improvements in Interlocking-Switch-Operating Mechanisms; and I do hereby 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.

My invention consists in the hereinafter-to-be-described mechanism for producing two or  
15 more independent and consecutive motions from one motion of a lever or equivalent prime moving piece.

In the drawings, Figure 1 shows my invention as applied in its simplest form to a rail-  
20 road-switch. Fig. 2 shows a detail of the construction in Fig. 1. Fig. 3 is a cross-sectional view of the construction shown in Fig. 1. Figs. 4 and 5 are details, and Fig. 6 is a cross-section, of a modification. Fig. 7 is a side  
25 view, and Fig. 8 a plan view, of said modification. Fig. 9 is a plan view of another modification of the construction shown in Fig. 1.

In operating interlocking switches and similar mechanisms it is frequently desirable to  
30 produce two or more independent and consecutive motions by one throw of the lever or other operating or prime moving device. Thus the switch is to be thrown before the signal is moved. One motion must be made  
35 to throw the switch, and a separate subsequent motion made to lock it. One switch must be thrown before another is opened, and so on through a variety of combinations.

It is the object of my invention to enable  
40 any or all of these successive motions to be produced by the operator, whether present or at a distance, by one motion of his lever.

In the drawings, A represents a conventional signal or tell-tale device mounted in a  
45 frame A' and turned by the sliding piece 3 through the agency of the crank 1 and connecting-link 2.

T and S are the movable rails of the switch, and T' and S' are the permanent rails. The  
50 movable rails T and S are shifted by the rod 4. The rod 3 has a set of two upright pins M, while the rod 4 has a corresponding set N.

The rod 3 has a separate and taller pin O, and the rod 4 a corresponding pin V. (Shown in Fig. 9, but hidden by the part G' in Fig. 1.) 55

In cases where it may be desirable to adopt the arrangement shown in Fig. 9 the spindle of the signal A would be stepped in the socket A'' at the other end of the string-piece Q, Fig. 1, and the signal would be operated by  
60 a similar crank 1 and a connecting-rod 2, attached to the other end of the rod 3. This arrangement would put the operating mechanism between the signal or tell-tale device and the track. 65

The parts G G', connected by the parts B and C, which are so cut away as to form guideways, each of which guideways has two straight portions B' B'' and C' C'', respectively, parallel but not in line with one another and connected by a curved or inclined  
70 portion B''' or C''', constitute the supporting and guiding piece for the sliding and twisting piece D. The part D has a swiveled continuation F connected to it by the joint shown  
75 in section in Fig. 2, in which the removable portion F' is held in place by the screw F'', as shown.

The guideways B and C have certain portions of their length inclined to the axis of  
80 motion of the sliding and twisting piece D, while other portions are parallel to said axis, as shown. The pin or equivalent projections P on the sliding and twisting piece D run upon the guideways B and C, and are raised  
85 and lowered to drop between the pins M or N, or equivalent recesses or projections on the sliding pieces 3 and 4, at predetermined points in the travel of the piece D.

H is a pin set in the supporting-block Q, and  
90 limits the outward motion of the sliding piece 3. A similar pin might be employed to limit the outward motion of the sliding piece 4; but neither of these two pins is absolutely  
95 necessary, as the motion of the piece 4 is limited by the movement of the switch-rails T and S, and the movement of the sliding piece 3 could be similarly limited by stops, which would control the angular movement of the crank 1. 100

The object of the pins O and V is to prevent any backward movement of the sliding pieces 3 and 4. Thus after the piece D has been slid away from the track a certain dis-



tance it will have been twisted by the guideway B, so as to raise the pin P from between the pins M, and thereafter sliding piece 3 will cease to move with the piece D. If nothing  
 5 were done to prevent displacement of the piece 3, it might be drawn back and the signal turned around by the wind or any other agency; but when the pin or projection P left the pins M and allowed the part 3 to remain at rest the pin O had been moved up  
 10 abreast of the end piece G. Consequently when the piece D reaches the limit of its motion the projection P will bring up against the end piece G and the tall pin O and prevent any backward motion of the sliding  
 15 piece 3. The sliding piece 4 is locked by a similar action of the pin V. (Shown in Fig. 9.)

Motion is transmitted to the piece D through  
 20 the rod W, the bell-crank lever L, and the swiveled extension F, which is connected to the piece D, as shown in Fig. 2, or in some equivalent manner. The rod W leads to the interlocking-station where the operator is  
 25 placed. It is evident, of course, that any equivalent operating mechanism for moving the piece D might be substituted for the one described without departing from the principle of my invention.

30 Figs. 4, 5, 6, 7, and 8 show a modification of my device, in which the parts G G' are combined in one part G, surrounding the sliding and twisting piece D, and having certain irregular slots—such as 15 and 16, Fig. 7—  
 35 which replace the open guideways B and C, Fig. 1. The principle of operation is, however, identical.

The sliding pieces 3 and 4 (shown in Fig. 1) are replaced by similar sliding pieces 13 and  
 40 14, Figs. 4, 5, and 6, which move in dovetailed grooves in the supporting-block Q, as shown in Fig. 6. The sliding and twisting piece D is there shown as a simple ferrule or sleeve on the reciprocating piece D', which slides  
 45 back and forth without any axial twisting motion.

The piece D', Figs. 8 and 9, is of course cut away, so that when the piece D is in place its outer surface shall be flush with that of the  
 50 adjoining portions of piece D'. This piece D may be made in two parts joined together in any of the usual ways; or it may be made in one piece parted at D'', as shown, and snapped into place. It has, as before, the  
 55 projections P.

As shown in Fig. 6, the rod D' is cut away in order to allow the pin P to pass through it and have the desired oscillation.

As shown in Figs. 7 and 8, the sliding piece  
 60 13 is given an intermittent motion in order to operate the locking-bar 18. The sliding piece 14, which operates the switch, has certain projecting pins 22 and 21, or their equivalent recesses, into which pins 19 and 20 on the  
 65 locking-bar 18 mesh at the proper time. The locking-bar 18 slides in the guides 25 and 26,

and is operated by the sliding piece 13 through the agency of the bell-crank 17.

It is evident, of course, that any suitable and equivalent locking device might be substituted for the bar 18 without departing from  
 70 the spirit of my invention.

As shown in Fig. 7, the slot 35 has three portions 15, 23, and 24, which form guideways parallel to the axis of motion of the  
 75 sliding and twisting piece D, and which are connected by inclined portions of the said slot. The slot 16 is the reverse of the slot 15. The sliding piece 13, Fig. 4, has the slot R, with the pockets 11 and 12, and the sliding  
 80 piece 14, Fig. 5, has the slot R' and the pocket 10.

The operation of this device is as follows: The apparatus being in the condition shown  
 85 in Fig. 8, the switch controlled by the sliding piece 14 is locked in one position by virtue of the pin 19 meshing with the projecting pins 21. A movement of the piece D causes the pin or projection P to run along the portion  
 90 24 of the slot, and, striking against a rigid portion of the sliding piece 13, which forms one side of the pocket 11, Fig. 4, it moves the said piece 13, bell-crank 17, and the locking-bar 18 far enough to unlock the sliding  
 95 piece 14. Further motion of the sliding and twisting piece D causes the projection P to run up the inclined portion of the slot or guideway 15 and down the corresponding portion of the slot or guideway 16. This raises one end of projection P from the  
 100 pocket 11 and drops the other end of the said piece into the pocket 10, thus leaving the sliding piece 13 motionless, but moving the sliding piece 14, and thereby throwing the switch. By the time the projection P  
 105 has moved along the portion 23 of the guideway and thrown the switch in the manner above described it strikes the second inclined portion of the said guideway, and is lifted out of the pocket 10 and dropped into  
 110 the pocket 12 of the sliding piece 13. Further motion of the sliding-piece D causes the projection P to slide along the portion 15 of the guideway and move with it the sliding  
 115 piece 13, thus drawing the pin 20 of the locking-bar 18 into engagement with the pins 22 of the sliding piece 14, and thereby locking the switch in its other position.

In Fig. 9 a slight modification of the construction of Fig. 1 is shown, inasmuch as the  
 120 apparatus is designed to be placed between the signal and the switch, and consequently the sliding pieces 3 and 4 run in opposite directions, as indicated. Moreover the sliding and twisting piece D is here reduced to a  
 125 sleeve mounted on the reciprocating piece D', as is shown in Fig. 6.

While I have shown my invention as applied to the operation of switches and signals, I do not desire to be limited to such  
 130 narrow use of the invention, as there are evidently many other similar purposes to which



an apparatus of this construction could be applied without other changes than those of mechanical details.

A continuation of the sliding piece 13, Fig. 8, may operate the signal or tell-tale device in the manner before described without interfering with the operation of the locking device therein illustrated.

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

1. In an apparatus for producing two or more independent and consecutive motions, the combination of the sliding and twisting piece, a supporting-piece which has inclined guideways, and two or more sliding pieces, against certain rigid parts of which projections on the sliding and twisting piece strike, together with suitable mechanism for imparting motion to the sliding and twisting piece, substantially as described.

2. In an apparatus for producing two or more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece which has inclined guideways, and two or more sliding pieces which have certain parts with which projections from the sliding and twisting piece engage at predetermined points in the travel of the said sliding and twisting piece, together with a reciprocating lever connected to the sliding and twisting piece by a swivel-joint and suitable connective mechanism, substantially as described.

3. In an apparatus for producing two or more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece which has guideways upon which certain projections from the sliding and twisting piece move, said guideways being inclined to the axis of motion of the sliding and twisting piece for certain portions of their length, while other portions are parallel to said axis, two or more sliding pieces which move parallel to the axis of motion of the sliding and twisting piece, and which have certain rigid parts with which projections from the sliding and twisting piece engage at predetermined points in its travel, together with mechanism for imparting motion to the said sliding and twisting piece, substantially as described.

4. In an apparatus for producing two or more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece which has guideways upon which certain projections from the sliding and twisting piece move, said guideways being inclined to the axis of motion of the sliding and twisting piece for certain portions of their length, while other portions are parallel to said axis, two or more sliding pieces which move parallel to the axis of motion of the sliding and twisting piece, and which have certain rigid parts with which projections from the sliding and twisting piece engage and disengage at various pre-

termined points in its travel, together with a reciprocating lever connected to the sliding and twisting piece by a swivel-joint and suitable connective mechanism, substantially as described.

5. In an apparatus for producing two or more independent and consecutive motions, the combination of the sliding and twisting piece, a supporting-piece which has inclined guideways, and two or more sliding pieces against certain rigid parts of which projections on the sliding and twisting piece strike, together with suitable mechanism for imparting motion to the sliding and twisting piece, and a lock operated by one of the said sliding pieces to lock and unlock the other sliding piece, substantially as described.

6. In an apparatus for producing two or more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece which has guideways upon which certain projections upon the sliding and twisting piece move, said guideways being inclined to the axis of motion of the sliding and twisting piece for certain portions of their length, while other portions are parallel to said axis, two or more sliding pieces which move parallel to the axis of motion of the sliding and twisting piece, and which have certain rigid parts with which projections from the sliding and twisting piece engage at predetermined points in its travel, and a lock operated by one of the said sliding pieces to lock and unlock the other in its various positions of rest, together with mechanism for imparting motion to the said sliding and twisting piece, substantially as described.

7. In an apparatus for producing two or more independent and consecutive motions, the combination of the sliding and twisting piece, a supporting-piece which has inclined guideways, and two or more sliding pieces against certain rigid parts of which projections on the sliding and twisting piece strike, together with suitable mechanism for imparting motion to the sliding and twisting piece, a locking-bar which has projections which engage with suitable portions of one of the sliding bars, and a bell-crank by which the other sliding piece reciprocates the locking-bar, substantially as described.

8. In an apparatus for producing two or more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece having inclined guideways, two or more sliding pieces which have certain rigid parts with which projections on the sliding and twisting piece engage at predetermined points in its travel, a movable switch connected to one of said sliding pieces, and a tell-tale device connected to the other of said sliding pieces, together with suitable mechanism for imparting motion to said sliding and twisting piece, substantially as described.

9. In an apparatus for producing two or



more independent and consecutive motions, the combination of a sliding and twisting piece, a supporting-piece having inclined guideways, two or more sliding pieces which  
5 have certain rigid parts with which projections on the sliding and twisting piece engage at predetermined points in its travel, a movable switch connected to one of said sliding pieces, a tell-tale device connected to the  
10 other of said sliding pieces, and a locking device for the movable switch, also operated by

the second sliding piece, together with suitable mechanism for imparting motion to the first-named sliding and twisting piece, substantially as described. 15

In testimony whereof I affix my signature in presence of two witnesses.

FRANK PATTERSON ABERCROMBIE.

Witnesses:

CHAS. M. CLEMENT.

W. A. BROSIUS.