

No. 666,027.

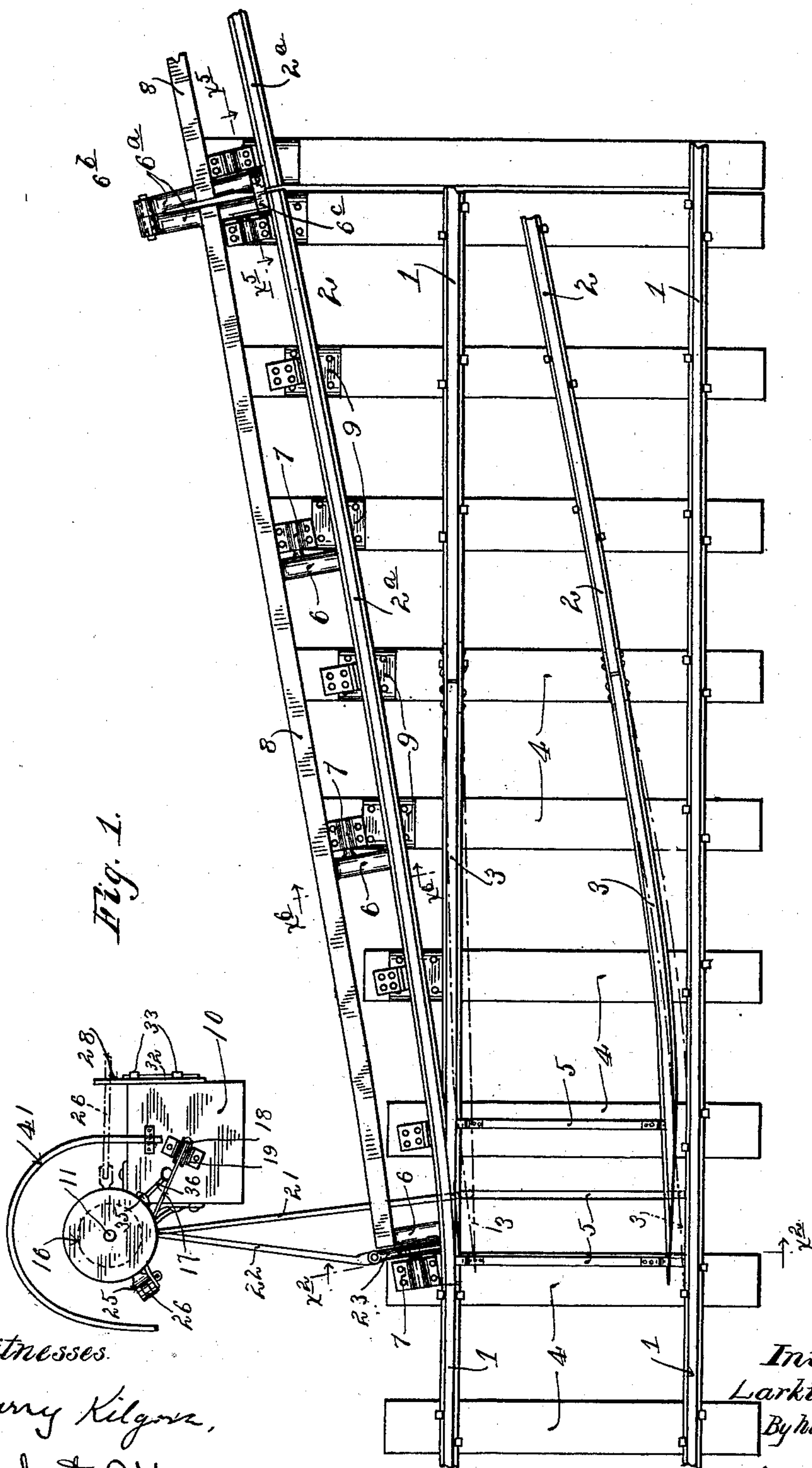
Patented Jan. 15, 1901.

L. S. SAFFORD.
AUTOMATIC SWITCH.

(Application filed May 5, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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Fig. 2.

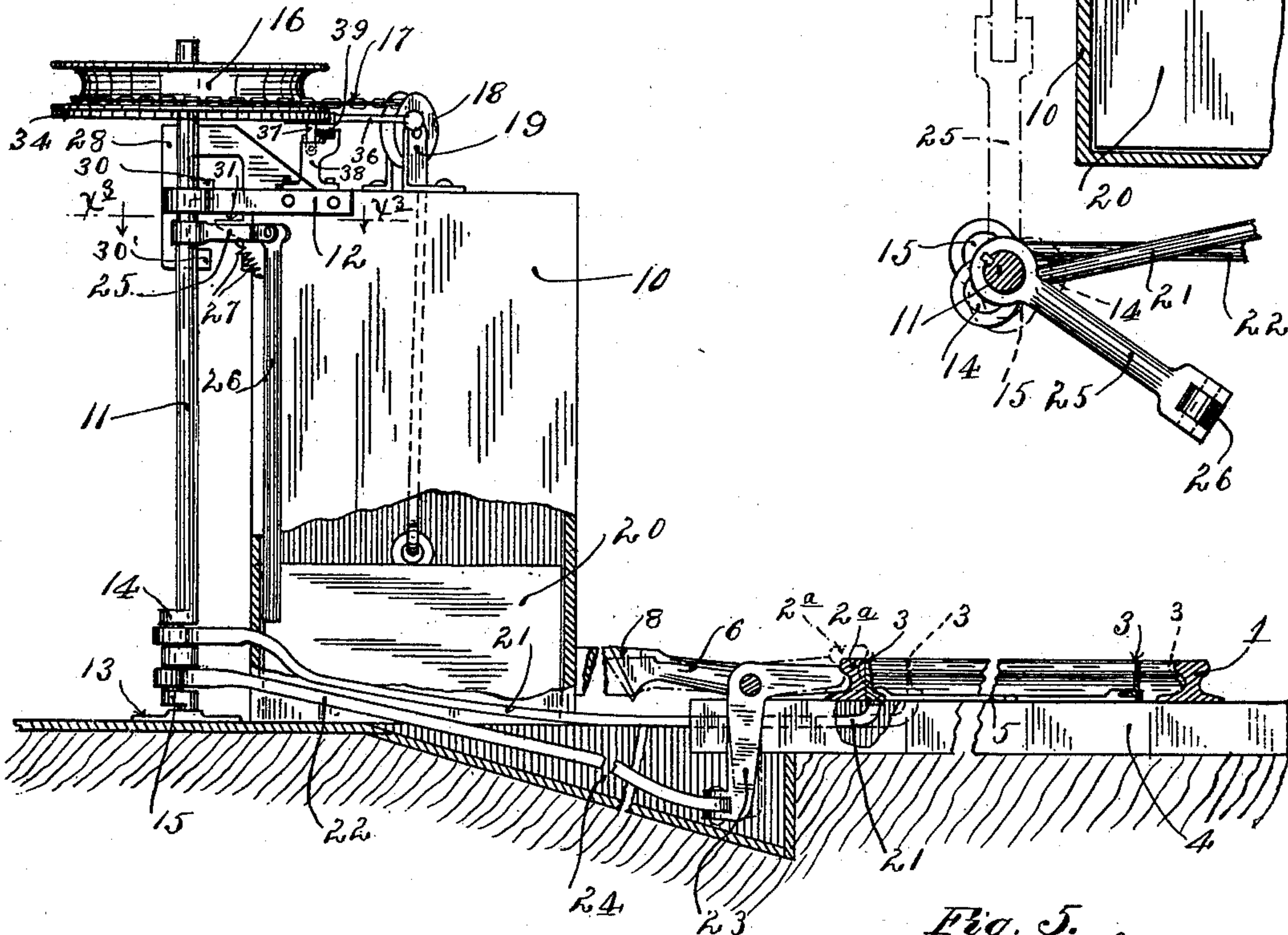


Fig. 3.

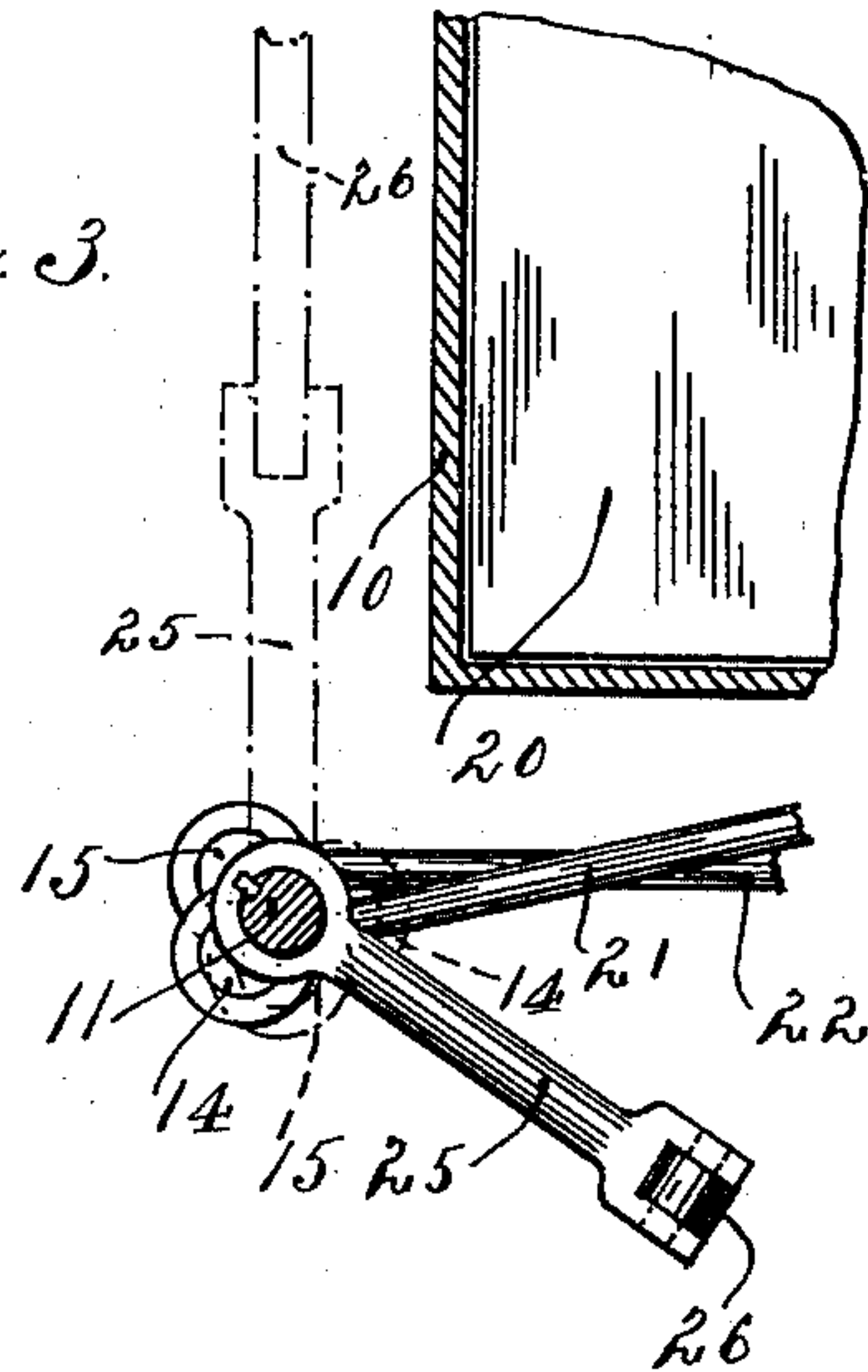


Fig. 4.

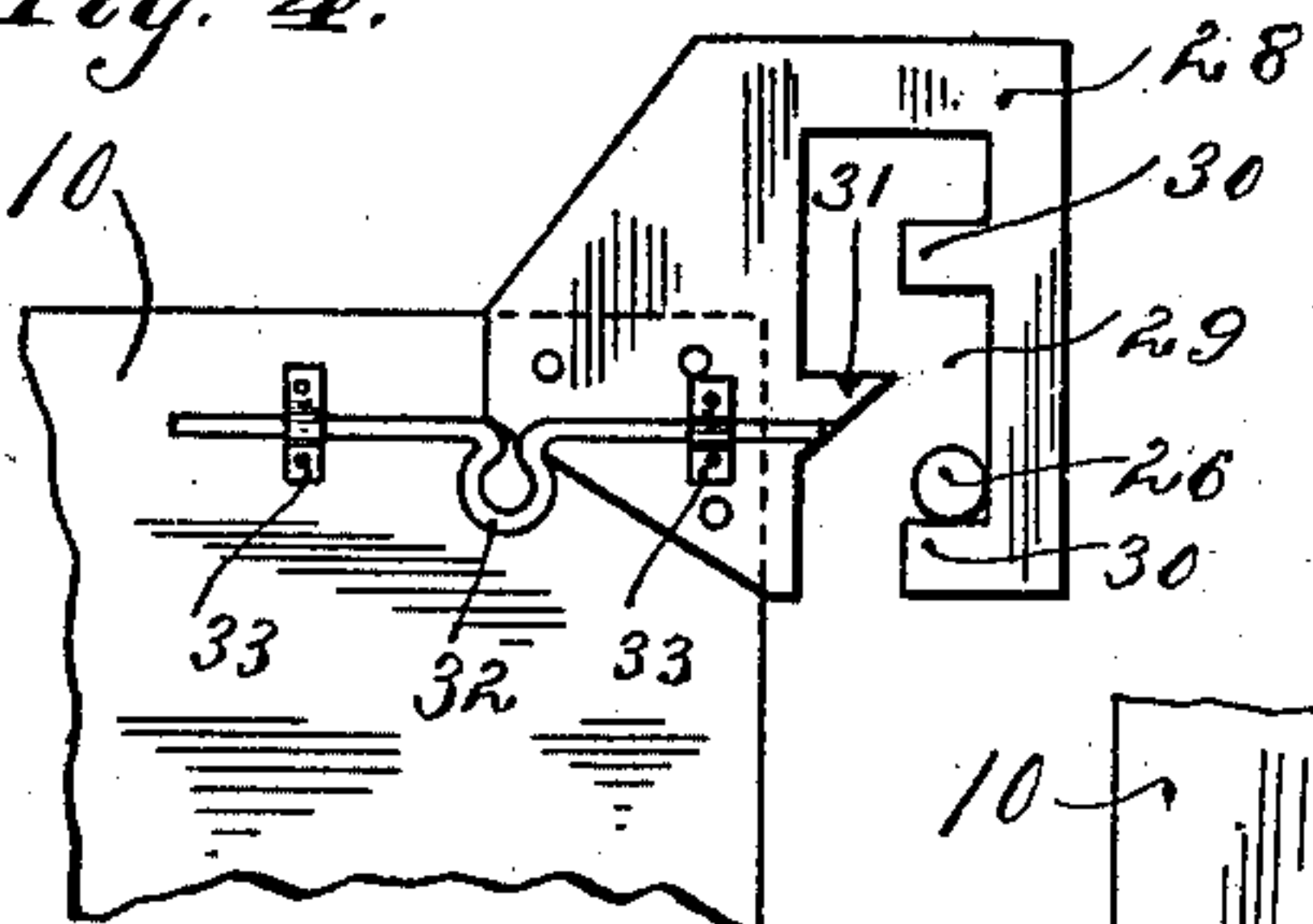


Fig. 8.

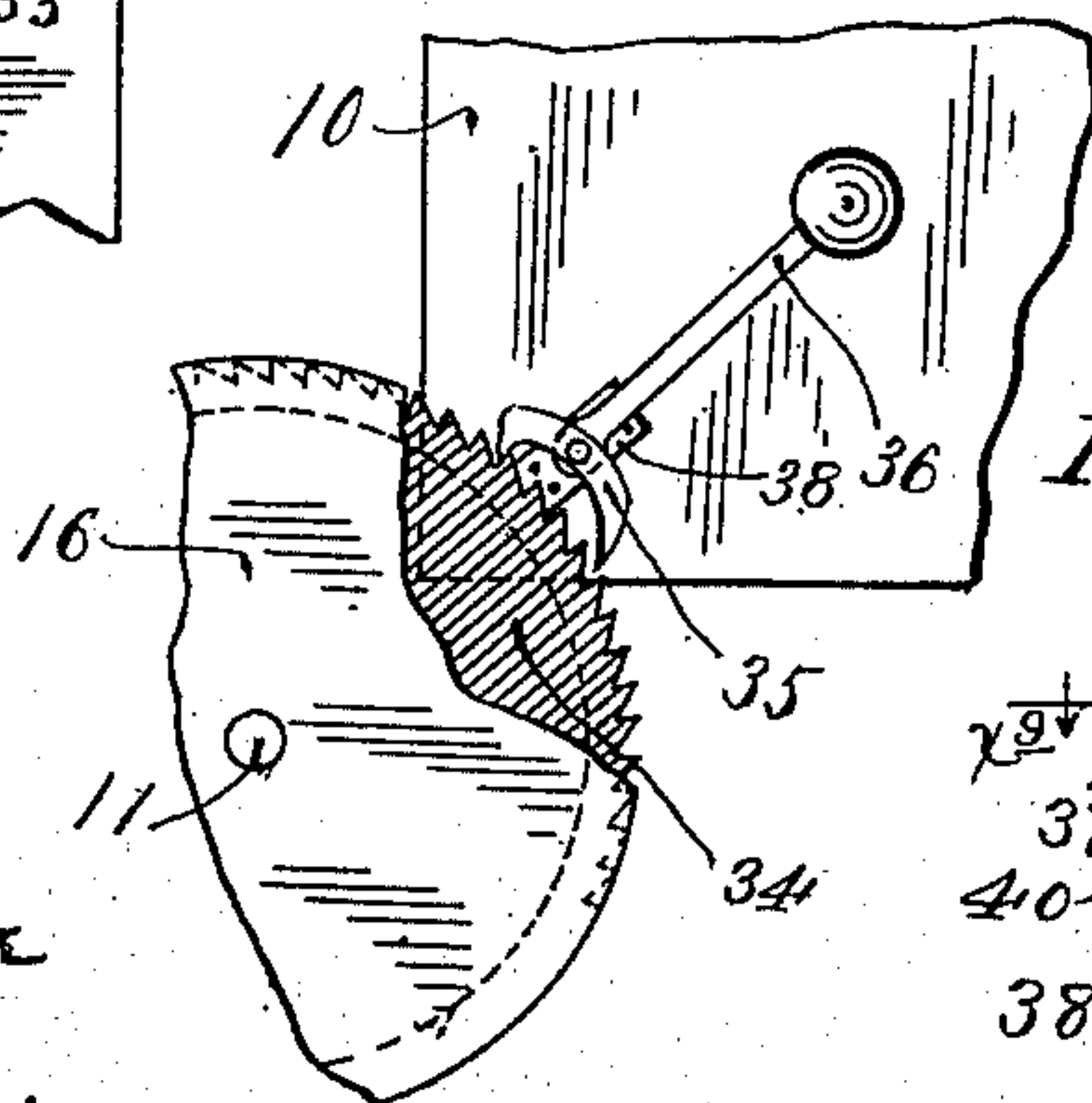


Fig. 5.

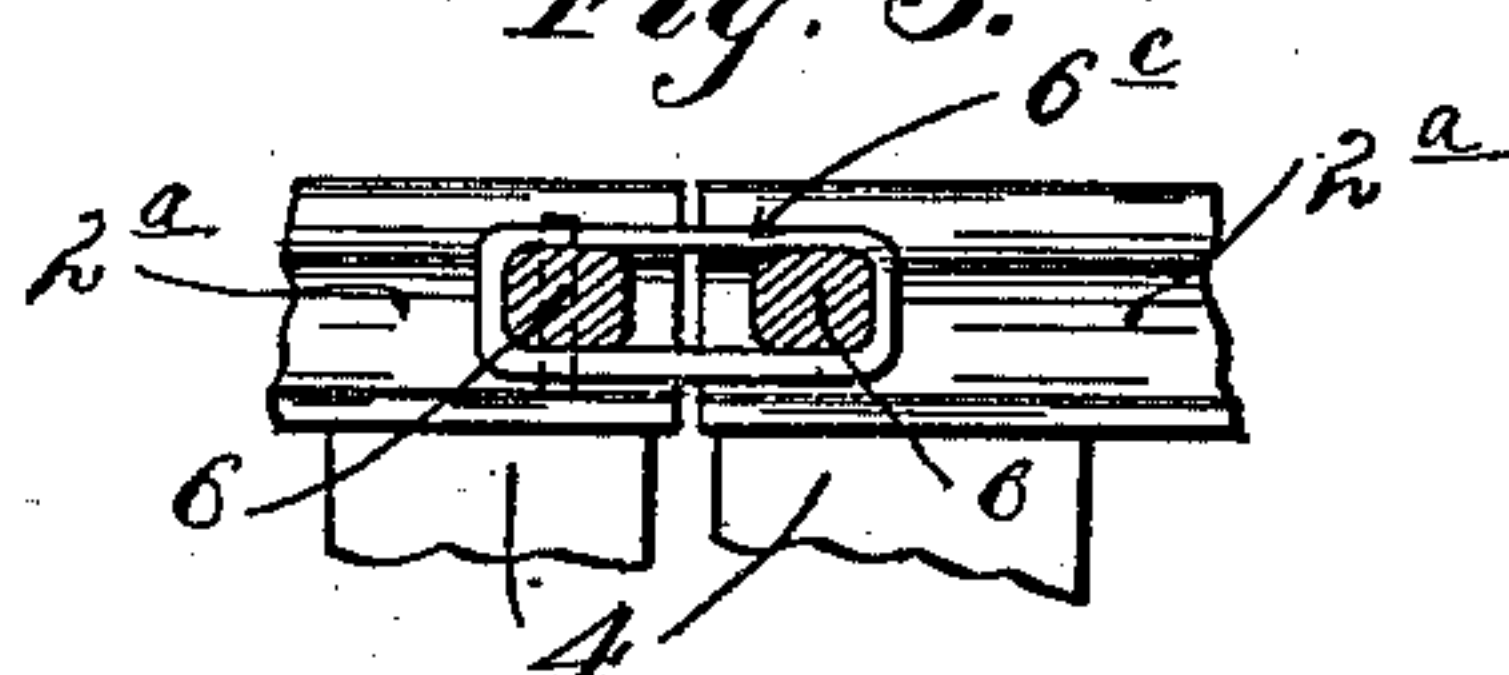


Fig. 6.

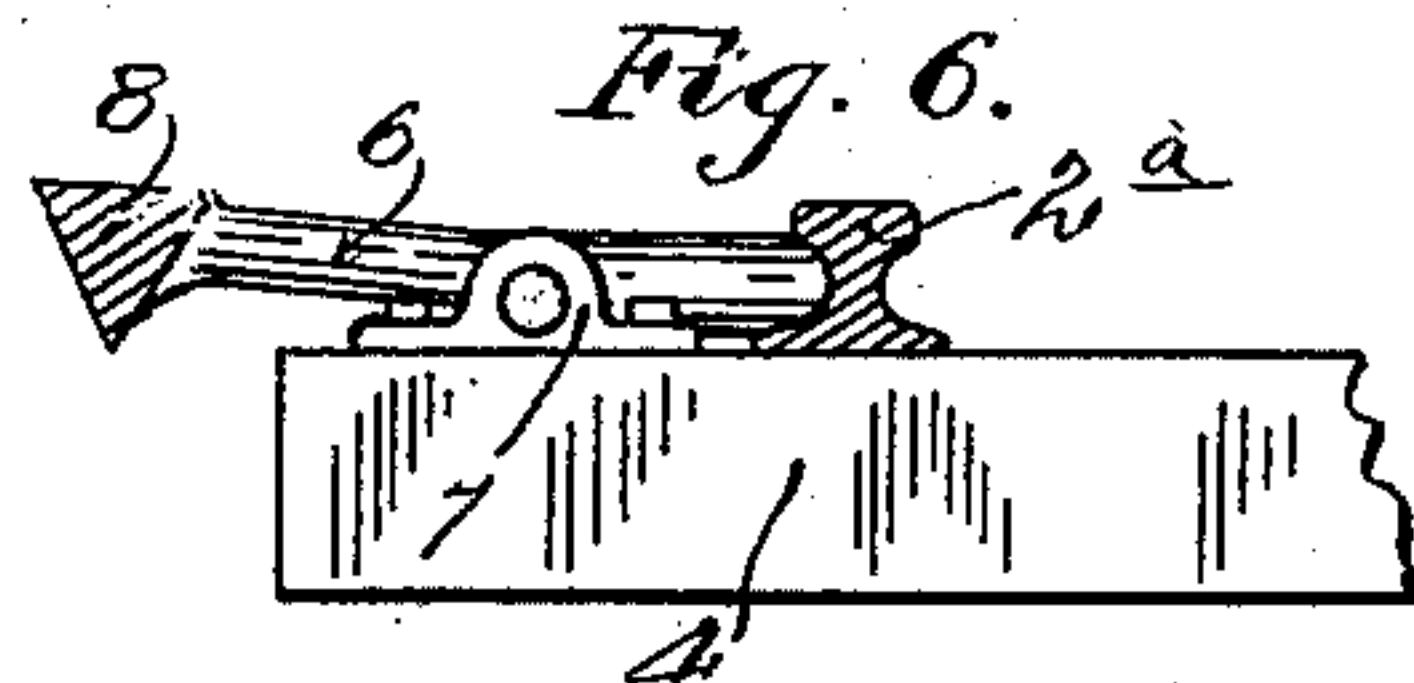


Fig. 9.

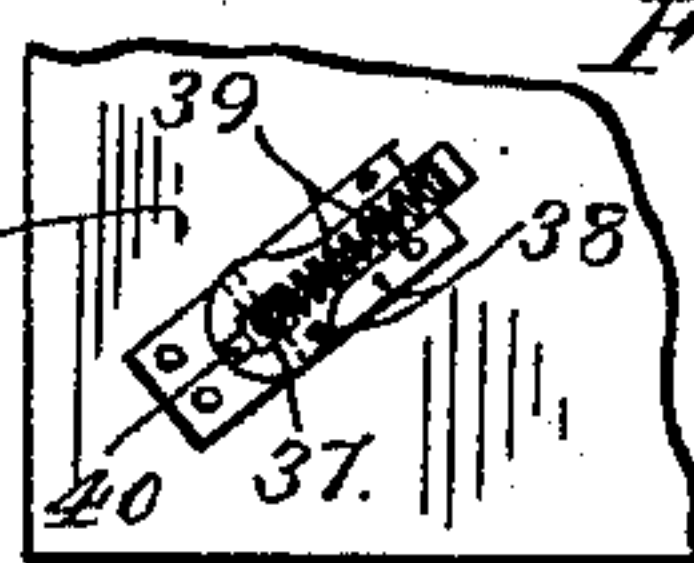
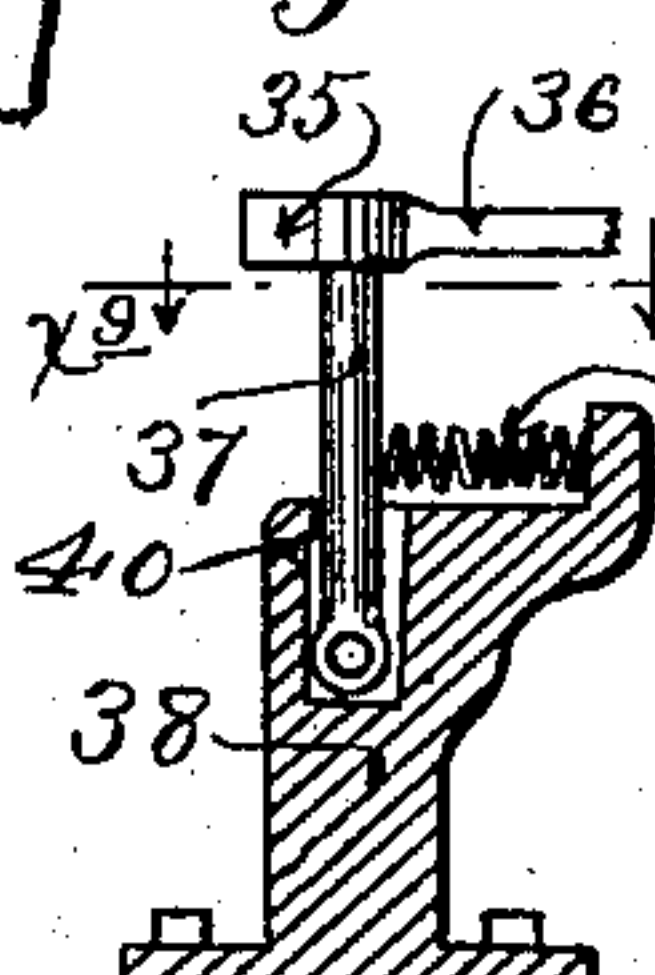


Fig. 7.



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UNITED STATES PATENT OFFICE

LARKIN S. SAFFORD, OF KELSO, NORTH DAKOTA.

AUTOMATIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 666,027, dated January 15, 1901.

Application filed May 5, 1900. Serial No. 15,586. (No model.)

To all whom it may concern:

Be it known that I, LARKIN S. SAFFORD, a citizen of the United States, residing at Kelso, in the county of Traill and State of North Dakota, have invented certain new and useful Improvements in Automatic Switches; 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 present invention has for its object to provide an automatic railway-switch; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

More specifically stated, the principal object of this invention is to provide, in connection with a main line and switch track, a switch-throwing device which may be set to close the side track and open the main line and which under the action of the train as it passes completely onto the side track operates automatically to again close the main line and open the side track. However, in the preferred arrangement of the device the switch may be set so as to require a train or a section thereof to pass two or more times over the rail or other part of the switch-actuating mechanism which is subject to the passage of the train in order to effect the closing of the main line and opening of the side track.

It is a well-known fact that many serious wrecks have been occasioned by the neglect or failure of the brakeman or other person to close the main-line track after a train has been side-tracked. This is usually due to carelessness; but in some cases it has been due to lack of time to throw the switch to prevent such a collision. By means of my automatic switch the possibility of accidents by improperly-thrown switches is nearly or quite eliminated.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a plan view showing my improved switch device applied to a split switch between the main line and a side track. Fig. 2 is a transverse vertical section approximately on the line $x^2 x^2$ of Fig. 1, some parts

being shown in side elevation and others being broken away. Fig. 3 is a horizontal section approximately on the line $x^3 x^3$ of Fig. 2. Fig. 4 is a detail view, in side elevation, showing the lever-lock plate and immediately connected parts. Fig. 5 is a detail in section approximately on the line $x^5 x^5$ of Fig. 1. Fig. 6 is a transverse section on the line $x^6 x^6$ of Fig. 1. Fig. 7 is a detail view, in side elevation, some parts being sectioned, showing parts of an escapement device. Fig. 8 is a plan view of the said escapement device, some parts being broken away; and Fig. 9 is a horizontal section approximately on the line $x^9 x^9$ of Fig. 7.

The numeral 1 indicates the main-track rails, 2 the side-track rails, 3 the split switch-rails, and 4 the ties, all of which are of ordinary construction. The free ends of the split rails 3 are spaced apart in the ordinary manner by sliding tie bars or rods 5.

One of the side-track rails 2^a is mounted for a limited up-and-down movement, this, as shown, being accomplished by rigidly connecting the same to a series of levers 6, pivoted at their intermediate portions in bearings 7 on the ties 4 and provided at their outer ends with weights, which, as shown, are formed by a longitudinally-extended bar or bars 8, connecting several of the said levers, and formed, advisably, V-shaped in cross-section, so as to more readily cut its way through snow or light obstructions. As shown, the ties 4 are provided with bearing-plates 9, upon which the rail or rails 2^a rest when sustaining the load of the train. As the rails 2^a usually extend on a curve in the vicinity of the switch, they are preferably formed in sections, which permit limited movements of the said rails in a horizontal direction, but cause them to rise and fall together. Such a coupling is illustrated in Figs. 1 and 5, wherein the adjacent arms 6 are shown as provided with extensions 6^a, loosely connected at 6^b, one of the said arms 6 having a yoke 6^c, that embraces the adjacent arm 6 and permits slight lateral movements thereof, but causes the said arms to move together.

The switch-throwing mechanism or actuating device is of novel construction, and the construction illustrated will now be considered in detail.

At one side of the track, about where the ordinary switch-stand would be located, is a vertical receptacle or box 10, at the side of which is journaled a vertical crank-shaft 11, 5 mounted in suitable bearings 12 and 13. At its lower end the said crank-shaft 11 is provided with a pair of cranks 14 and 15, and at its upper end it is provided with a sheave 16, to which is attached one end of a chain or 10 flexible connection 17. Said chain or flexible connection 17 runs over a guide-sheave 18, mounted in bearings 19 on top of the box 10, and at its lower end it is attached to a weight 20, which operates upon the switch, 15 as hereinafter described. The crank 14 of the shaft 11 is connected by a link or rod 21 to one end of one of the spacing-bars 5, which space apart the split rails 3. The other crank 15 is connected by a similar rod or link 22 to 20 the lower arm or extension 23 of one of the rail-supporting levers 6, heretofore noted. In the construction illustrated the lower end of the arm 23 and of the connecting-rod 22 work within an inclined box or housing 24.

25 The crank-shaft 11 is adapted to be moved against the tension of the weight 20 by means of a handpiece 25 26, the sections of which are pivoted. The outer section 26 will tend to fall by its own weight; but, if desired, a 30 spring 27 may be applied between the sections 25 and 26 to make the descent of the said section 26 more positive and rapid and also to prevent said section 26 from being thrown outward by centrifugal force. The 35 action of the weight 20 is such as to normally hold the switch connections, as shown in Fig. 1, with the main line closed. To open the main line and close the side track, the lever 25 26 is turned into the position indicated 40 by dotted lines in Figs. 1 and 3, in which position the crank 15, acting through the rod 22, levers 6 and 23, and coupling 6^a, raises slightly the switch or side-track rails 2^a, as shown by dotted lines in Fig. 2.

45 To hold the switch-lever 26 in its dotted-line position indicated in Figs. 1 and 3, I provide a latch device, preferably in the form of a plate 28, shown as secured to one corner of the box 10. The plate 28 is formed with a 50 zigzag slot 29, which is open at its bottom and is formed with one or more supporting-ledges 30 and with a reversely and intermediately extended tooth 31. The lever-section 26 when raised to a horizontal position is adapted 55 to be engaged with one or the other of the ledges 30 of the slot 29 in the latch-plate 28, and it will be there held by the force of the weight 20. For another purpose to be hereinafter noted a sliding plunger or supporting-rod 32 is mounted in suitable bearings 33 on 60 the box 10, with one end in position to project entirely across the latch-plate slot 29.

When the lever-section 26 is released from the latch-plate 28, the force of the weight 20 65 will tend to throw violently the parts subject thereto back into their normal positions. (Indicated by full lines in the drawings.) To re-

tard this rapid return movement under the action of the weight 20, and thereby to make it practically impossible or at least unne- 70 cessary for a person to have his foot caught between the rails of the main line and the ends of the split rails 3, I provide a retarding device, preferably in the form of an escapement and wheel. The escapement-wheel 34 is 75 shown as rigidly secured on the switch-shaft 11, just below the sheave 16, with its toothed edge projecting approximately even with the periphery of the same. For coöperation with the wheel 34 an escapement-pawl 35, having 80 a weighted arm 36, is pivoted on the upper end of an arm 37, which arm is pivoted at its lower end to a block or casting 38 on the top of the box 10. A spring 39 normally forces the arm 37 against a stop 40 on the block 38, 85 and thus holds the escapement-pawl in position for its escapement action on the wheel 34 when the shaft 11 is turned by the weight 20. However, when the escapement-wheel and the shaft 11 are turned from their nor- 90 mal positions and against the force of the weight 20 the teeth of the ratchet-wheel 34 by their camming action on the pawl 35 will force the arm 37 against the spring 39, so as to freely permit the switch to be set in its 95 dotted-line position, as indicated in Figs. 1 and 3.

The action of the switch device, briefly summed up, is as follows: Suppose, for exam- 100 ple, it is desired to run a train onto the side track and then to again close the main track as soon as the train has been completely side-tracked. This may be done by turning the lever 25 26 into the position indicated by dot- 105 ted lines in Figs. 1 and 3 and engaging the same with the lower ledge 30 of the latch-plate 28. In this position of the said lever the side track is closed and the main line is open. When the train runs onto the verti- 110 cally-movable rail or rails 2^a, said rails will be forced downward onto the bearing-plates 9, and this movement, acting through the arm 23, rod 22, and crank 15 of the shaft 11, will force the lever-section 26 toward the left with 115 respect to Figs. 3 and 4, thereby releasing the pivoted lever-section 26 from the latch-plate and permitting the same to fall by gravity or by gravity and the action of the spring 27. As long as any portion of the train rests upon 120 either of the rails 2^a the force of the weight 20 will be overcome and the side track will remain closed. As soon, however, as the train entirely leaves the rails 2^a, the same then being completely side-tracked, the weight 20 125 is permitted to exert its force to close the main line and open the side track with a retarded action controlled by the escapement and as already clearly described.

If the lever-section 26 be engaged with the upper ledge 30 of the latch-plate 28, the first 130 time a train or a portion thereof passes onto the rail 2^a said lever-section 26 will be dropped onto the tooth 31, and when the said train leaves the said rail or rails said lever-

section 26 will be dropped onto the lower ledge 30. Hence it is evident that to close the main line with the lever-section 26 set, as above described, will require a train or a portion thereof to pass twice onto and off from the vertically-movable rail or rails 2^a. More or less of the retaining ledges or teeth, arranged as above described, may be employed. However, if a complicated piece of switching is to be done it would probably be desirable to lock the side track closed, and this may be readily done by projecting the outer end of the bolt or plunger 32 under the free end of the pivoted lever-section 26, which of course prevents the said lever from falling, and hence prevents the weight 20 from becoming effective to close the main line.

It will of course be understood that the mechanism above described is capable of a large range of modification within the scope of my invention. For instance, instead of the extended rail or bar 8 acting as a weight to raise the rail or rails 2^a the levers supporting said rails might be provided with weighted outer ends. The latch device and the support or housing for the weight 20 might also take various other forms. The escapement device in some cases would not be employed, while in others it would be desirable. 41 indicates a segmental guard which is secured to the case 10 and serves to prevent a person from being struck by the lever-section 26 or the outer end of the section 25 when the said parts are swung under the action of the weight 20. Attention is also called to the fact that under this swinging movement the lever-section 26 is held against centrifugal force and in a downturned position by the spring 27.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a switch between a main line and a branch or side track, of switch-actuating mechanism under strain to automatically close the main line, said mechanism involving a latch adapted to be set at will to hold said switch in position to close the side track, and a trip for said latch released by the passage of the train onto the side track, to thereby permit said mechanism to close the main line, substantially as described.

2. The combination with a switch between a main line and a branch or side track, of a

depressible rail in the side track, and switch-actuating mechanism under strain to automatically close the main line, said mechanism involving a latch adapted to be set at will to hold said mechanism in a position to close the side track, and a trip for said latch having connections to said depressible side-track rail, whereby the passage of the train onto the side track permits said switch-actuating mechanism to close the main line, substantially as described.

3. The combination with a switch between a main line and a branch or side track, said switch having a vertically-movable rail, of an oscillating crank-shaft with connections for operating the switch, a weight with connections to said crank-shaft tending to close the main line, a trip-latch for setting said crank-shaft against the action of said weight, and a connection between said vertically-movable switch-rail and said crank-shaft for releasing said trip, substantially as described.

4. The combination with a switch between the main line and a branch or side track, of a switch-actuating device under strain to automatically close the main line, and a trip-latch for releasing said switch-actuating device, having connections with one of the switch-rails, and arranged to be released by a step-by-step action produced by the passing of a train or portion thereof, several times over the said switch-rail, substantially as described.

5. The combination with the main-line rails 1 and side-track rails 2, and switch-rails 3, of the rails 2^a, the levers 6 secured to said rails 2^a and provided with a weight or weights at their outer ends, the crank-shaft 11, 14, 15, with sheave 16, the weight 20 suspended by a connection 17 applied to said sheave 16, the connection 21 between said crank 14 and the switch-rails 3, the connection 22 between said crank 15 and the depending extension 23 of one of said levers 6, the operating-lever 25, 26, carried by said crank-shaft 11, and the latch-plate 28 having the slot 29 and ledge 30, said parts operating substantially as described.

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

LARKIN S. SAFFORD.

Witnesses:

MABEL M. McGRARY,
F. D. MERCHANT.