

No. 709,629.

Patented Sept. 23, 1902.

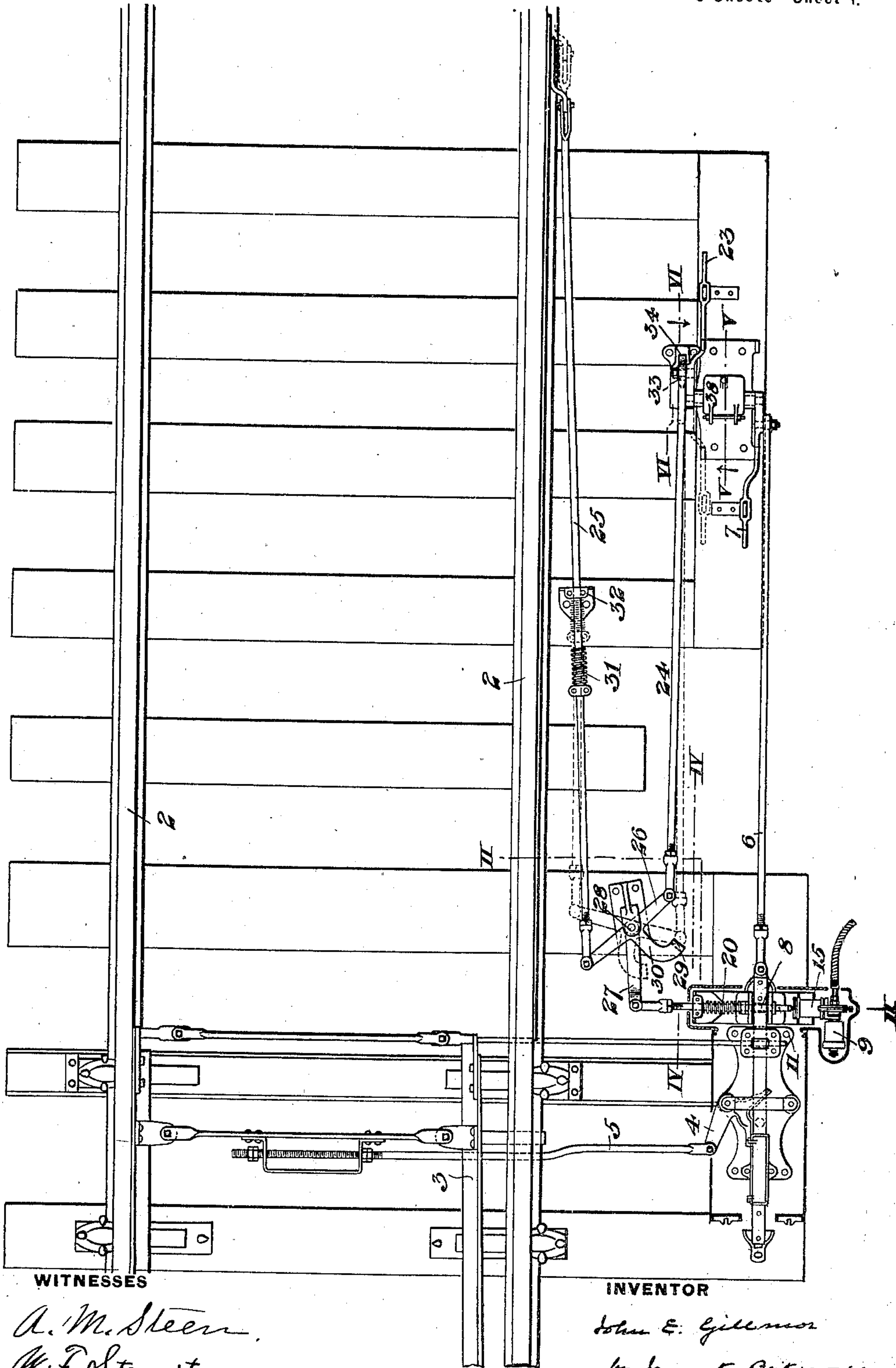
J. E. GILLMOR.
AUTOMATIC SWITCH LOCK.

(Application filed July 23, 1901. Renewed Aug. 16, 1902.)

(No Model.)

6 Sheets—Sheet 1.

Fig. 1.



WITNESSES

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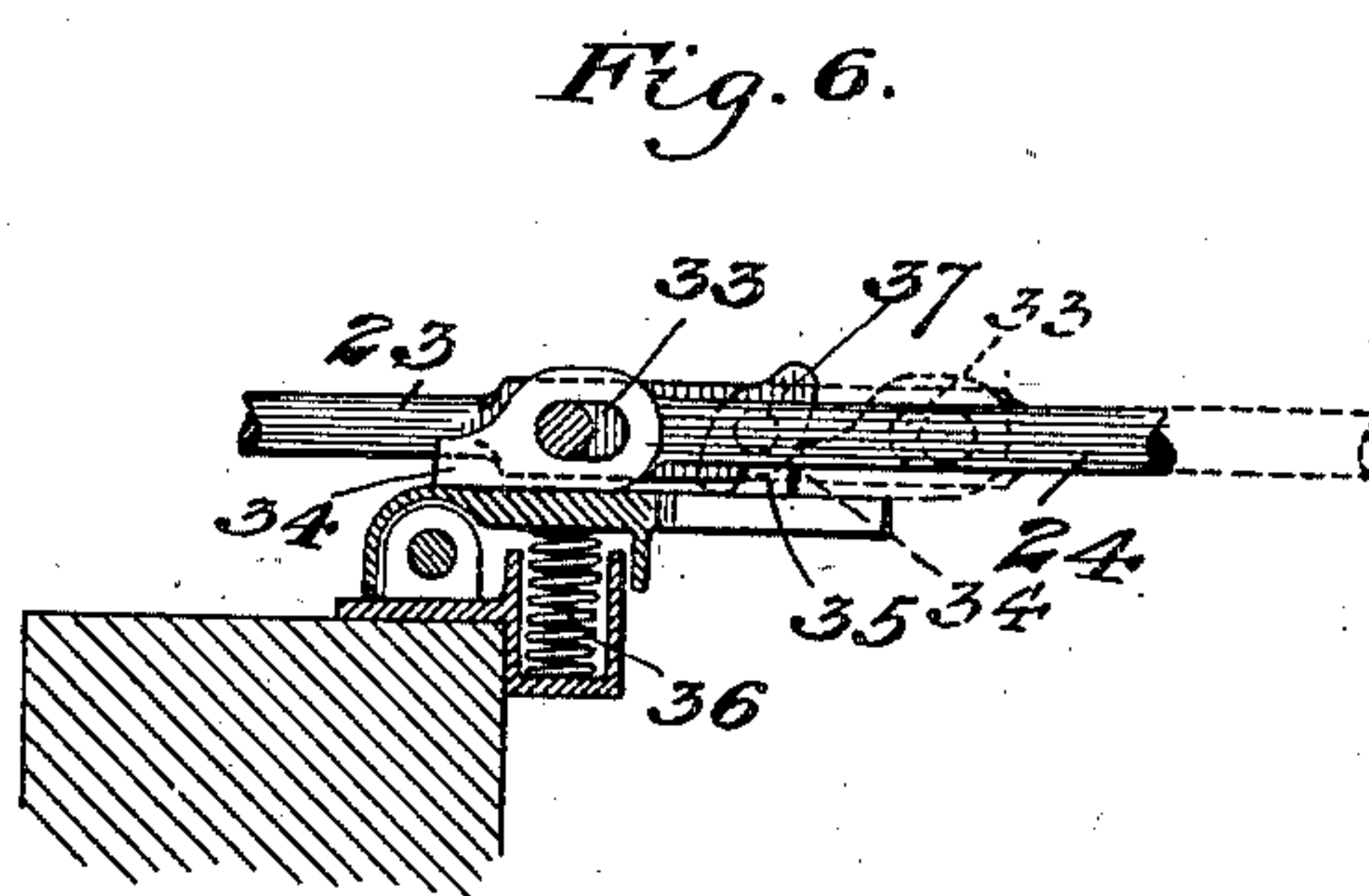
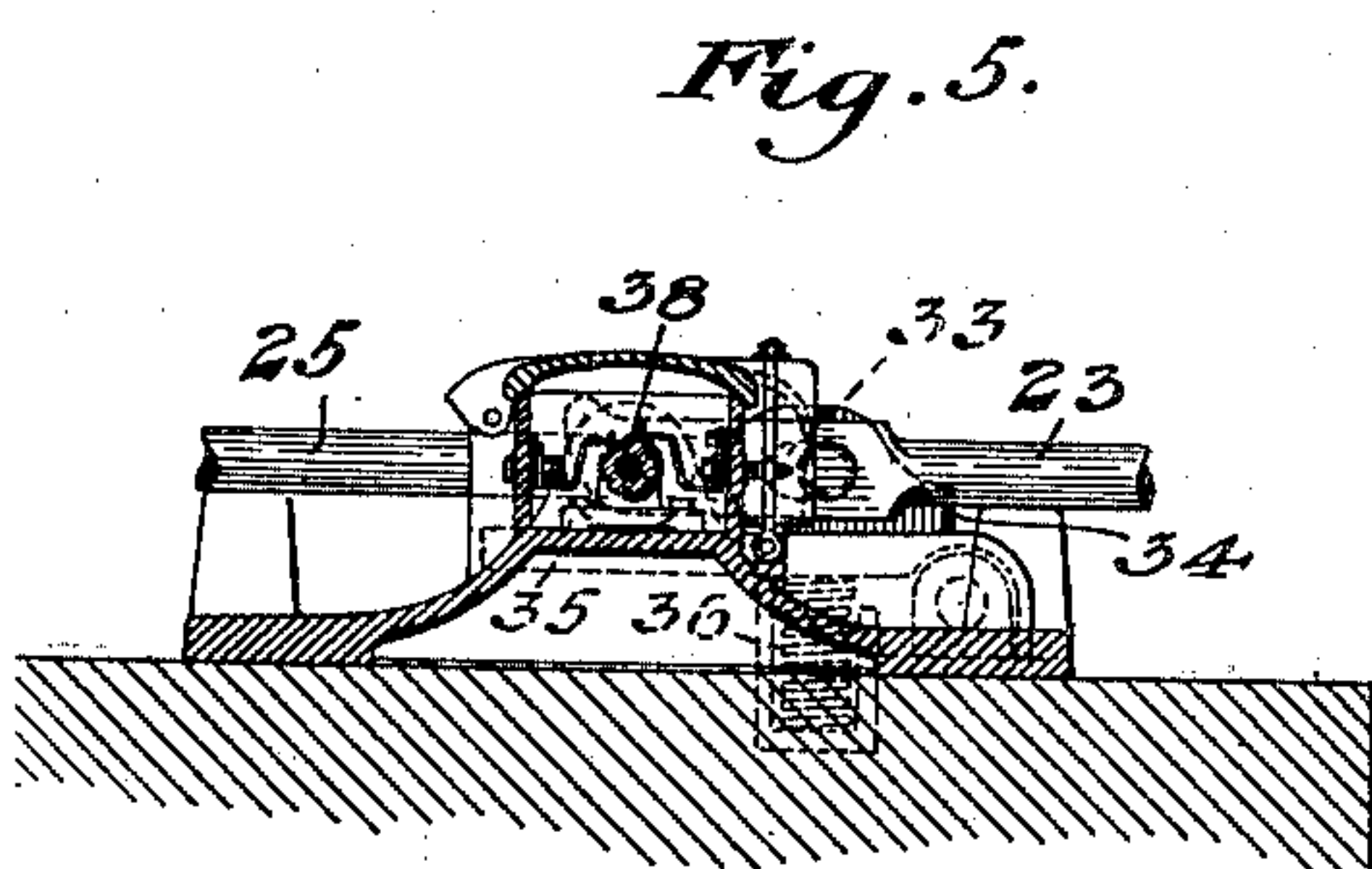
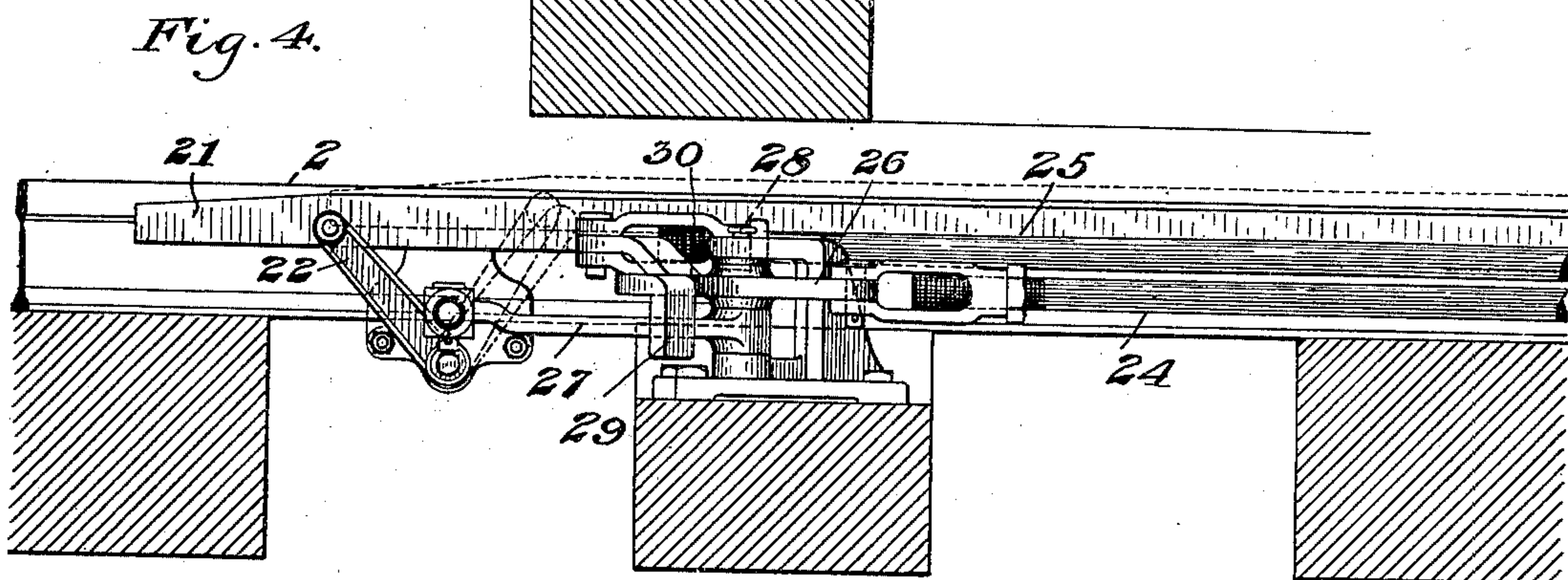
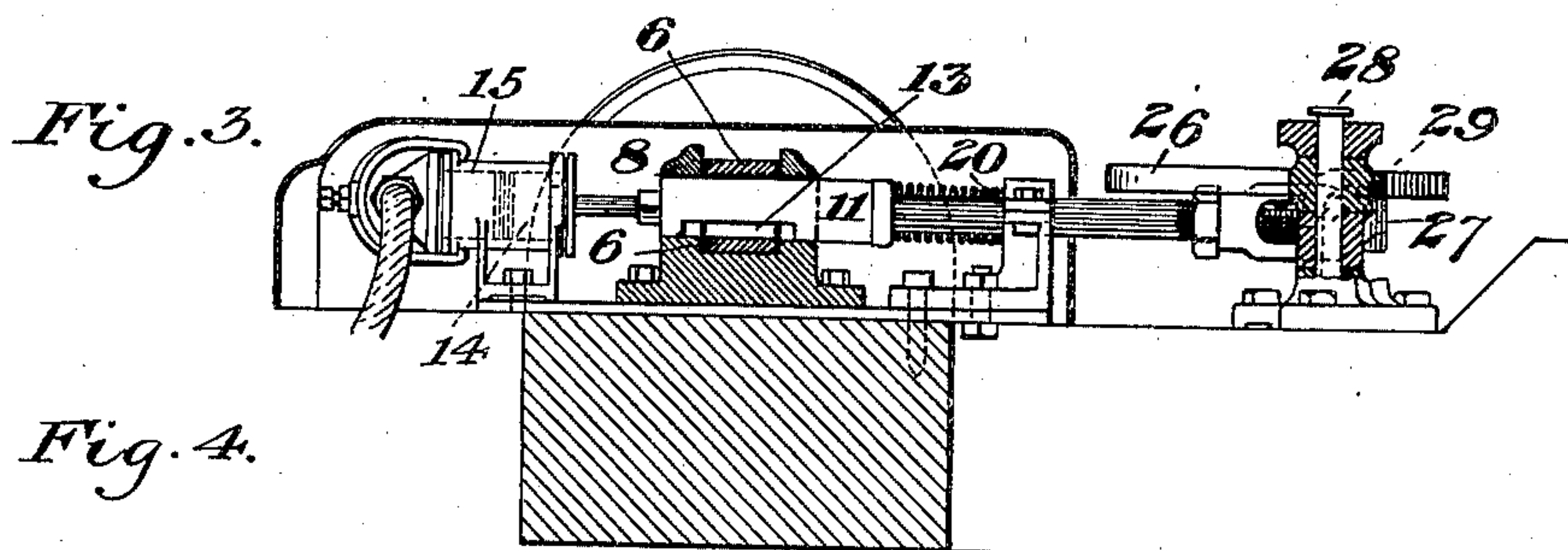
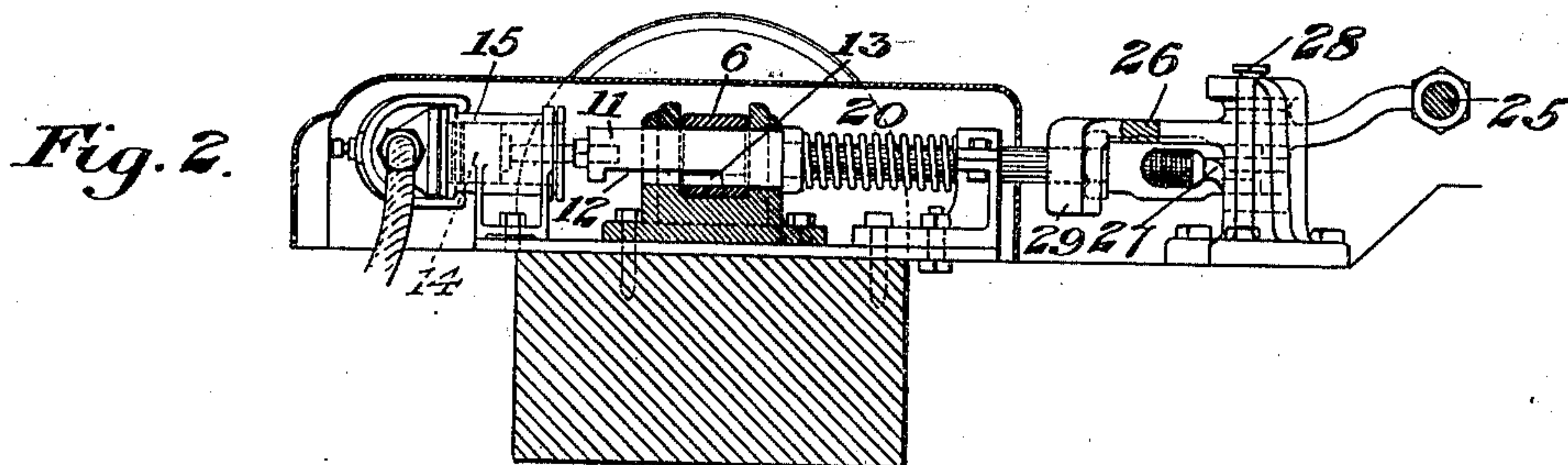
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AUTOMATIC SWITCH LOCK.

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6 Sheets—Sheet 2.



WITNESSES

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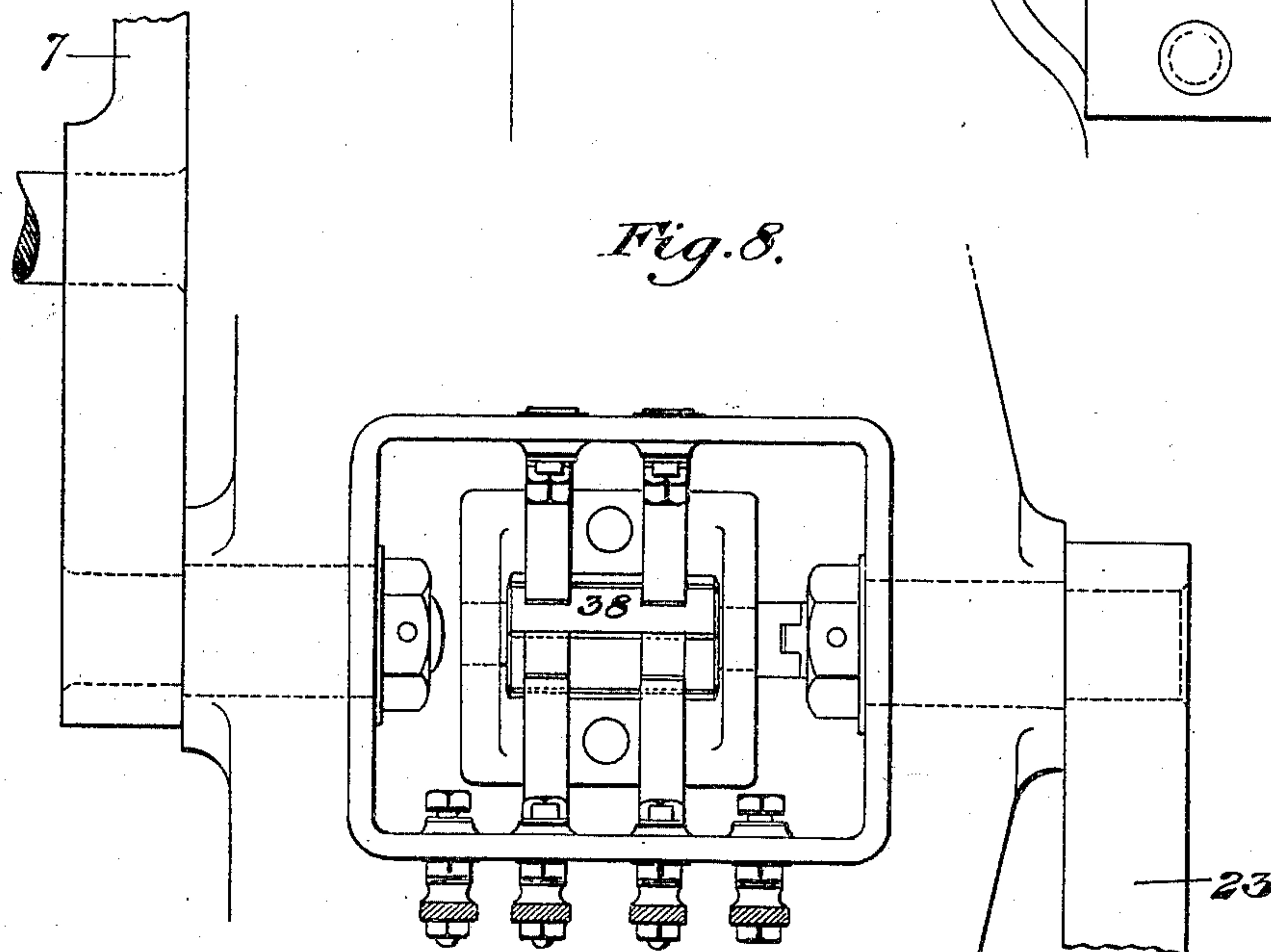
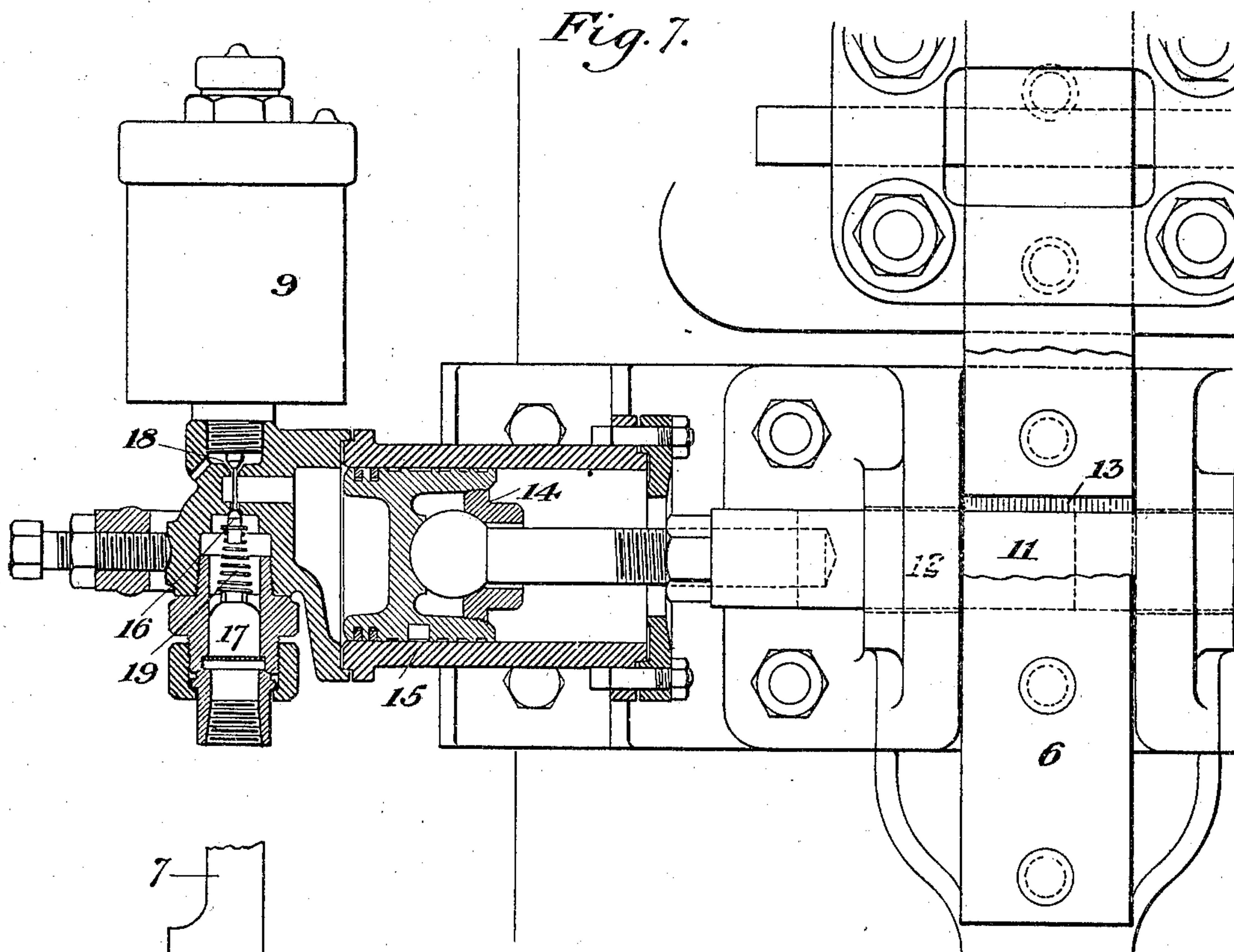
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(No Model.)

6 Sheets—Sheet 3.



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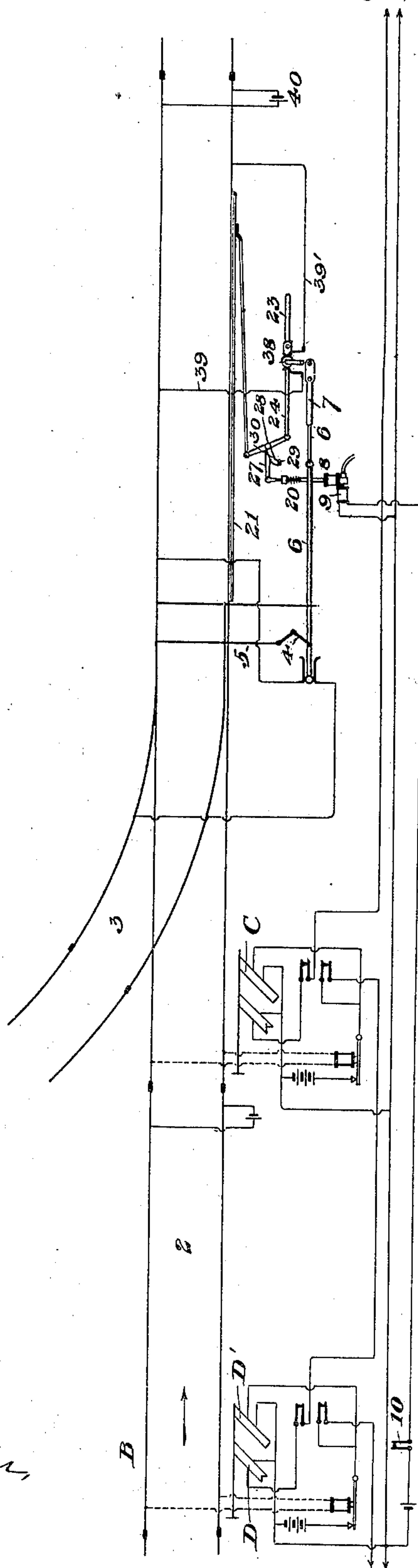
AUTOMATIC SWITCH LOCK.

(Application filed July 23, 1901. Renewed Aug. 16, 1902.)

(No Model.)

6 Sheets—Sheet 4.

Fig. 9.



WITNESSES

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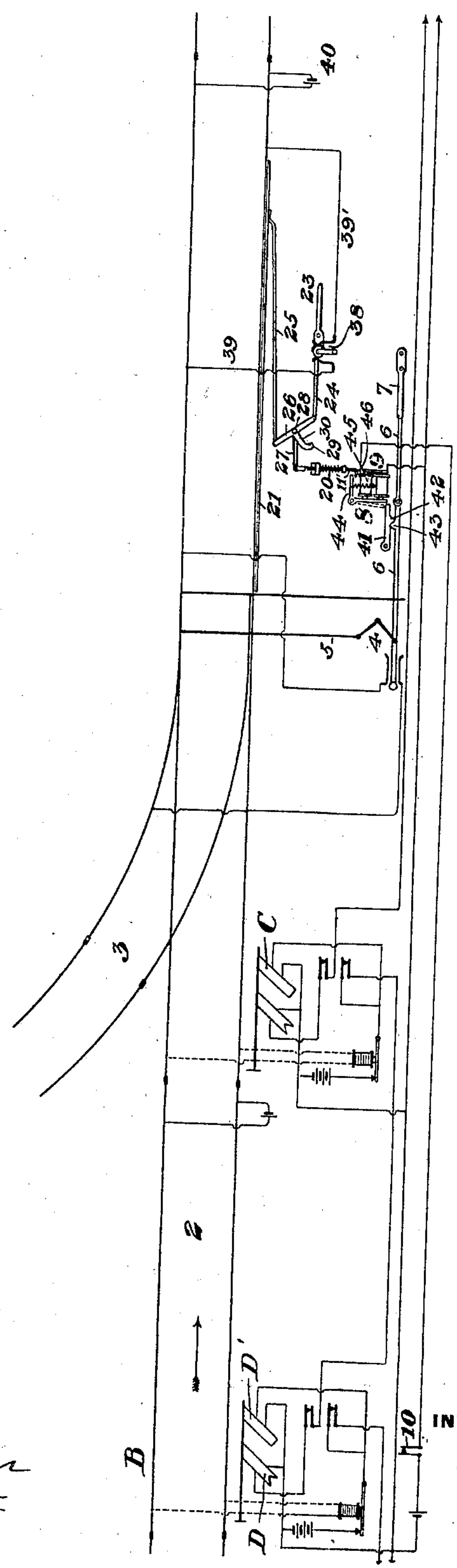
J. E. GILLMOR.
AUTOMATIC SWITCH LOCK.

(Application filed July 23, 1901. Renewed Aug. 16, 1902.)

(No Model.)

6 Sheets—Sheet 5.

Fig. 10.



WITNESSES

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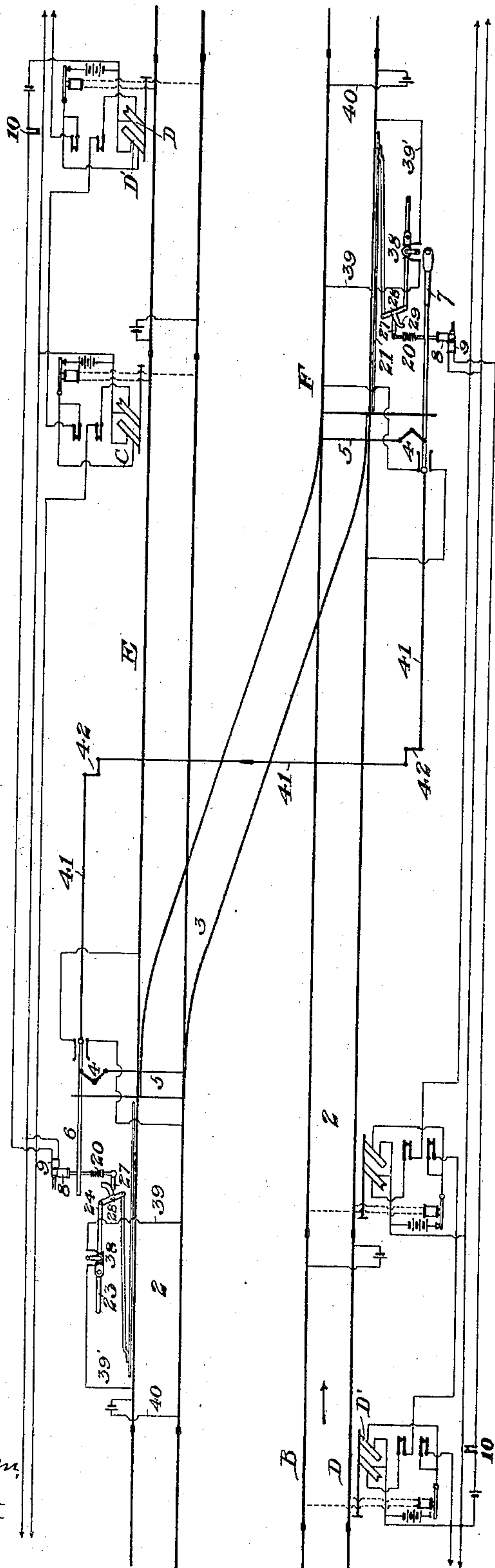
AUTOMATIC SWITCH LOCK.

(Application filed July 23, 1901. Renewed Aug. 16, 1902.)

(No Model.)

6 Sheets—Sheet 6.

Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN E. GILLMOR, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE
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AUTOMATIC SWITCH-LOCK.

SPECIFICATION forming part of Letters Patent No. 709,629, dated September 23, 1902.

Application filed July 23, 1901. Renewed August 16, 1902. Serial No. 119,914. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. GILLMOR, of Jersey City, Hudson county, New Jersey, have invented a new and useful Automatic Switch-
5 Lock, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in plan view the mechanical
10 parts of my improvement. Fig. 2 is a section on the line II II of Fig. 1, showing, on a larger scale, the parts of the locking device when in locked position. Fig. 3 is a similar view of the parts unlocked. Fig. 4 is a sectional side elevation on the line IV IV of Fig.
15 1, showing the treadle-bar 21 and its connected mechanism. Figs. 5 and 6 are sections on the line V V and VI VI, respectively, viewed in the direction of the arrow shown in Fig. 1.
20 Fig. 7 is a sectional view showing, on a larger scale, the pneumatic operating mechanism of the lock. Fig. 8 is a plan view showing the circuit-controller which is operated by the switch-lever 23. Fig. 9 is a diagram view of
25 the mechanism shown in the preceding figures. Fig. 10 is a diagram view of a modified construction of my invention. Fig. 11 is a diagrammatic view showing my device applied to a connecting-track between two par-
30 allel tracks.

The object of my invention is to provide means by which outlying railway-switches can be automatically locked by the approach
35 of a train, so as to prevent them from being tampered with, the parts being so arranged that in order to unlock the switch the trainman must set the mechanism so that a bar or other suitable device can be engaged by the
40 car about to enter the switch and when operated frees the locking mechanism, leaving the switch free to be opened.

My invention consists, broadly, in the combination, with a switch, of a lock controlled
45 by the entrance of a train upon a portion of the track, means for locking the same when the train so enters that portion of the track, unlocking mechanism adapted to be operated by a car in proximity to the switch to unlock
the switch, and means adapted to be con-

trolled by a switchman and arranged to put 50
the unlocking mechanism into operative position.

The apparatus when constructed in accordance with my invention is an efficient safety
55 device and provides against carelessness on the part of the switchman or malicious tampering with the switch.

Referring to Fig. 1, 2 represents the main-
line track, and 3 the switch, which is operated
by a lever 4 and rod 5 of any suitable con- 60
struction. This lever 4 is moved by a rod 6, which may be operated by a hand-lever 7 or
otherwise. The rod 6 or some other part of
the mechanism between the operating-lever
and the switch is provided with a lock 8, the 65
details of which I will presently describe and the function of which is to lock the switch
mechanism in closed position. In Fig. 1 I
show this lock operated by a pneumatic cyl-
inder, and in Fig. 10 it is operated by a spring 70
or weight; but in both cases it is controlled
by an electromagnet 9, the circuit of which
extends to a point B at any desired distance
from the switch, and it is so arranged that nor-
mally the parts are held in unlocked position, 75
but when a train reaches the point B and enters
the block on which the switch is situated the
circuit is broken at a circuit-controller 10,
and the magnet 9 is thereby discharged and
the lock brought automatically into locked 80
position. The circuit-controller 10 is preferably
operated mechanically by motion of the
semaphore D, the circuit of which is con-
trolled by motion of the home signals D' and
C. It will be understood, however, that the 85
part 10 may be operated by other mechanism
at any point on the track at which it is desired
to establish the control of the lock of the
switch.

In the mechanism shown in Fig. 1 (illus- 90
trated in detail in Figs. 2 and 3) the lock consists
of a bar 11, having a recessed portion 12,
adapted to move over a recessed portion 13
of the bar 6, so that when the two recessed
portions coincide, as in Fig. 3, the rod 6 will 95
be free to move, but when the recessed portion
12 is drawn out of the path of the bar 6,
as in Fig. 2, the bar will be locked. The

locking-bar 11 is operated in the apparatus of Fig. 1 by the piston 14 of a pneumatic cylinder 15, whose air-inlet valve 16 controls the inlet of air from the passage 17, leading
 5 from an air-reservoir, there being also an exhaust-port controlled by a valve 18. When the magnet 9 is in circuit, the exhaust-valve 18 is held in closed position and the inlet-valve 16 open, so as to project the piston 14
 10 and to hold the locking-bar 11 in the unlocked position. (Shown in Fig. 3.) When, however, the magnet is discharged, as it is by the entrance of a train upon the block at B, a spring 19 closes the inlet-valve and opens the
 15 exhaust-valve, as shown in Fig. 7, and thereupon a retracting-spring 20 moves the locking-bar 11 into the locked position shown in Figs. 1, 2, and 7, so that until this bar is unlocked, either by the action of the train
 20 leaving the block and causing the air again to enter the cylinder 15 or by the action of the switchman, as I shall now describe, the switch is held locked and cannot be moved from its closed position. If the switchman
 25 desires to open the switch, he uses the following mechanism: 21 is a treadle-bar, which may be mounted on links 22 beside the rail of the main track in proximity to the switch, the links being so set that normally this bar
 30 is a little below the level of the rail, but that by turning the links it can be raised into the position shown by dotted lines in Fig. 4 slightly above the top of the rail and can be engaged by the wheels of a car and depressed
 35 thereby. This motion of the links and the treadle-bar I effect by a lever 23 or other suitable device connected with one of the links 22 by rods 24 and 25 and a lever 26. The locking-bar 11 is connected to a lever 27,
 40 which is pivoted at 28 and is adapted to be engaged by a hook or projection 29 at the end of an arm 30 on the lever 26 when the switch-lever 23 has been thrown so as to elevate the treadle-bar, as shown by dotted lines in Figs.
 45 1 and 4. When the treadle-bar has been thus elevated and is in position to be engaged by the wheels of the car, it affords means for the unlocking of the switch by such car, for when the car is brought upon the treadle-bar it will
 50 depress it against the action of the spring 20 and preferably a second spring 31, which then engages a stop 32, through which the rod 25 passes, and by turning the links 22 it will draw on the rod 25 and will move the
 55 lever 26 farther, causing the projection 29, which is in engagement with the lever 27, to move this lever, and by drawing on the rod 11 it will bring it into the unlocking position, (shown in Fig. 3,) leaving the parts then free
 60 for the switchman to move the lever 7 and to throw the switch. This additional motion of the lever 26 and its connections is permitted by a slot 33, formed in the end of the lever 23. The springs 31 and 20 are preferably
 65 made so strong that in order to compress them and to move the locking-bar 11 it is nec-

essary to apply to the treadle-bar 21 a weight nearly as heavy as that which is applied by the wheels of an ordinary car. When the switch has thus been unlocked or opened, it
 70 is desirable that the switchman should be able to keep it unlocked, so that the car which has entered the switch may be removed from it when desired. For this purpose I provide a locking device by which when the
 75 treadle-bar has been depressed it can be held in the depressed position. Such mechanism I show in Figs. 5 and 6. Thus I form an extension on the rod 24 and provide it with a
 80 shoulder 34, which normally rests upon a latch 35, backed by a spring 36. When the treadle-bar is being depressed by the weight of a car, the motion which it imparts thereby to the rod 24 and which is permitted by the
 85 slot 33, as explained above, carries the lug 34 past the catch 35, and the latter being actuated by the spring 36 springs up back of the lug and by keeping the parts from moving in reverse direction holds the treadle-bar
 90 down and keeps the switch unlocked until the switchman again throws the lever 23 for the purpose of restoring the parts to their original position. When he does this, a cam
 95 37, which is fixed to the axis of the lever 23, depresses the latch 35, releases the lug 34, and frees the treadle-bar. In order to guard against carelessness on the part of the switchman, who might at the end of the switching operation neglect to move the lever 23, and thus leave the switch unlocked, I provide
 100 the switch-lever with a circuit-breaker 38, electrically connected with the rails of the track, so that when the lever 23 is moved into the proper position to depress the treadle-bar it will establish the circuit to the con-
 105 ductors 39 and 39' and by short-circuiting the battery 40 will cut off the current from the magnets of the signal C, causing it to come to the danger position, where it will remain until the circuit through 39 39' at the
 110 point 38 is again broken by the return motion of the lever, which releases the treadle-bar.

In Fig. 10 I show a modified construction of the device, in which I substitute a lock different in construction and differently oper-
 115 ated from that shown in Figs. 1 and 9. In this case the treadle-bar 21, rod 25, lever 26, arm 30, rod 24, and lock 23, having a spring 20, may be employed, as before. The lock is constituted by a catch 41, having a beveled
 120 lug 42, engaging a corresponding lug 43 on the switch-rod 6. 44 is a weighted or spring-actuated locking-arm which when locked occupies the position shown in dotted lines, and its end being directly against the latch 41
 125 holds it in contact with the lug on the switch-rod and prevents the latter from being moved. If, however, the arm 44 is drawn by a magnet 45 into the position shown in full lines, it will release the catch 41, and by reason of the in-
 130 clined surfaces of the lugs longitudinal motion of the switch-rod can be effected by op-

eration of the lever 7. The magnet 45 is controlled by a circuit similar to that which controls the magnet 9 in Figs. 1 and 9 and, like it, is inclosed in a case which prevents it from being tampered with. To unlock the arm 44 by operation of the treadle-bar, I form at the end of the rod 11' a projection 46, which is in proximity to the weighted or spring-connected end of the arm. If now the part 44 is brought into locking position by discharge of the magnet 45, consequent upon the train reaching the point B, and if it is desired to open the switch 3, the lever 23 is moved so as to raise the treadle-bar, and the car having been brought upon the treadle-bar depresses it, and overcoming the resistance of the spring 20, which is preferably strong enough to resist any weight less than that of a car or engine, moves the arm 44 and brings it into unlocked position, in which it is held by mechanism similar to that shown in Figs. 5 and 6. The switchman is now free to open the switch by operation of the switch-lever. When he wishes to restore the parts to their initial position, the switch-lever having been moved to close the switch, the operator moves the lever 23 to its original position, thereby through the mechanism shown in Fig. 6 releasing the treadle-bar.

In Fig. 11 I show my device applied to a connecting-track between two parallel tracks E and F in such a manner that a train approaching the switch on either track will cause the lock to lock the lever 7 on the operating-stand in a manner similar to that described with reference to Figs. 9 and 10 and prevent the throwing of either switch and at the same time operate the signals of both tracks and in both directions. The switches at both ends of the connecting-track are operated simultaneously by a lever 7 through the rods 41 and bell-cranks 42, connected to the slide-bars 6 of both stands in order to enable both switches to be operated from a single point when the lever 7 is thrown over. On one operating-stand the lever 7 is omitted, and in order to pass from track E to track F it requires that the treadle-bar at track E be elevated in the manner previously described, and a car or train must be brought onto the bar 21, depressing it, in order to unlock the slide-bar 6, after which the trainman must go to his stand at track F to operate both switches. This, however, is not necessary when crossing over from track F to track E, as the operating-stand at track F is provided with the lever 7, and said lever, through the connections 41 and 42, operates both switches simultaneously, the locking and unlocking being accomplished in the manner already described.

Within the scope of my invention as defined in the claims modifications in the con-

struction of the parts may be made by the skilled mechanic.

I claim—

1. The combination with a switch, of a lock controlled by the entrance of a train upon a portion of the track, means for locking the same when the train so enters that portion of the track, unlocking mechanism adapted to be operated by a car in proximity to the switch to unlock therewith, and means adapted to be controlled by a switchman and arranged to put the unlocking mechanism into operative position; substantially as described.

2. The combination with a switch, of a lock controlled by the entrance of a train upon a portion of the track, means for locking the same when the train so enters that portion of the track, unlocking mechanism adapted to be operated by a car in proximity to the switch to restore the lock to its locked position, means adapted to be controlled by a switchman and arranged to put the unlocking mechanism into operative position, and a signal-circuit operated by motion of the last-named means; substantially as described.

3. The combination with a switch, of a lock controlled by the entrance of a train upon a portion of the track, means for locking the same when the train so enters that portion of the track, unlocking mechanism adapted to be operated by a car in proximity to the switch to unlock therewith, means adapted to be controlled by a switchman and arranged to put the unlocking mechanism into operative position; and a locking device by which said unlocking mechanism when operated by the car is held in unlocking position; substantially as described.

4. The combination of a treadle-bar normally below the level of the rail, mechanism for raising the treadle-bar to a level slightly above the rail, and a switch-lock operated by the treadle-bar; substantially as described.

5. The combination of a treadle-bar normally below the level of the rail, mechanism for raising the treadle-bar to a level slightly above the rail, a spring which resists motion of the treadle-bar and is adapted to resist weights substantially as described.

6. The combination of a treadle-bar normally below the level of the rail, mechanism for raising the treadle-bar to a level slightly above the rail, a lock operated on a depression of the treadle-bar to lock the same in depressed position, and mechanism for releasing said lock; substantially as described.

In testimony whereof I have hereunto set my hand.

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Witnesses:

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