

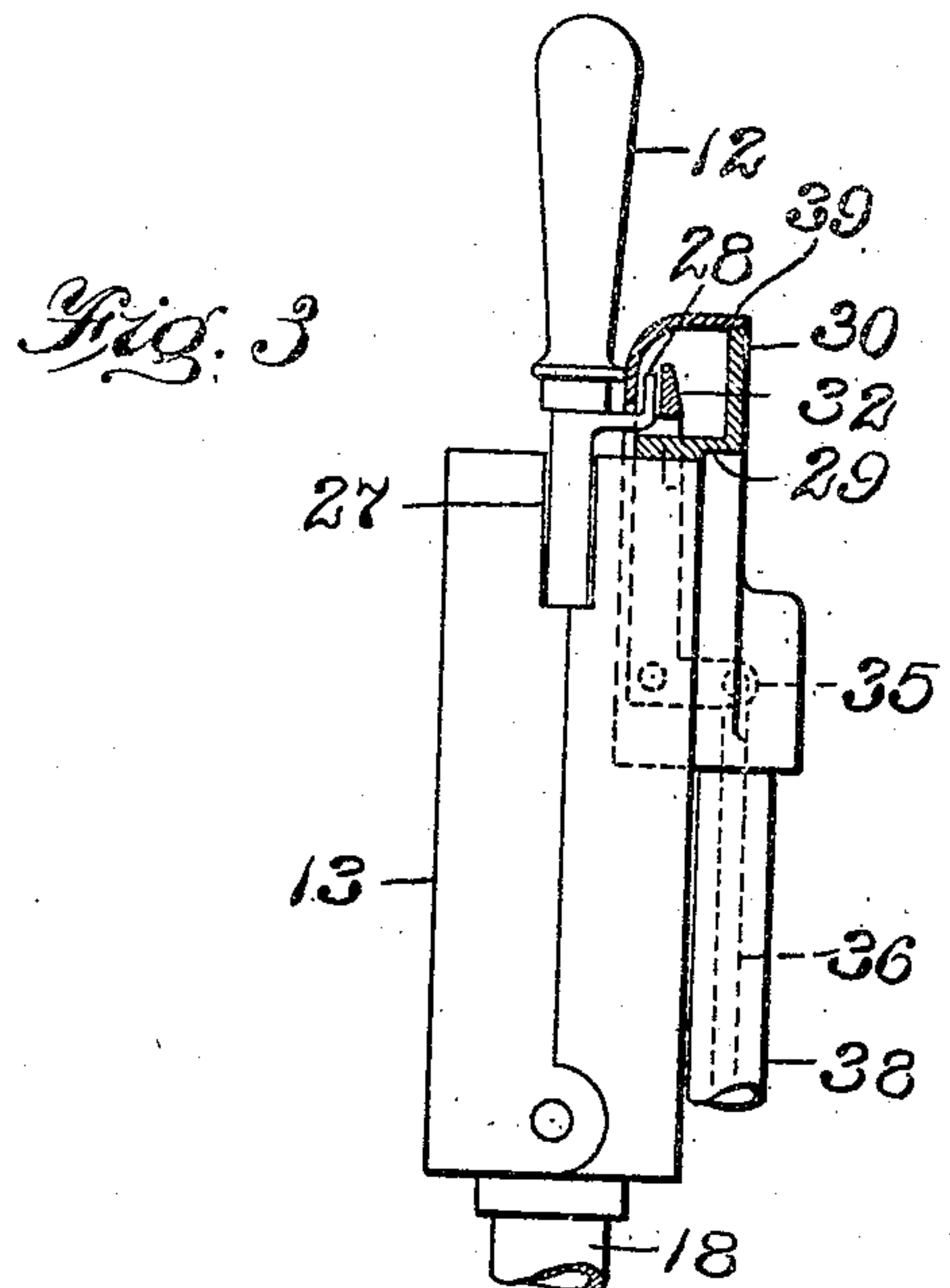
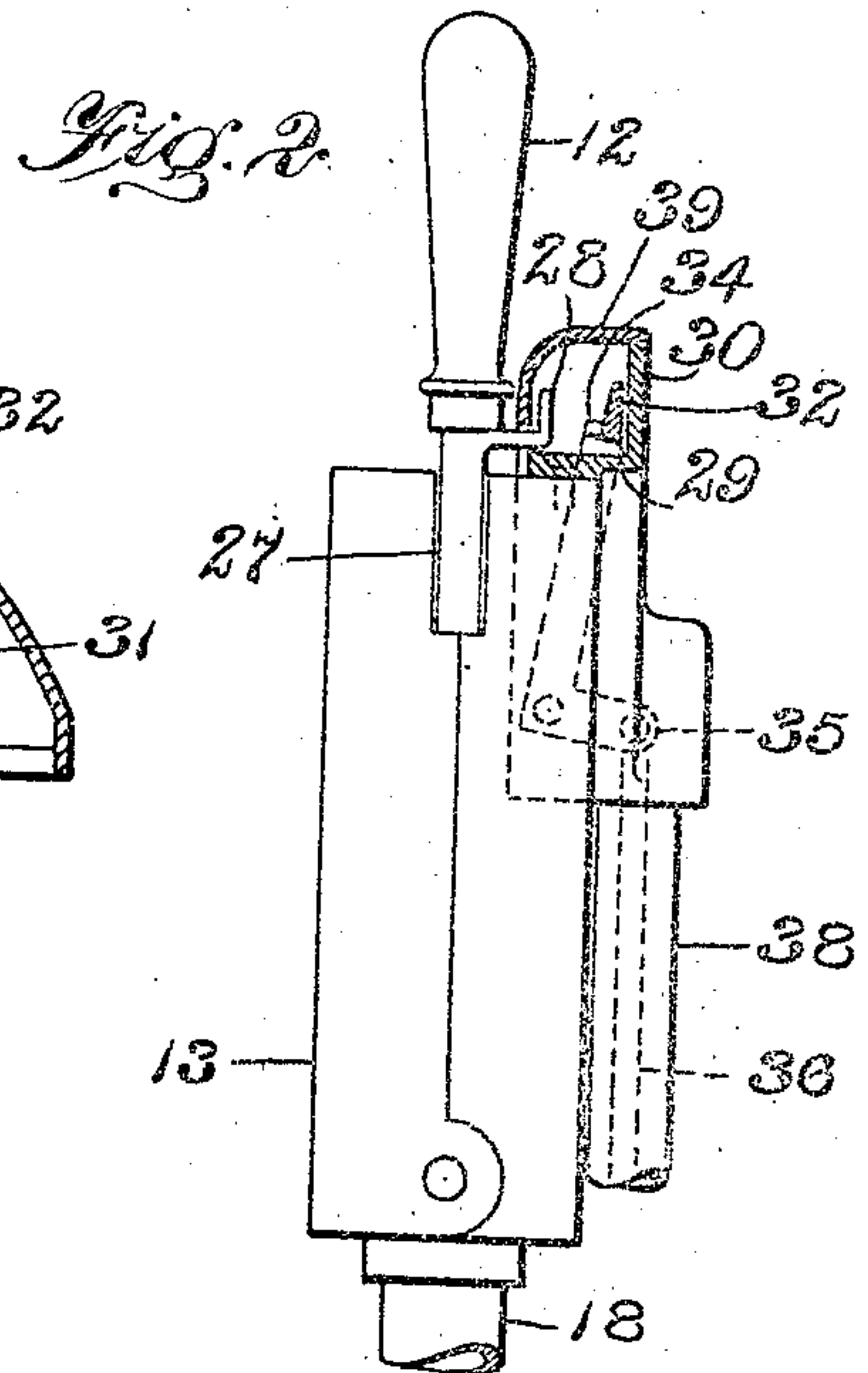
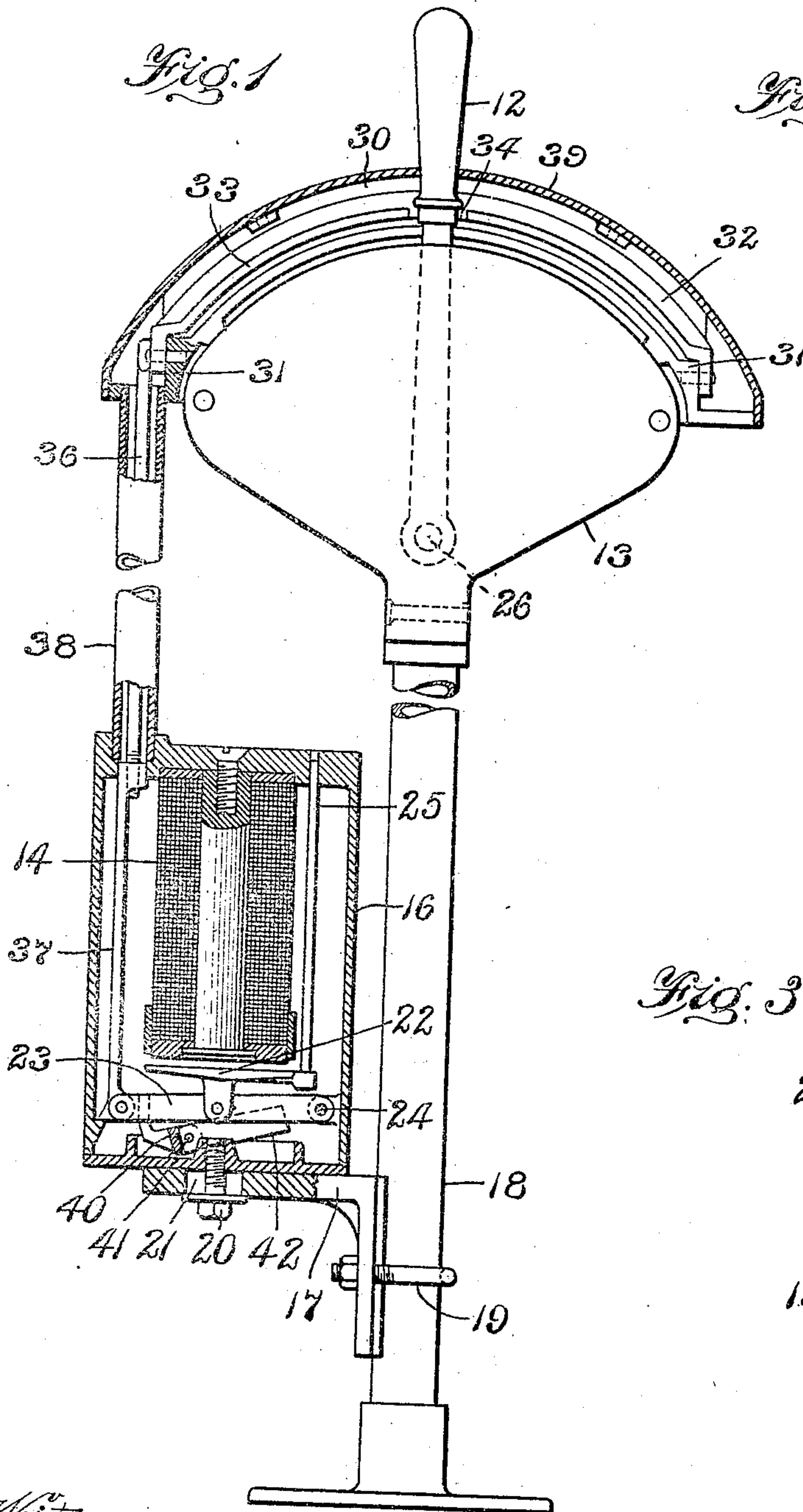
No. 824,646.

PATENTED JUNE 26, 1906.

G. HAIL.  
ELEVATOR SAFETY MECHANISM.

APPLICATION FILED SEPT. 6, 1904.

3 SHEETS—SHEET 1.



Witnesses:  
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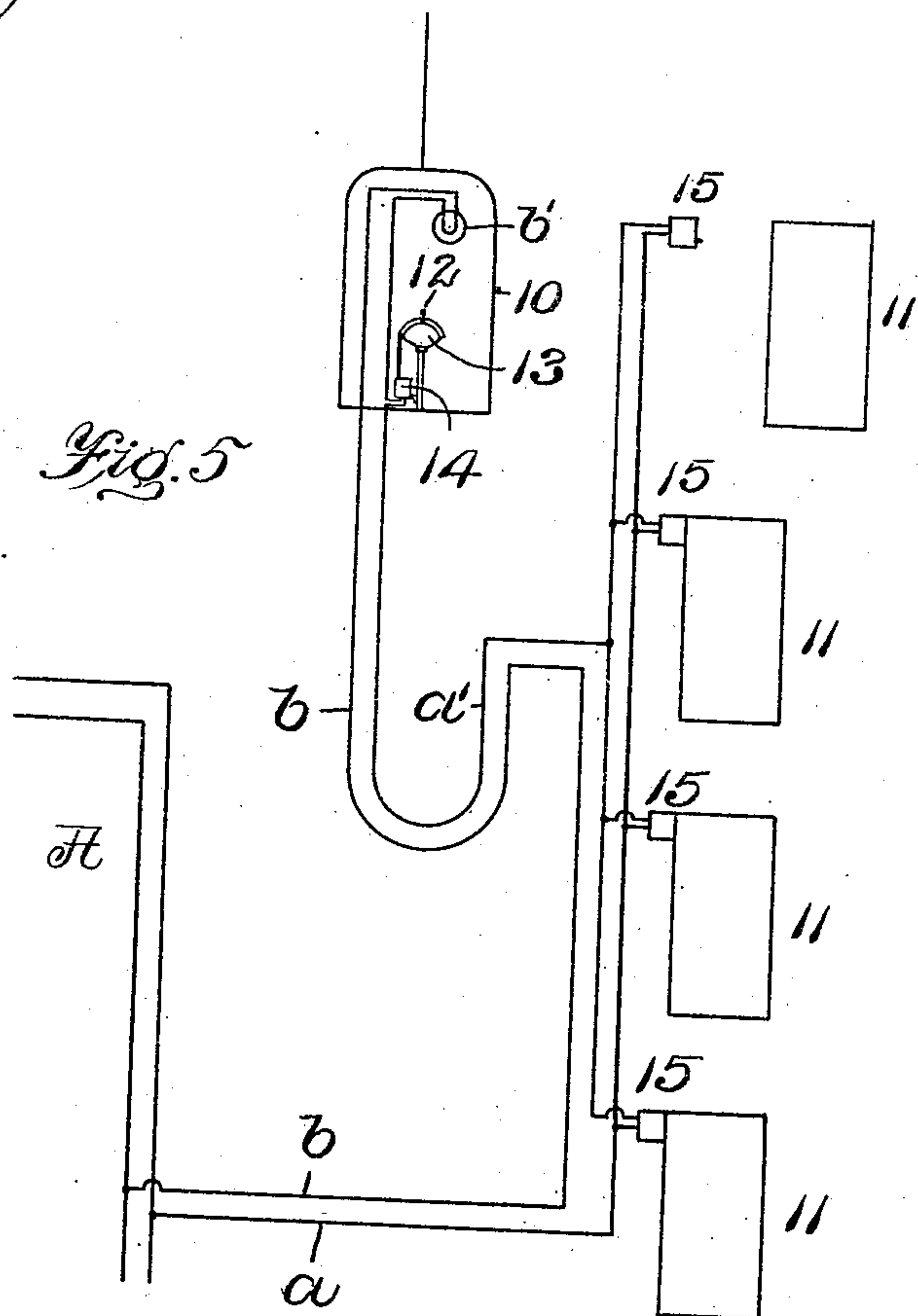
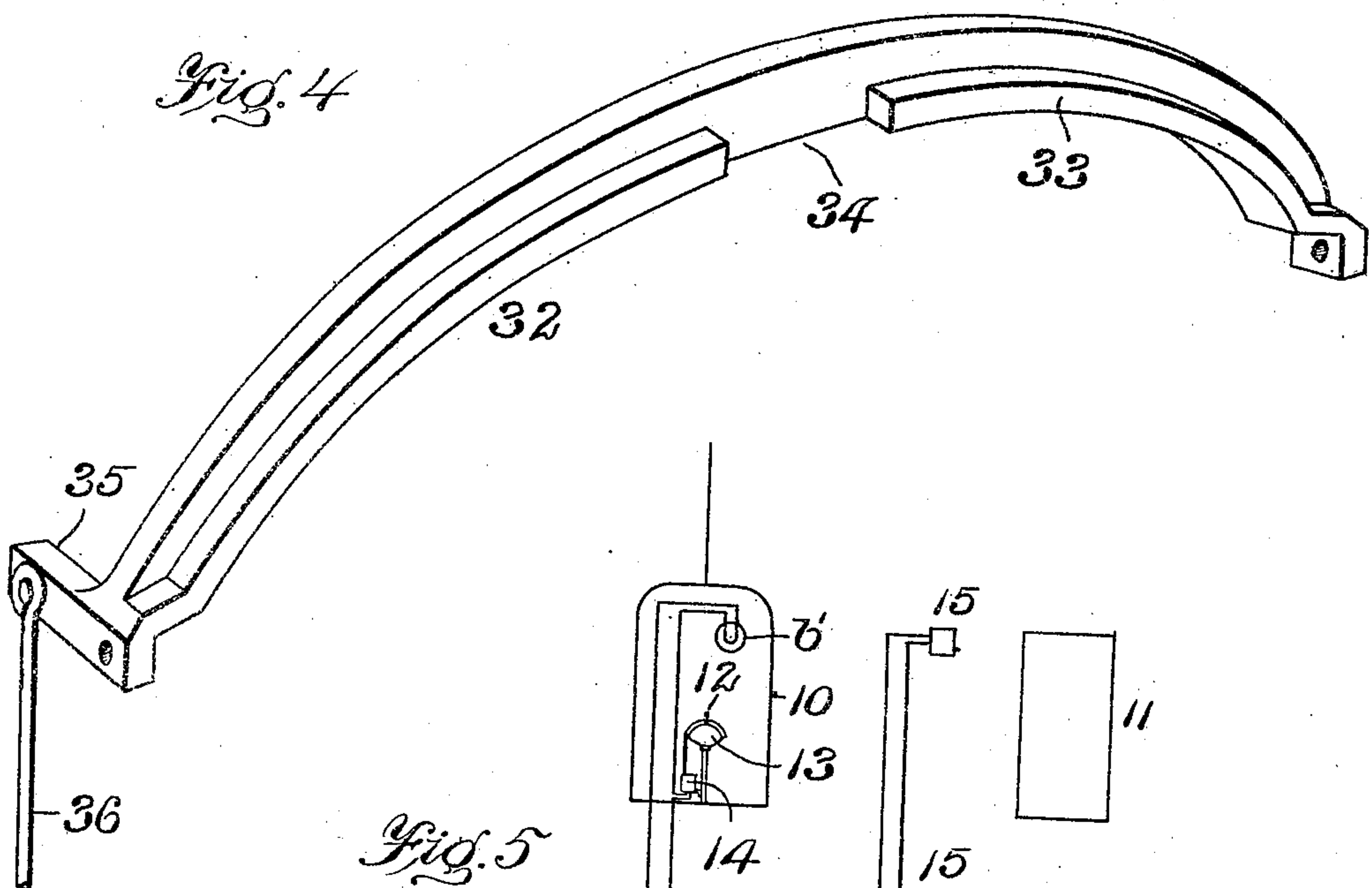
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3 SHEETS—SHEET 2.



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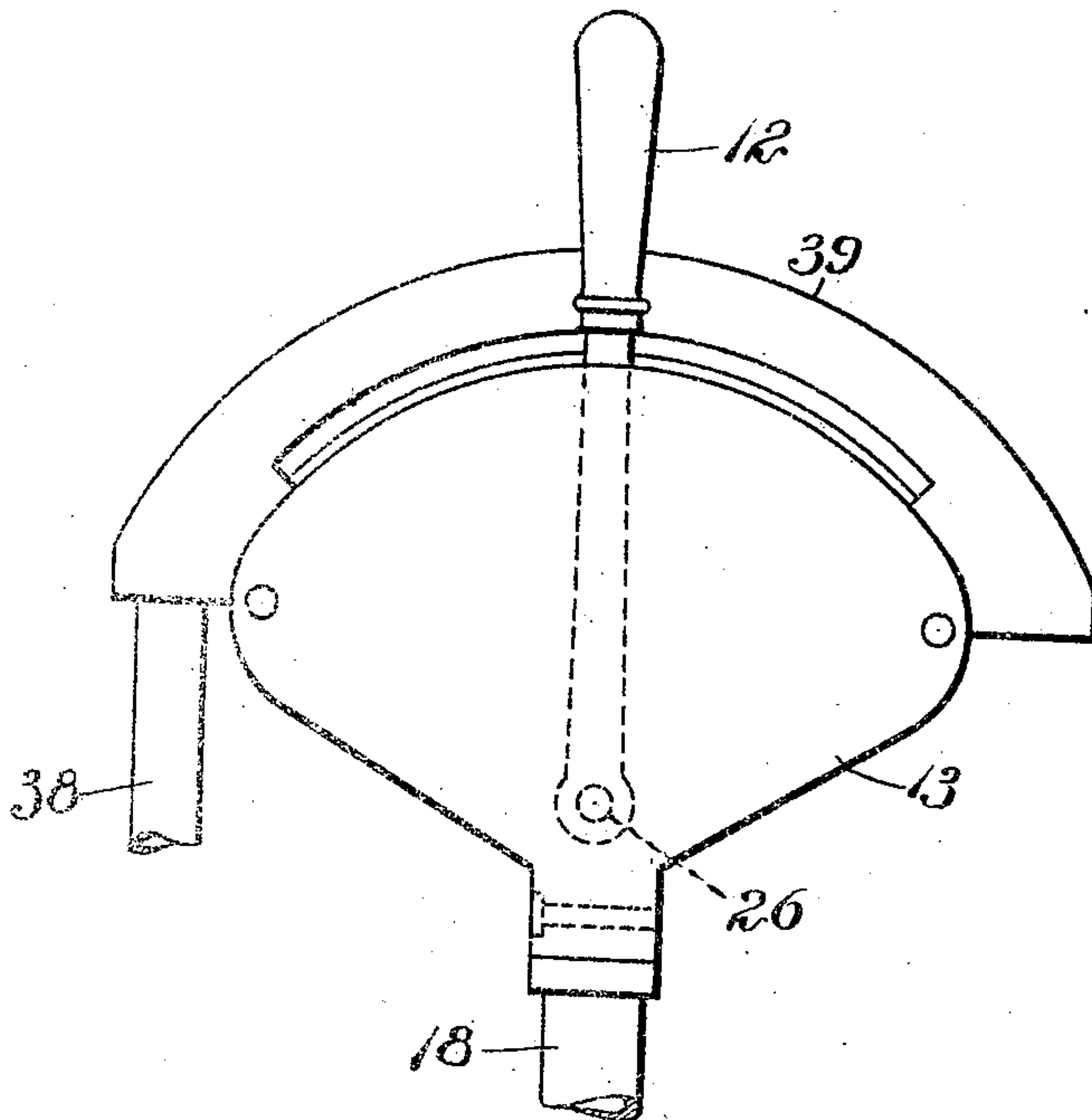
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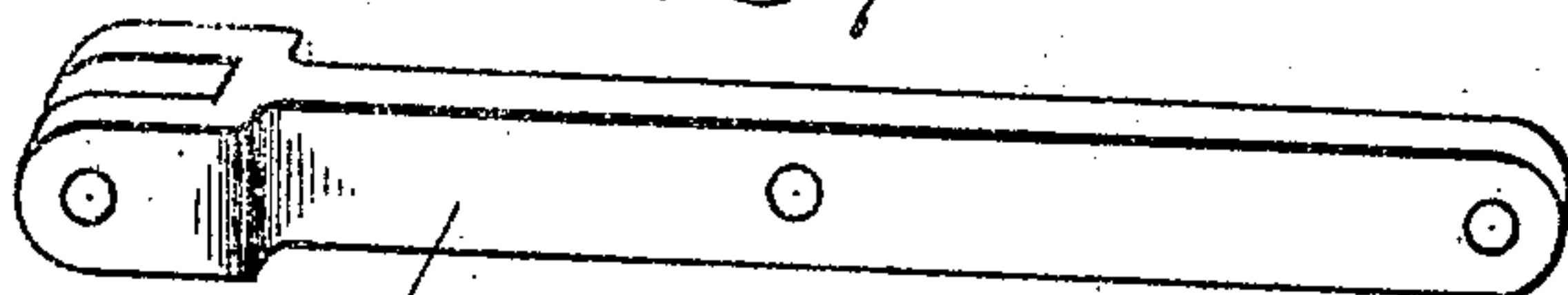
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3 SHEETS—SHEET 3.

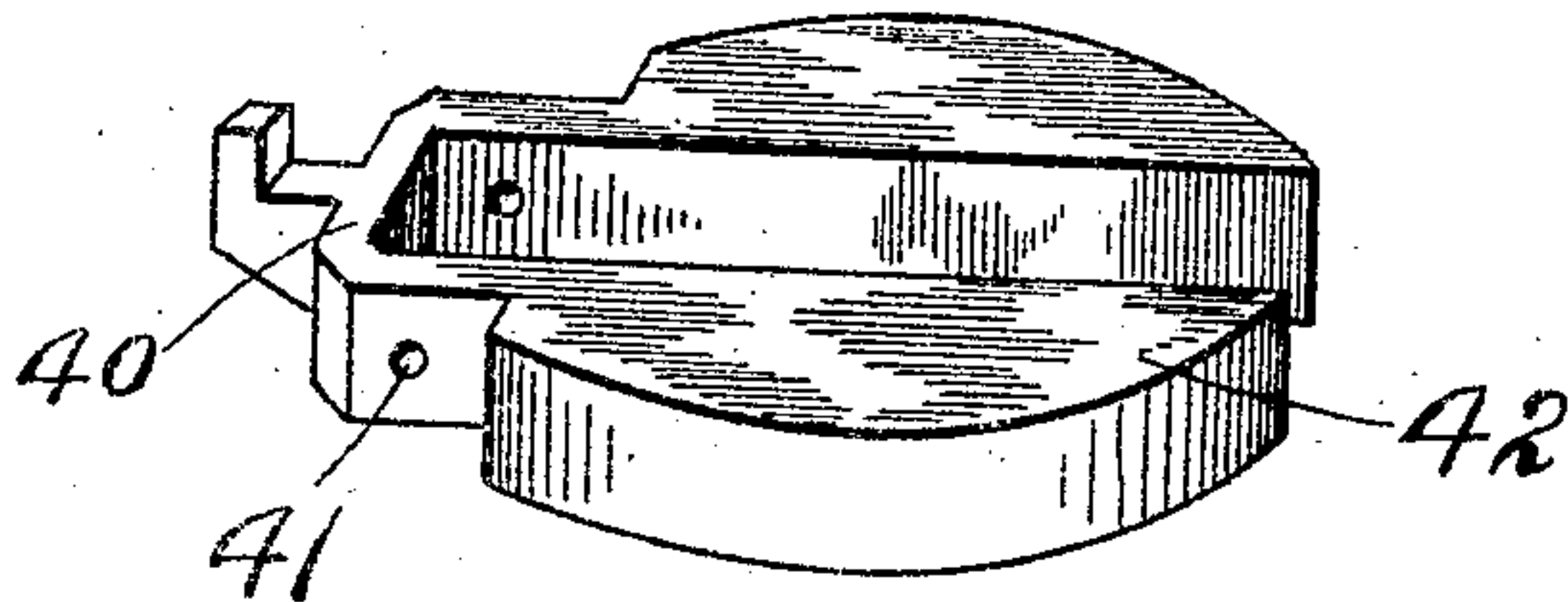
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

GEORGE HAIL, OF PROVIDENCE, RHODE ISLAND.

## ELEVATOR SAFETY MECHANISM.

No. 824,646.

Specification of Letters Patent.

Patented June 26, 1906.

Application filed September 6, 1904. Serial No. 223,316.

*To all whom it may concern:*

Be it known that I, GEORGE HAIL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Elevator Safety Mechanism, of which the following is a specification.

This invention has relation to that class of elevator safety mechanisms in which provision is made for preventing the starting of the car while the landing-door is open by locking or holding against movement the elevator-controller.

The object of the present invention is to provide a safety device of the character above mentioned which is particularly adapted for locking the switch-handle or controller of an electric car-controller, but which may likewise be utilized on elevators wherein an oscillatory handle is employed in connection with a rope or cable.

Referring to the drawings forming a part of this specification, Figure 1 shows in vertical sectional view an electrically-operated locking device in connection with an elevator-car controller. Fig. 2 shows a portion of the same in cross-section. Fig. 3 shows the same parts in interlocked position. Fig. 4 is a perspective view of the locking member. Fig. 5 is a diagram of the electric system by which the device is operated. Fig. 6 represents in front elevation the controller and the adjacent parts. Fig. 7 represents the arm to which the armature is attached. Fig. 8 represents the counterweight.

The same reference characters indicate the same parts wherever they occur.

Referring first to Fig. 5, an elevator-car and four landing-doors 11 are shown in conventional form. The car 10 is provided with an oscillatory controlling-lever 12, by which the car is started in either direction and stopped. The drawing illustrates the invention in connection with an electrically-controlled elevator and shows a segmental electric contact-box 13, though the electric system of which the controller forms a part is not illustrated, as it forms no part of the present invention. The device for locking the lever 12 is actuated by a motor, such as an electromagnet 14, located in the car 10, and is shown in shunt-circuit with an electric lighting system A, although the current for said magnet may be from any convenient source. The safety-circuit in which the magnet 14 is connected in series comprises

the feed and return wires *a* and *b*, which are connected in multiple with the lighting-circuit A. Four door-switches 15, one at each landing, are illustrated as connected in multiple with the safety-circuit, so that when any one of the doors is opened the safety-circuit is closed. A lamp or resistance *b'* is arranged in the safety-circuit and is located in the car. The switches 15 may be of any convenient form adapted to normally complete the circuit through them, but adapted to break the circuit when engaged by the doors 11, as shown by the three lower ones in Fig. 5. In this figure the door at which the car stands is shown open and disengaged from the switch 15. Under these conditions the switch completes the connection between the wires *a* and *a'*, thus causing the energizing of the electromagnet 14, with the result that the magnet effects the locking of the controlling-lever 12, as hereinafter described.

Referring now to Fig. 1, it will be seen that the magnet 14 is inclosed in a casing 16. Said casing is mounted on a bracket 17, secured to the supporting-post 18, on which the controller-box 13 is mounted. The bracket 17 is clamped to the post 18 by a U-bolt 19 and is vertically adjustable thereon, while the casing 16 is clamped to the bracket by a bolt 20, passing through a slot 21 in the bracket and into the bottom of the casing. The slot 21 provides for lateral adjustment of the casing for a purpose hereinafter mentioned. 22 is the armature of the magnet. Said armature is pivoted to a lever 23, which is fulcrumed at 24 to ears formed on the casing 16 and is held squarely and guided vertically by a stem 25, which fits easily in a hole in the casing. Thus when the armature 22 is lifted it swings the lever 23 about the fulcrum 24, with the result hereinafter specified.

Referring now to the controller, it will be seen that the operating-lever 12 is mounted to oscillate about its pivot 26 in the controller-box 13 to operate in conjunction with stationary contacts in said box. The lever projects through a segmental slot 27 in the box and has a rearwardly-projecting hooked finger 28 just outside the box. 29 is a segmental rim secured to the upper edge of the box. Said rim has a flange or wall 30 at its rear edge and at each end a squared portion 31. A segmental locking member 32, the center of whose arc is coincident with the center 26, occupies the rim 29 and is pivoted by



its ends to the squared portions 31 thereof. Said locking member has a flange 33, which when the locking member is rocked forward on its pivots, as shown by Fig. 3, engages the hooked finger 28 on the controlling-lever 12. A notch or blank-space 34 is formed in the flange 33 opposite the neutral or middle position of the lever 12, so that when the locking member is rocked forward, as hereinafter explained, the hooked finger 28 is caught and locked in the notch 34. One end of the locking member has a rearwardly-projecting finger 35, to which is pivoted a connecting-rod 36. Said rod extends downwardly and through the top of the casing 16. The lower end of the rod 36 has a screw-thread, and it is adjustably screwed into an extension-piece 37, which is inside the casing 16 and is pivoted to the free end of the lever 23. It is therefore evident that when the armature 22 is actuated by the magnet 14, as previously stated, it lifts the two-piece connecting-rod, and so causes the locking member 32 to lock the lever 12.

Since the magnet 14 is energized only when the electrical circuit is completed, the controlling-lever is movable only when all the doors are closed. If it so happens that a door accidentally springs open or a short circuit occurs while the controlling-lever is at either extreme of its movement, the locking member 32 is rocked forward until the flange 33 engages the finger 28. Then the next time the lever is swung to the neutral position the locking member snaps over the finger 28 and locks the lever until the trouble is remedied.

To provide against accidental movement of the locking member and its connecting parts, the connecting-rod 36 is incased in a tube 38, whose ends are fastened in the casing 16 and the rim 29, respectively. A segmental hood or protective guard 39 is attached to the flange 30 to protect the locking member from external interference. Said guard projects forwardly and downwardly over the hooked portion of the finger 28, thus forming, with the rim 29 and flange 30, a segmental or arc-like casing having just enough opening to provide for the travel of the finger 28 therein.

In the bottom of the casing 16 is a device adapted to counterbalance to some extent the weight of the lever 23 and the connecting-rod 36 37, and so to lessen the load on the magnet 14. Said device consists of a weighted lever 40, pivoted at 41 to ears on the bottom of the casing. The longer end of said lever is bifurcated, as at 42, so that it may straddle and rise above the lower edge of the lever 23, and its sides bulge considerably, so as to give it additional weight. The shorter end of the lever 40 is forced by the longer end thereof upwardly against the lever 23; thus exerting on it an influence which compen-

sates for a portion of the weight which the magnet is made to lift.

The accompanying drawings illustrate the invention in connection with an electrically-operated elevator; but it will be understood that it is readily adaptable to any elevator which is controlled by an oscillatory lever or an oscillatory hand-wheel.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. The combination with an elevator-car, and a controlling device comprising a box with a pivoted controller, of a locking device for preventing the actuation of the controller, door-controlled means for actuating said locking device, and a protective guard for said locking device to prevent interference with the operation thereof.

2. The combination with an elevator-car and an oscillatory controller, of an electrical circuit, door-controlled switches in said circuit, a movable segmental locking member extending along the path of movement of said controller, and an electromagnet on said car and in said circuit, and adapted to move said locking member to lock said controller.

3. The combination with an elevator-car and an oscillatory controller having a lateral projection, of an electrical circuit, door-controlled switches in said circuit, a movable segmental locking member extending along the path of movement of said projection on the controller, and an electromagnet on said car and in said circuit and adapted to move said locking member to engage said projection.

4. The combination with an elevator-car and an oscillatory controller having a projection, of a door-controlled locking member for locking said projection, and an arc-like guard inclosing said member, said guard having a segmental slot in which said projection oscillates.

5. The combination with an elevator-car and a controller, of a locking device and door-controlled means for actuating said locking device to lock said controller, and guards or casings for said locking device and door-controlled means to protect them from external interference.

6. The combination with an elevator-car and an oscillatory controller, of a movable locking member for said controller, a door-controlled means for actuating said locking member, and means preventive of manual interference with said means and said locking member.

7. The combination with an elevator-car and an oscillatory controlling-lever, of a movable locking member for said lever, a door-controlled motor for actuating said locking



member, connections between said motor and locking member, and means preventive of manual interference with said motor, said locking member, and said connections.

5 8. The combination with an elevator-car, and an oscillatory controller, of an arc-like or segmental locking member, extending along the path of movement of said controller and pivoted at its ends to swing transversely of  
10 the plane of movement of said controller, and automatic means rendered active by the opening of a door for yieldingly moving said member into locking relation to said controller.

15 9. The combination with an elevator-car, and a controlling device comprising a box having a controller pivoted therein, of a segmental or arc-like locking member pivoted at its ends to said box and movable transversely  
20 to the path of movement of said lever, and automatic means connected to said member and rendered active by the opening of a door for yieldingly actuating said member to lock said controller.

25 10. The combination with an elevator-car, and a controlling device comprising a support, and a box having a controller pivoted therein, of a segmental or arc-like locking member pivoted at its ends to said box and  
30 movable transversely to the path of move-

ment of said lever, and door-controlled means adjustably attached to said support and connected to said member for actuating it to lock said controller.

11. The combination with an elevator-car, 35 and a controlling device comprising a standard, and a box having a controller pivoted therein, of a segmental or arc-like locking member pivoted at its ends to said box and movable transversely to the path of move- 40 ment of said lever, a door-controlled magnet supported on said standard and having its armature operatively connected to said locking member to cause it to lock said controller.

12. An attachment for electric controlling 45 mechanisms for elevators, comprising a segmental locking-bar adapted to be pivoted at its ends to swing transversely to the controller, and having a laterally-projecting finger, a casing having therein an electromagnet, 50 an armature, and a pivoted lever, and connections between said finger and the free end of said pivoted lever, substantially as described.

In testimony whereof I have affixed my 55 signature in presence of two witnesses.

GEORGE HAIL.

Witnesses:

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EDWARD L. HAIL.