

H. WATSON.  
SAFETY ELEVATOR.

APPLICATION FILED DEC. 27, 1907.

Patented Sept. 22, 1908.

4 SHEETS—SHEET 1.

899,362.

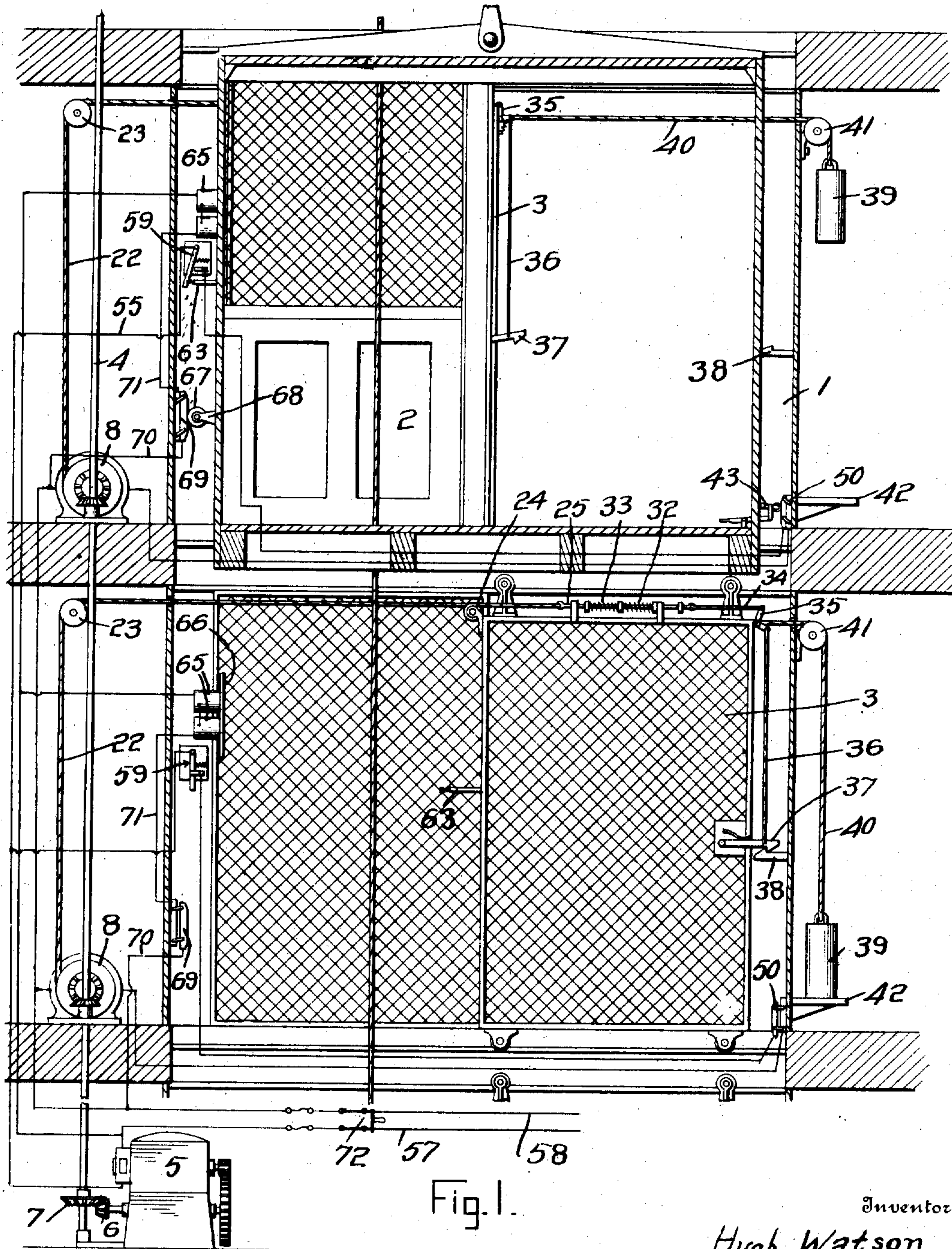


Fig. 1.

Witnesses

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By

*Francis Appelman*

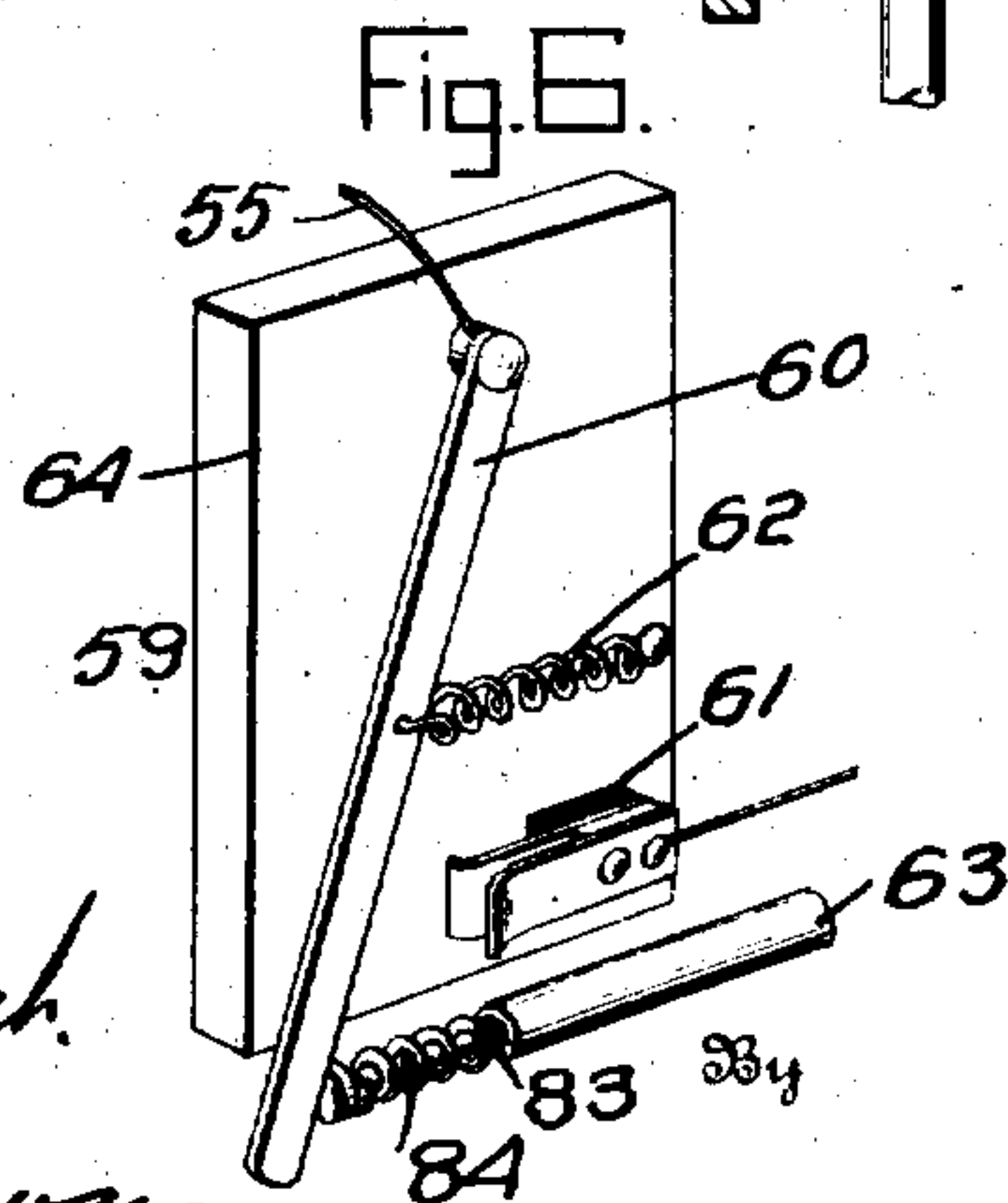
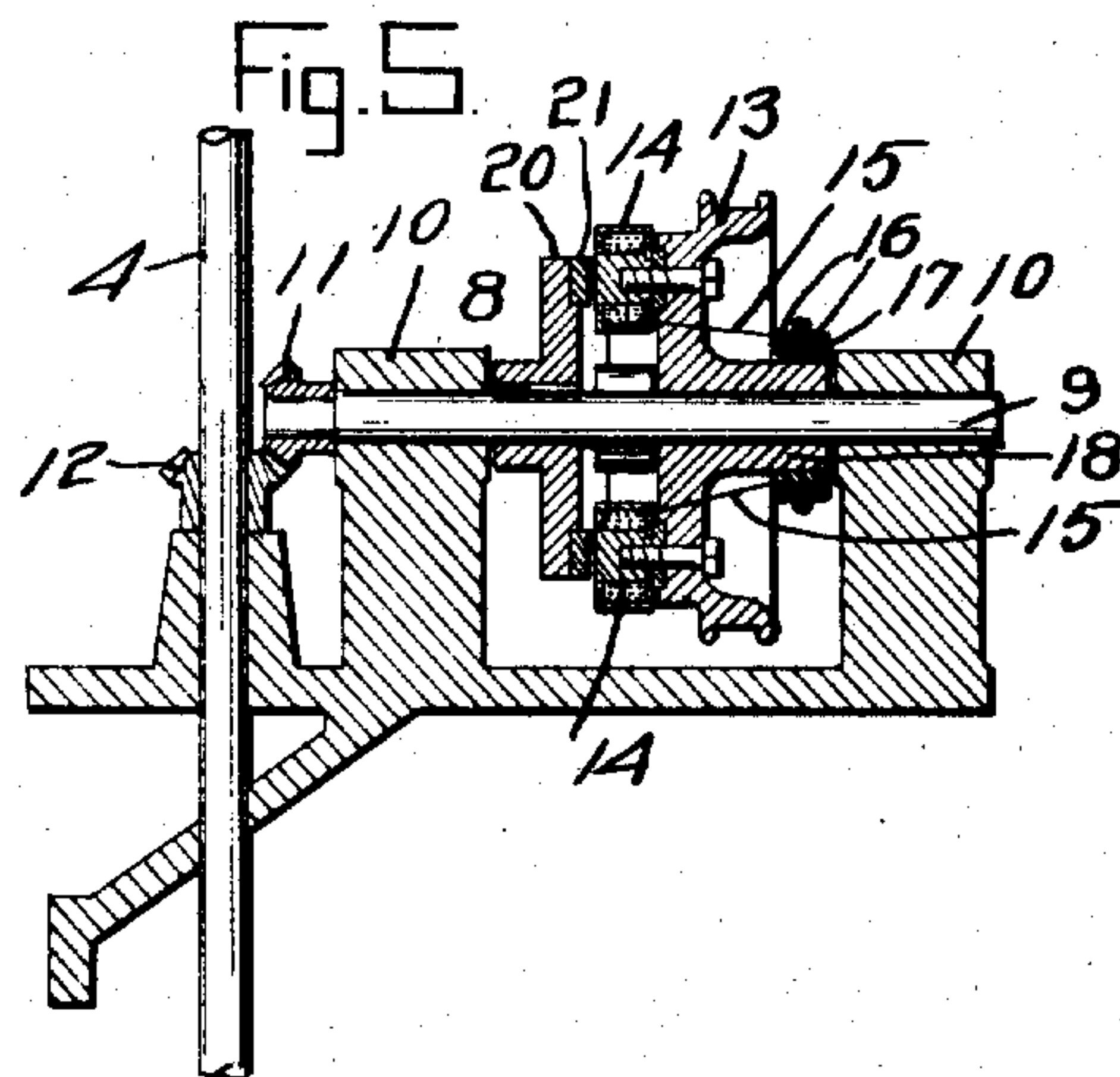
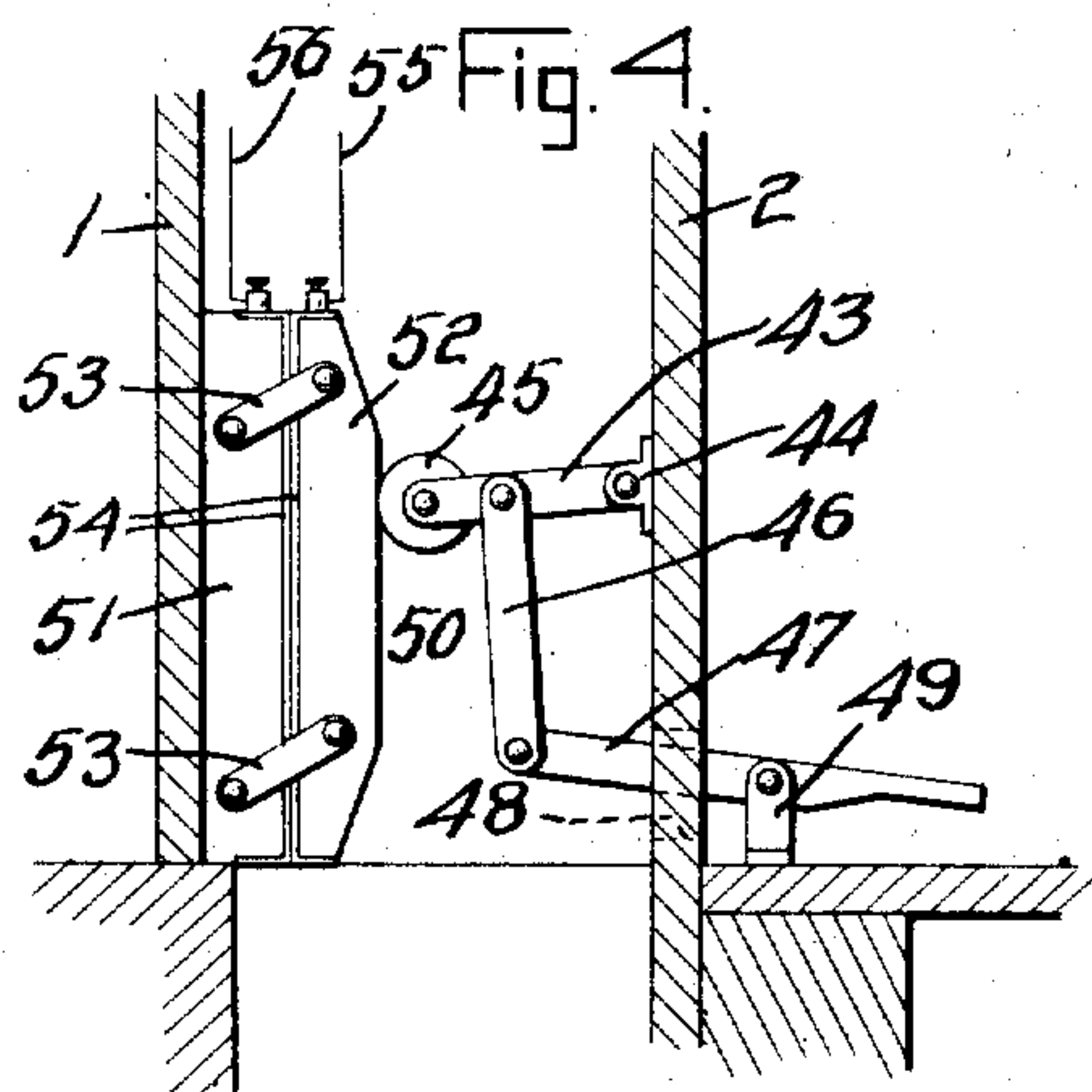
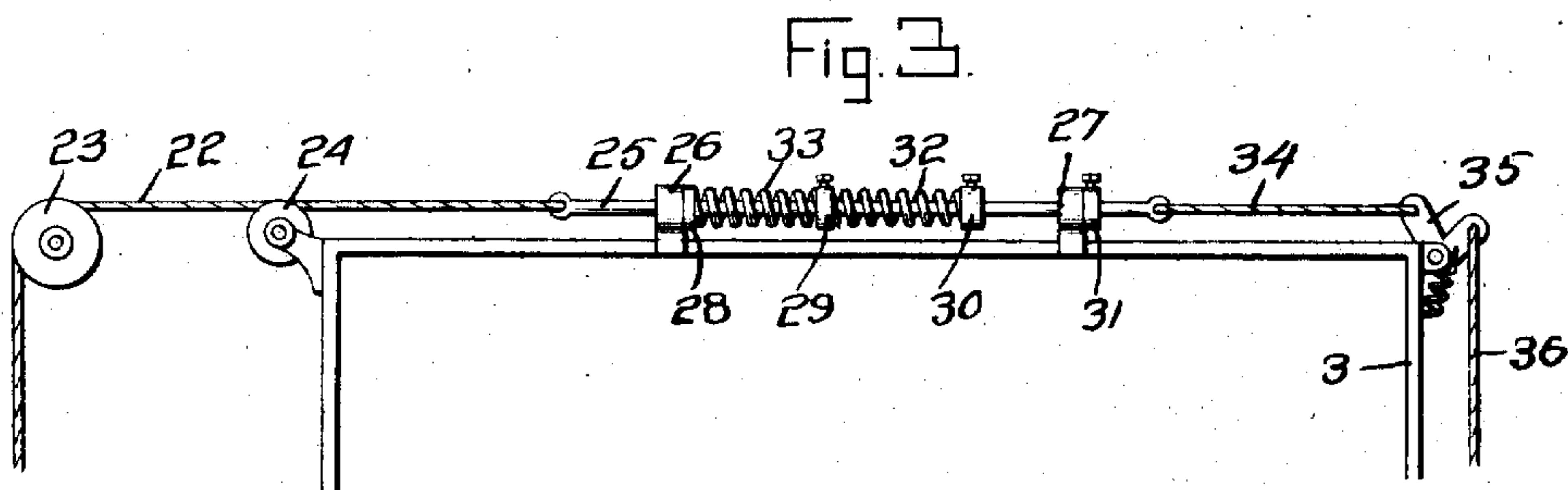
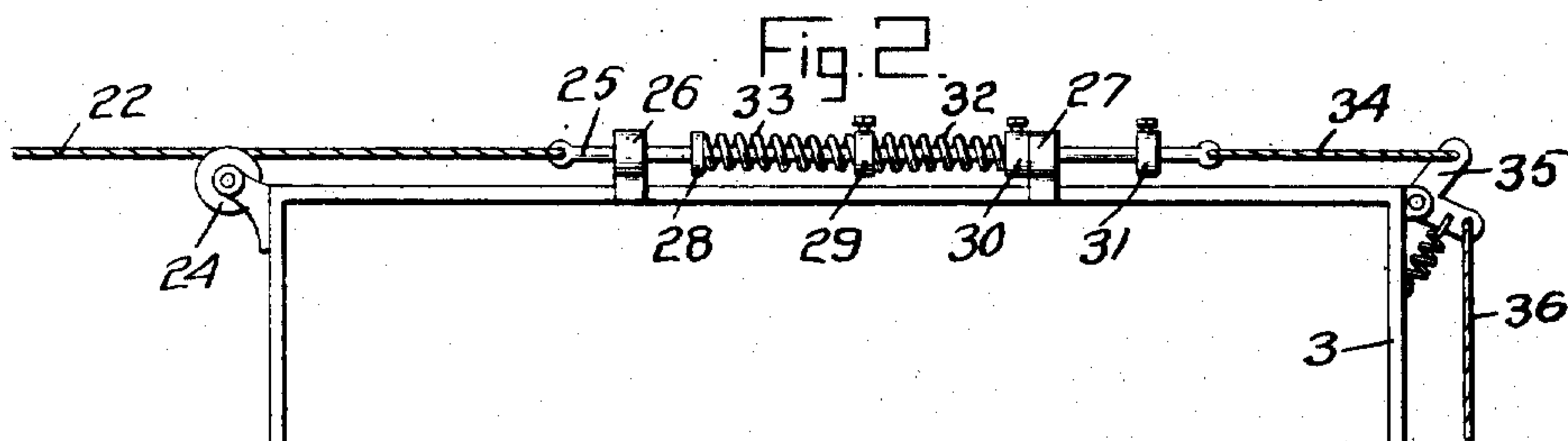
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4 SHEETS—SHEET 2.



Witnesses

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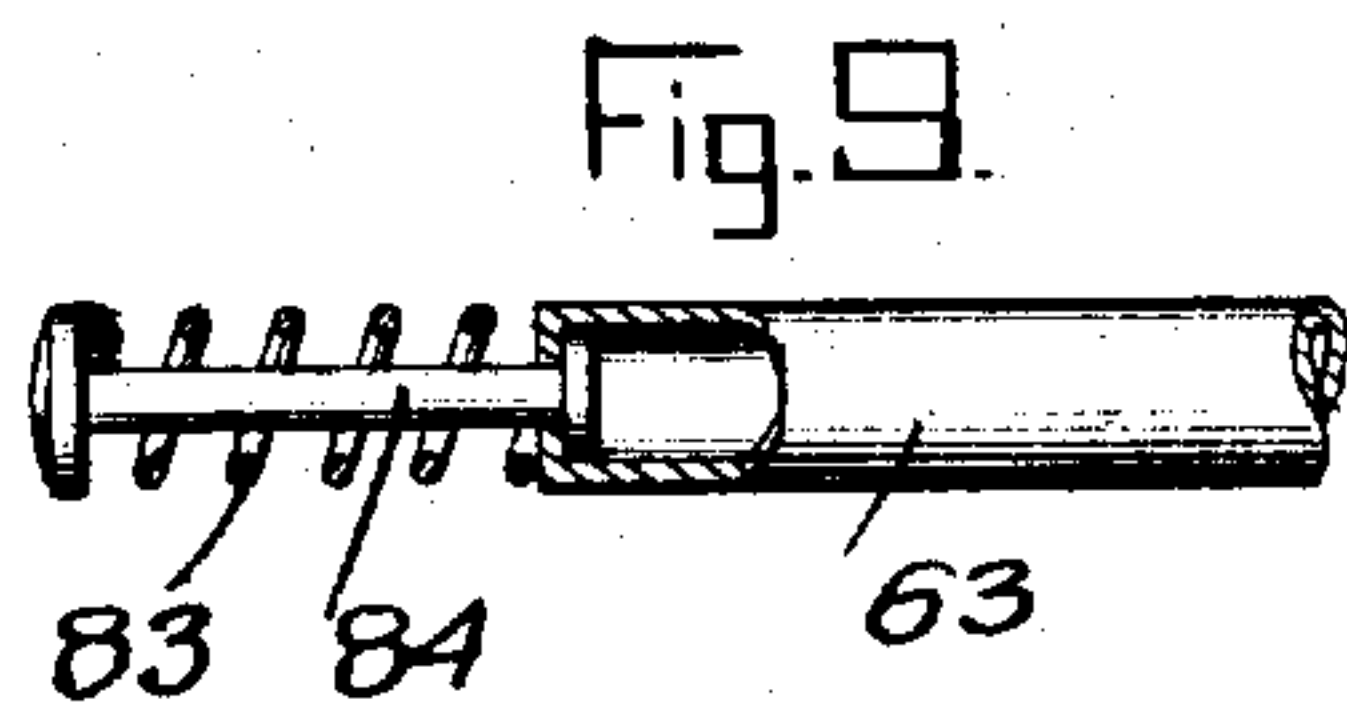
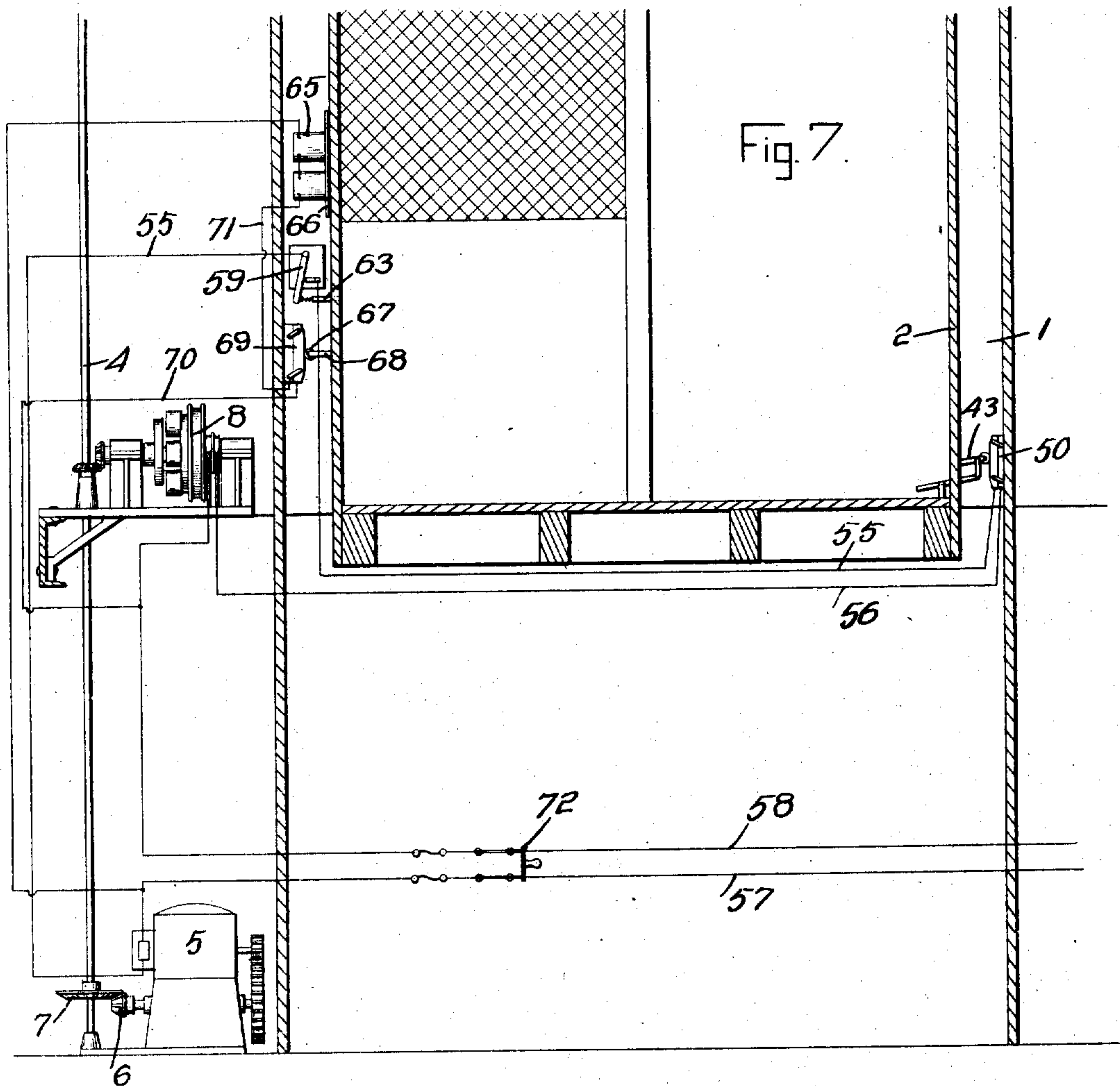
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4 SHEETS—SHEET 3.



Witnesses  
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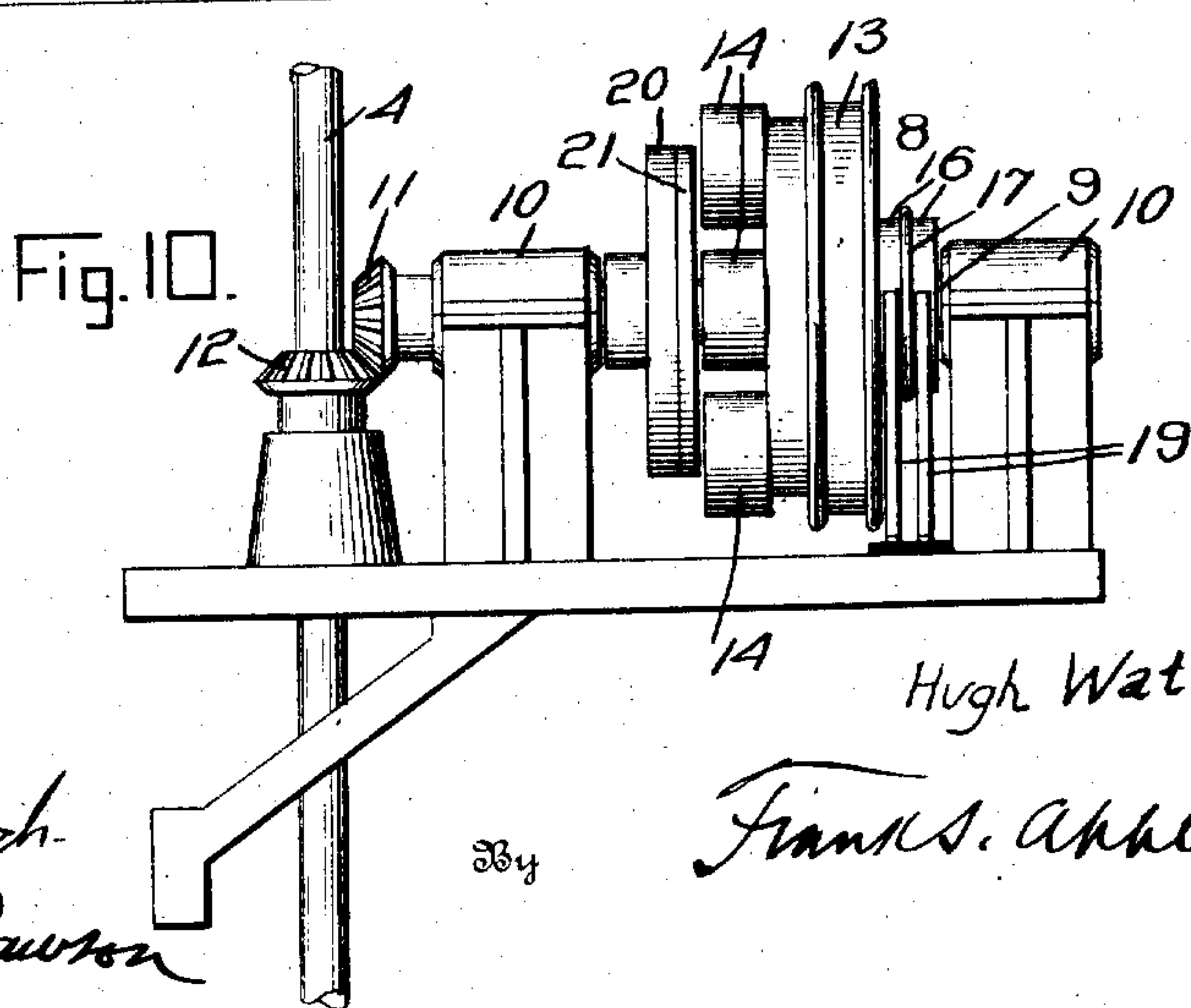
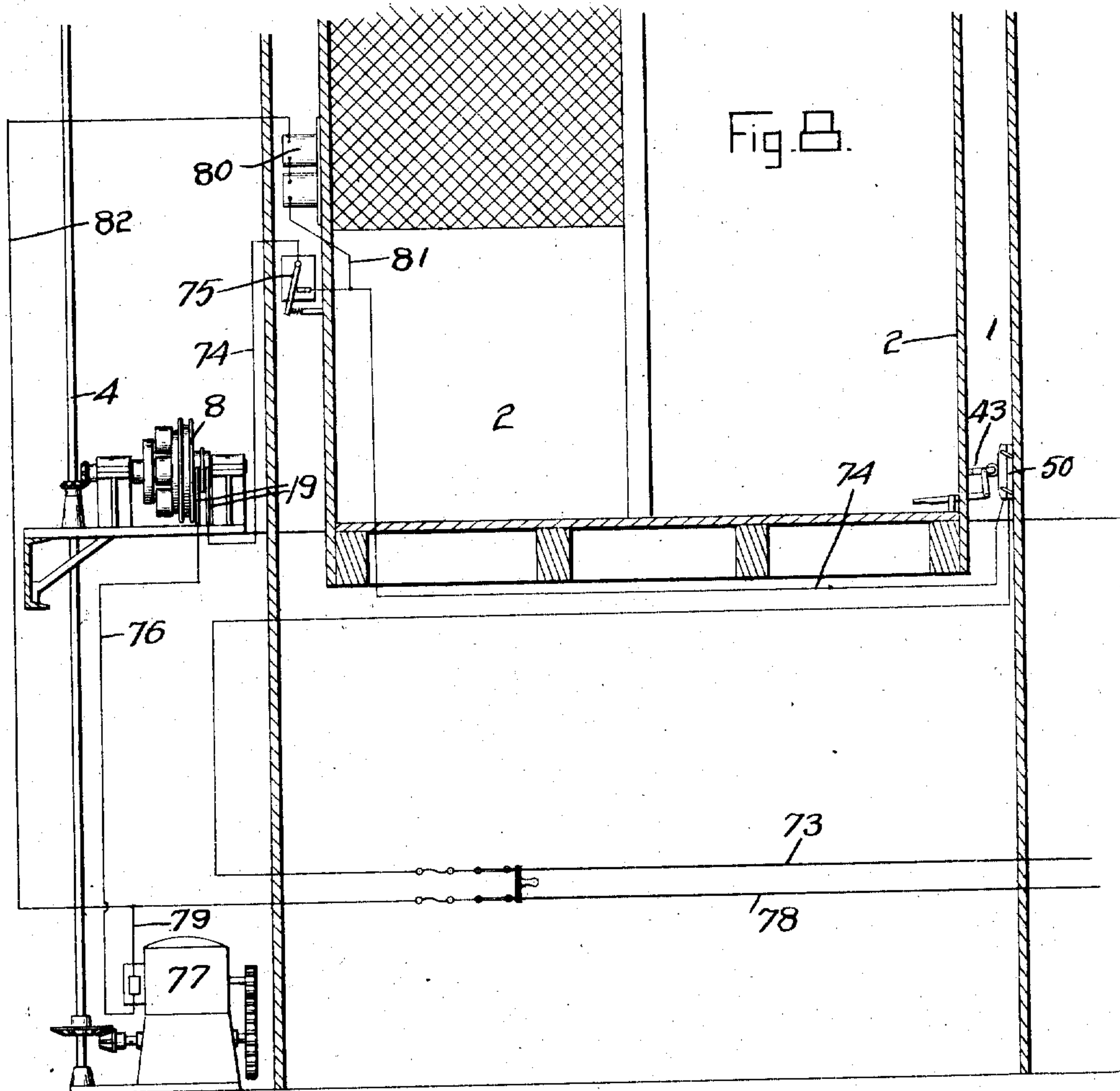
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4 SHEETS—SHEET 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

HUGH WATSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

## SAFETY-ELEVATOR.

No. 899,362.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed December 27, 1907. Serial No. 408,286.

*To all whom it may concern:*

Be it known that I, HUGH WATSON, a citizen of the United States of America, residing at the city of Washington, in the District of Columbia, have invented certain new and useful Improvements in Safety-Elevators, of which the following is a specification.

This invention relates to new and useful improvements in devices for opening and closing elevator doors and it has relation more particularly to devices which remain inoperative until the car has reached a predetermined point.

It is an object of the invention to provide a novel device of this character wherein an electrical contact may be made when the car has reached the floor to operate a mechanism which will open the door.

It is also an object of the invention to provide novel means in a device of this character whereby simultaneously with the closing of the circuit for opening the door a means will be made operative for holding said door open.

It is also an object of the invention to provide in combination with a device of this character, novel means whereby the circuit for controlling the opening of the door will be broken before the door has reached the limit of its movement.

It is also an object of the invention to provide a novel device of this character wherein the various doors of the elevator-well or shaft are caused to open by a common motor, each door having its individual clutch operating in conjunction with a shaft operated by the motor.

It is also an object of the invention to provide a novel device of this character wherein the various elements required for the successful operation of the device in opening a door and holding said door opened are made operative from a single contact.

Finally an object of this invention is to produce a novel device of the character noted, which will possess advantages in points of simplicity, efficiency and durability, proving at the same time comparatively inexpensive to manufacture and maintain.

With the foregoing and other objects in view, the invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, ref-

erence will be had to the accompanying drawings forming part of this specification wherein like characters denote corresponding parts in the several views in which—

Figure 1, is a vertical section of a portion of a well-hole or shaft showing the door on one floor open and the door on another floor closed, the car being shown in section; Fig. 2, is a side elevation of the upper portion of a door showing a portion of the unlocking mechanism in the position when the door is closed; Fig. 3, is a view similar to Fig. 2, except that the unlocking mechanism is shown in the position assumed when the door is unlocked; Fig. 4, is a side elevation of the mechanism employed for setting the motor in operation to unlock and open the door; Fig. 5, is a sectional view of the clutch employed in the operation of the device; Fig. 6, is a perspective view of the cut-out employed for controlling the operation of the clutch; Fig. 7, is an enlarged sectional view setting forth the various connections required for the successful operation of the invention; Fig. 8, is a view similar to Fig. 7, illustrating a modified form of wiring wherein the various parts are made operative from a single contact; Fig. 9, is a fragmentary sectional view illustrating a detail of the invention; and Fig. 10, is a view in elevation of the combined clutch and winding drum.

In the drawings 1, denotes the well-hole or shaft, 2, the car and 3, the doors, all of which may be of any approved construction.

At one side of the well-hole 1, mounted in suitable brackets is the shaft 4, which is rotated by a motor 5, through the medium of the gears 6 and 7. This motor may be positioned anywhere intermediate the length of the shaft but it has been found best in practice to have the same located within the basement of the building.

On each floor adjacent the shaft 4, and at one side of the well-hole 1, is a combined clutch and drum 8. This combined clutch and drum may be supported in its proper position in any desired manner as this forms no essential feature of the invention. In its construction, the combined clutch and drum comprises a driving shaft 9, mounted in suitable bearings 10. One end of this shaft projects beyond one of the bearings and is provided with a beveled gear 11, meshing with a beveled gear 12, on the shaft 4. It will thus



be seen that with the rotation of the shaft 4, the driving shaft 9, will be rotated thereby. Loosely mounted on the shaft 9, is the winding drum 13. This drum has secured thereto a series of magnets 14 and these magnets are connected by the wires 15, with the contact rings 16, embracing the insulating sleeves 17, carried by the hub 18, of the drum. These rings in turn are contacted with by the brushes 19, suitably connected with a proper source of electricity. Keyed to the shaft 9, but capable of longitudinal movement thereon, is the disk 20, provided on its face opposed to the magnets with a soft iron ring 21. When proper electrical connection is made, the magnets 14, will become energized and draw thereto the disk 20, and as long as this connection is maintained the drum 13, will be caused to rotate with the rotation of the shaft 9.

Secured to the winding drum at one end is the drawing member 22. This member is illustrated in the drawings as being a cable, but it is to be understood that any flexible device which will operate with equal facility may be substituted therefor. This cable 22, passes over the pulleys 23 and 24 and is secured to an end of a rod 25, mounted in the brackets 26 and 27.

Located on the rod 25, are the collars 28, 29, 30 and 31, the collar 28, being loose on the rod, and collars 29, 30 and 31, being provided with set screws by means of which they may be adjusted to any desired position. Situated between the collars 29 and 30, is a spring 32, and between the collars 28 and 29, is a spring 33. The purpose of the springs is to cushion the stroke of the rod 25, as it slides in the brackets 26 and 27. Attached to the forward end of the rod 25, is an end of a flexible member 34, the opposite end of said member being secured to the upper arm of a spring-restrained angle-lever 35, pivoted to one corner of the door. Secured to the other arm of the angle lever is one end of a flexible connection 36, the opposite end of said connection being attached to a spring-pressed latch 37, which is intended to engage a keeper 38, secured to the wall of the well-hole. It will thus be seen that when the winding drum 13, is rotated, the door will be unlatched and caused to open. When the winding drum 13, has been released from the disk, the weight 39, will cause the door to close. This weight 39, is attached to a flexible member 40, secured to the forward edge of the door. This flexible member 40, passes over a pulley 41.

In order to prevent sudden shock or jar to the door in closing, a buffer or cushion 42, is provided to relieve the strain of the weight from the door when it has reached the limit of its necessary drop.

Carried by the car 2, is a lever 43, said lever being pivotally connected to the bracket

44, secured to an outer surface of the car. Mounted in the free end of this lever 43, is a roller 45, for a purpose to be hereinafter referred to. Intermediate its length, the lever 43 has pivoted thereto an end of a link 46, which has its opposite end pivoted to the outer portion of a foot lever 47, which extends through an opening 48, in the car. This foot lever 47, is pivotally secured intermediate its length to a bracket 49, secured to the base or floor of the car. By this arrangement, the lever 43, may be moved on its pivot.

The roller 45, is intended to engage a contact 50, in order to close the required circuits for opening the door. There is a contact 50, for each door and said contact is secured to a wall of the well-hole and is so positioned that the roller 45, may contact therewith only when the car 2, is in proper alignment with the floor for the discharge or admission of passengers. This contact 50, may be of any desired construction, but it has been found best to form the same of two pieces 51 and 52. The piece 51, is secured to the wall of the well-hole while the piece 52, is movable eccentrically with relation to the piece 51, through the medium of the links 53, pivoted to the piece 51, and the piece 52, more particularly shown in Fig. 4. These pieces are formed of non-conductive material and have their opposed or contacting edges faced with conductor strips 54, to which wires 55 and 56 are connected, the wire 55, being connected to the movable member while the wire 56, is connected with the stationary member. The wire 56, is in connection with one of the brushes 19, of the clutch. The wire 55, leads to the motor 5. The wire 57, of the main line is also in connection with the motor. The wire 58, of the main line is in connection with the second brush 19, of the clutch. By this arrangement, it will be seen that when the car has been stopped at the proper floor, and the operator presses the foot lever 49, the roller 45, will force the contact piece 52, against the piece 51, and thereby close a circuit through the wires 58, 56, 55 and 57, which contact will cause the motor 5, to rotate the shaft 4, and energize the magnets 14, which will effect the desired rotation of the winding drum 13, and thereby cause the door to open as will, it is thought, be fully understood.

The line 55, is interrupted by a switch 59. This switch may be of any structure which will meet the necessities of practice and it has been found desirable to employ the form shown in Fig. 6, wherein the pivoted blade 60, normally engages the contacts 61, said engagement being maintained through the medium of the contraction spring 62. This switch forms an essential feature of the invention as this switch breaks the circuit and stops the rotation of the winding drum 13, when the door has been caused to open sufficiently.



ciently. The switch depends upon the door for its operation.

Extending rearwardly from the door is an arm 63, which is in a line with the blade 60, and is intended to contact therewith, said blade being preferably extended beyond an edge of the base block 64, of the switch. The arm 63, contacts with the blade 60, just before the door has reached the limit of its movement and forces the blade out of engagement with the contact 61, and thereby breaks the circuit, which will consequently stop the motor and free the winding drum from the disk 20.

Under ordinary circumstances, the weight 39, would cause the door to close immediately upon the breaking of the circuit, but to hold the doors open until the car leaves its position, the magnets 65, are carried by the well-hole and are intended to, contact with the rear edge of the door or a metallic strip 66, carried thereby. When the car is in position, these magnets are inactive, but when the car has stopped at the floor, the roller 67, carried by the arm 68, projecting rearwardly from the car closes the contact 69, said contact being of the same construction as the one hereinbefore referred to.

The movable member of the contact is connected with the main wire 58, by the wire 70, while the immovable member is connected with the magnets by the wire 71, said wire being continued and connected with the wire 57, of the main line. Thus it will be seen that when the contact 69, is closed, the magnets are energized. When the car is moved, the contact 69, separates as soon as the roller 67, passes therefrom.

From the foregoing description, it will be seen that unless the device is in operation, there is no waste of electricity. When the time comes for the closing down of the elevator, the main line circuit may be broken by the switch 72, when the door will close. Access may be had to the car by the operator in the usual way by a key or the like, it being understood that the mechanism hereinbefore referred to will not interfere with the gate being operated manually.

It has been found in the successful operation of the invention that it is well to control the operation of the magnets 65, by the contact used in conjunction with the foot lever. This arrangement is more particularly shown in Fig. 8. In this form the wire 73, of the main line is connected with the stationary member of the contact while the movable member of the contact is connected by the wire 74, with one of the brushes of the clutch, said wire 74, being interrupted by a switch 75 as in the form hereinbefore referred to. The second brush of the clutch is connected by a wire 76, with the motor 77, said motor being connected with the wire 78, of the main line by the wire 79. The magnets 80,

are connected with the wire 74, by the wire 81, and with the wire 78, of the main line, by the wire 82. It will therefore be seen that when the pieces of the contact are in engagement, circuits will be formed for the motor, clutch, and the magnets, and that when the switch 75 is broken, a circuit will still be maintained for the magnets and that the said magnets will be energized as long as the pieces of the contact are held in engagement one with the other.

While not essential, it has been found advantageous to have the contacting end of the arm 63, cushioned. This cushioning may be effected in any manner but it has been found desirable to have a telescoping member 84, which is held at the limit of its outward movement by the coiled spring 83.

The device as hereinbefore set forth has been described in conjunction with a well-hole wherein each floor has but one door. It is to be understood, however, that a multiplicity of doors may be operated by the present device with equal facility, the slight changes which may of necessity accrue, easily fall within the scope of a skilled mechanic.

I claim:

1. In combination with an elevator shaft and its doors, a car, a winding drum for each door, a flexible connection between each drum and its door whereby the drum will move the door in one direction, and a means common to all the doors for rotating the drums.
2. In combination with an elevator shaft and its doors, a car, a winding drum for each door, a flexible connection between each drum and its door whereby the drum will move the door in one direction, a means common to all the doors for rotating the drums, and means whereby the operating means is made inoperative when the door has been moved a predetermined distance.
3. In combination with the doors of an elevator shaft, a car, a winding drum for each door, a flexible connection between each drum and the door to be operated by the drum, means for transmitting power to the drums, and electrically controlled means for intermittently connecting the drums to the power transmitting means.
4. In combination with the doors of an elevator shaft, a car movable with relation to the doors, means for operating the doors, a motor independent of the car moving motor for actuating the door operating means, and electrically controlled devices for connecting the door operating means with the actuating means.
5. In combination with the doors of an elevator shaft, a car movable in the shaft, means for holding the doors normally closed, door opening means comprising an electrically controlled clutch stationed in operative



relation to each door, a source of power for rotating one member of each clutch, and means for electrically connecting the parts of any one clutch independently of the other  
5 clutches, whereby one door opening means may be operated independently of the other door opening means.

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

HUGH WATSON.

Witnesses:

WM. J. KNOBLOCH,  
WILFRED E. LAWSON.