

G. A. HASSEL.
CUT-OUT FOR CRANES.
(Application filed July 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

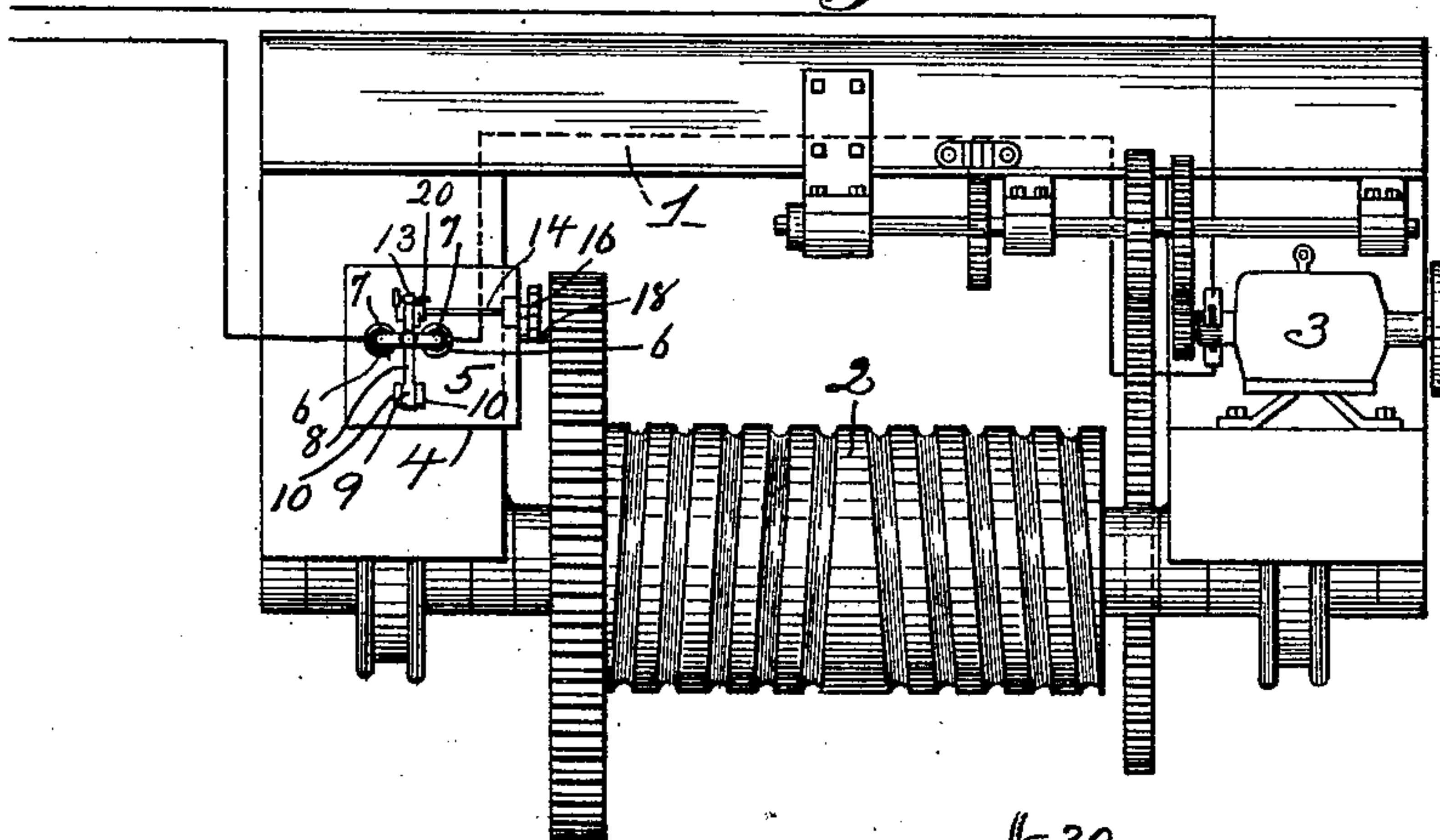


Fig. 2.

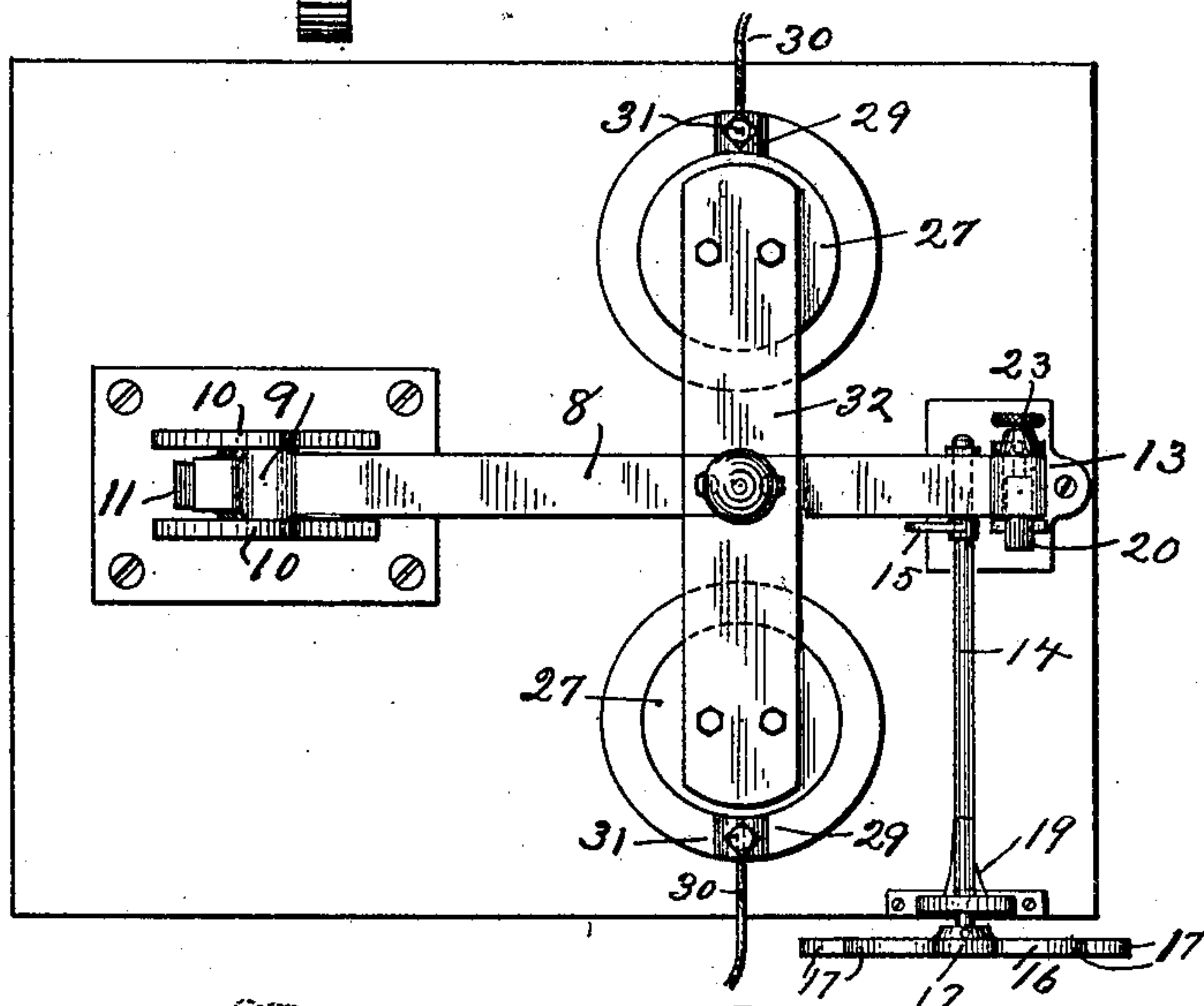


Fig. 3.

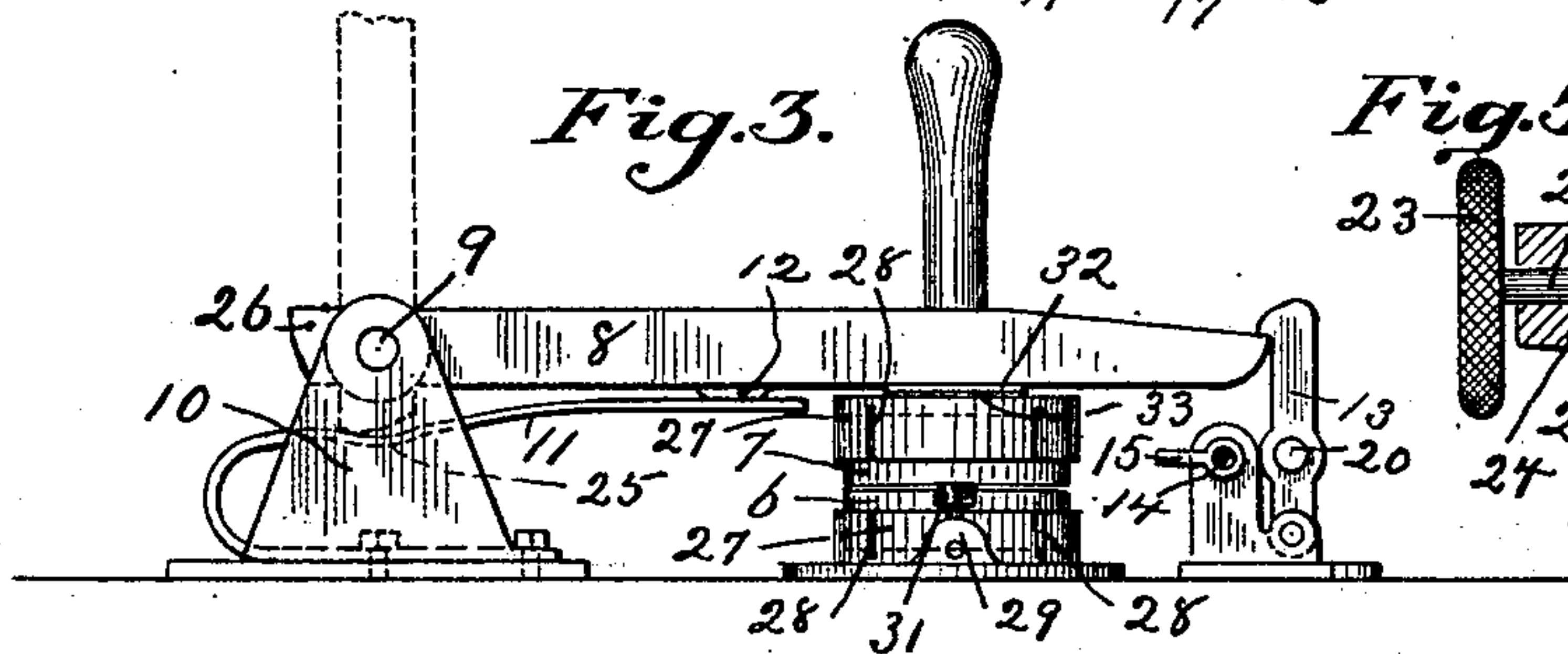


Fig. 5.

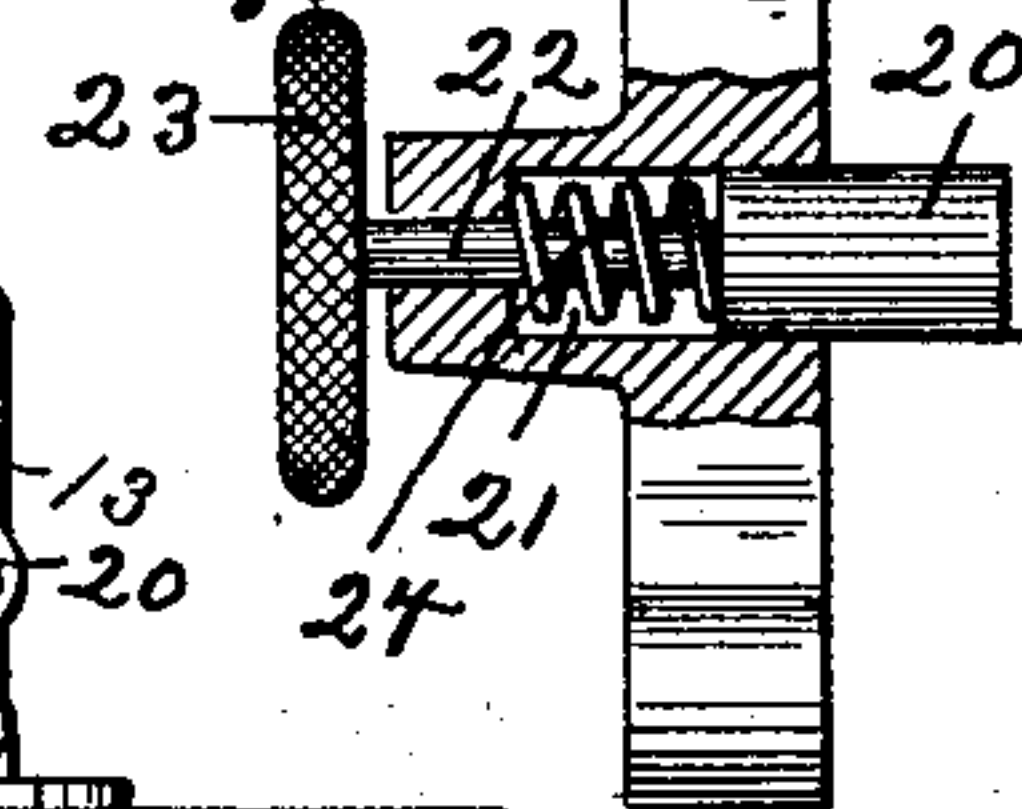
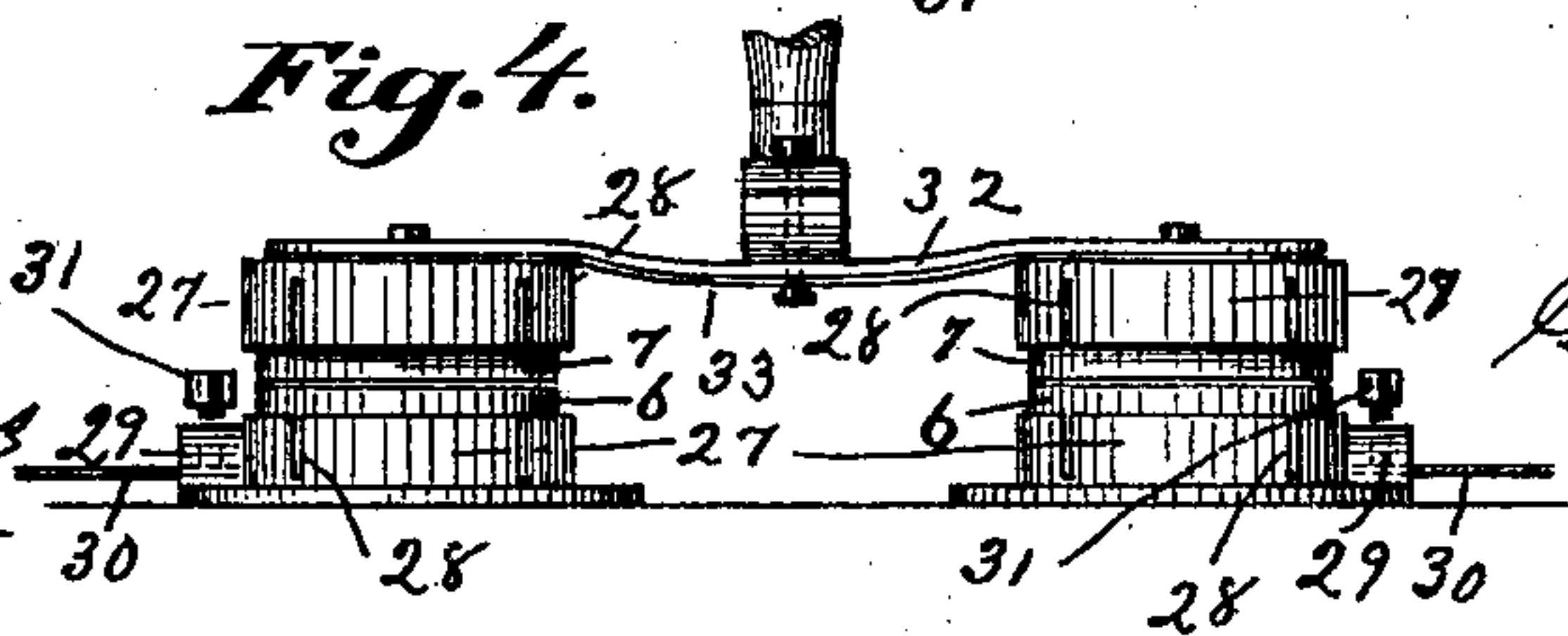


Fig. 4.



Witnesses:

W. S. Tamm
Frederic Sweet

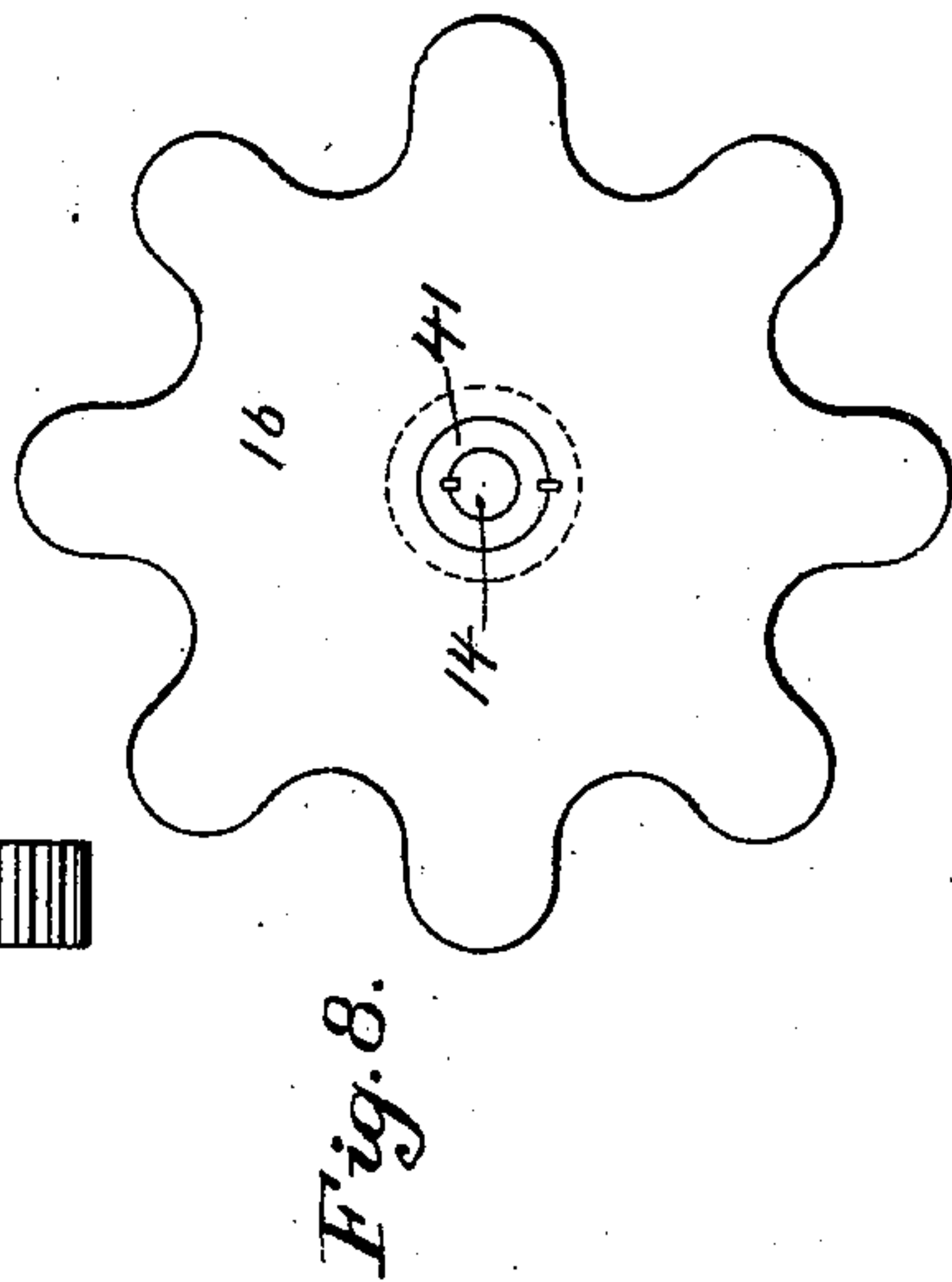
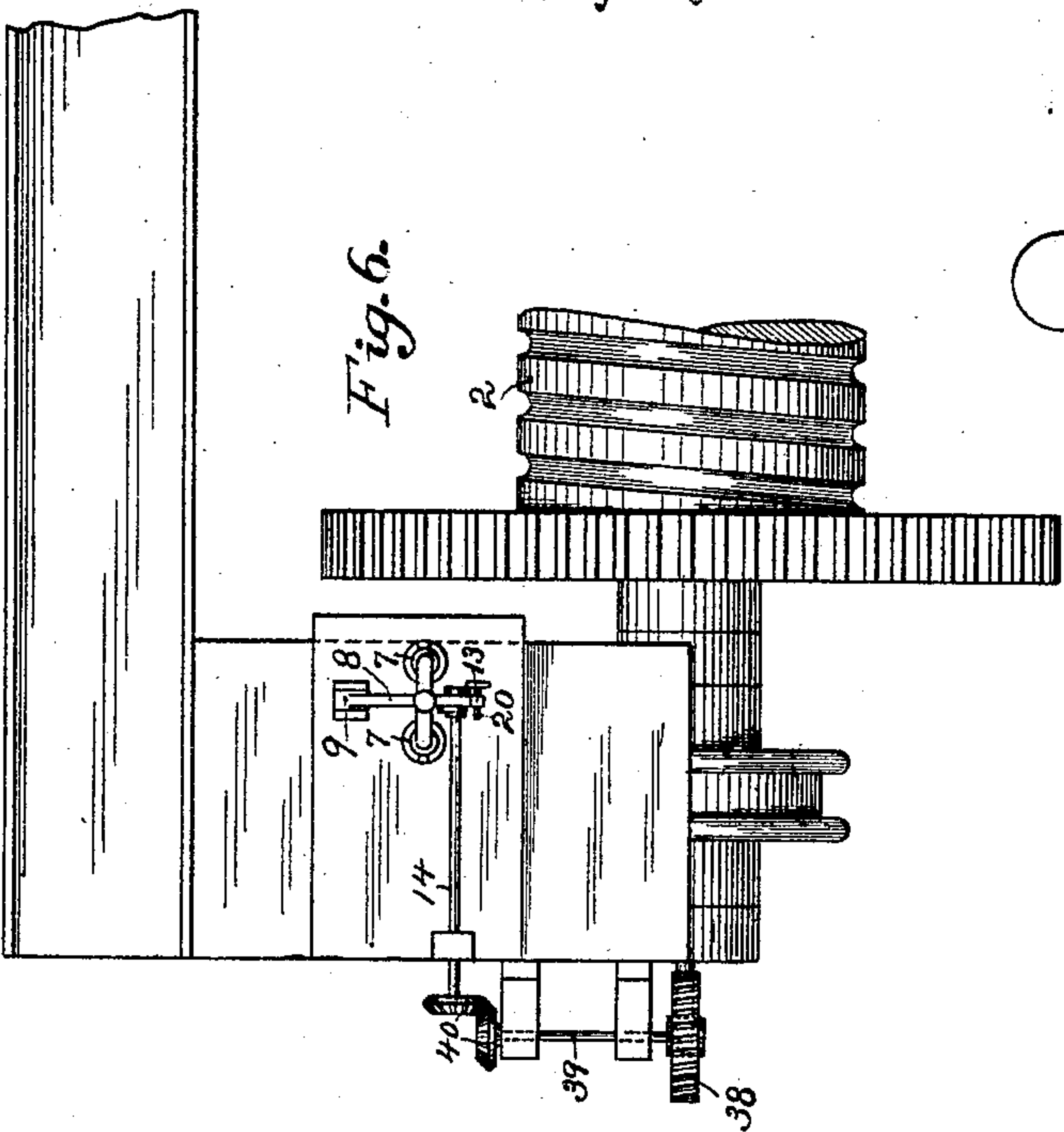
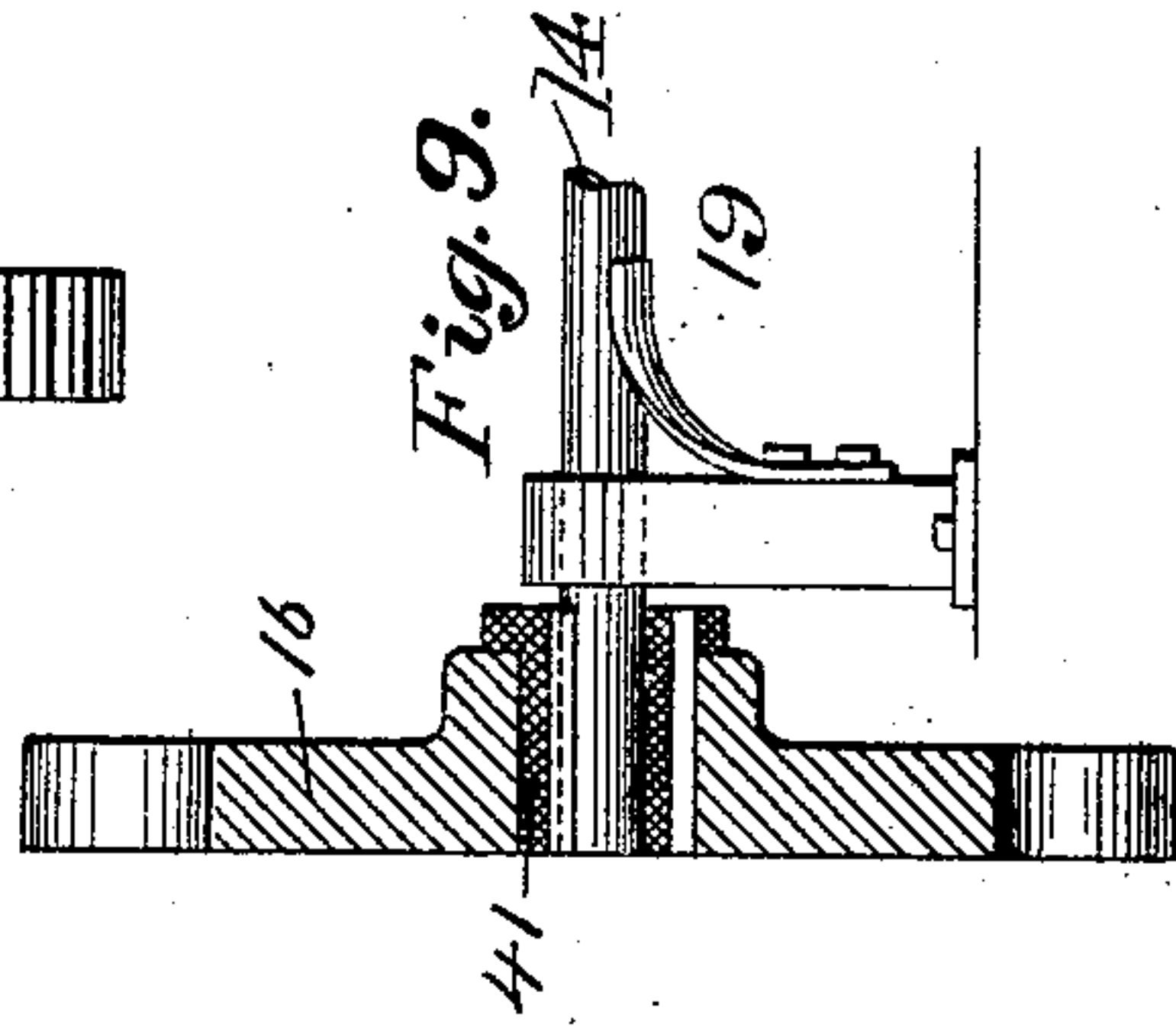
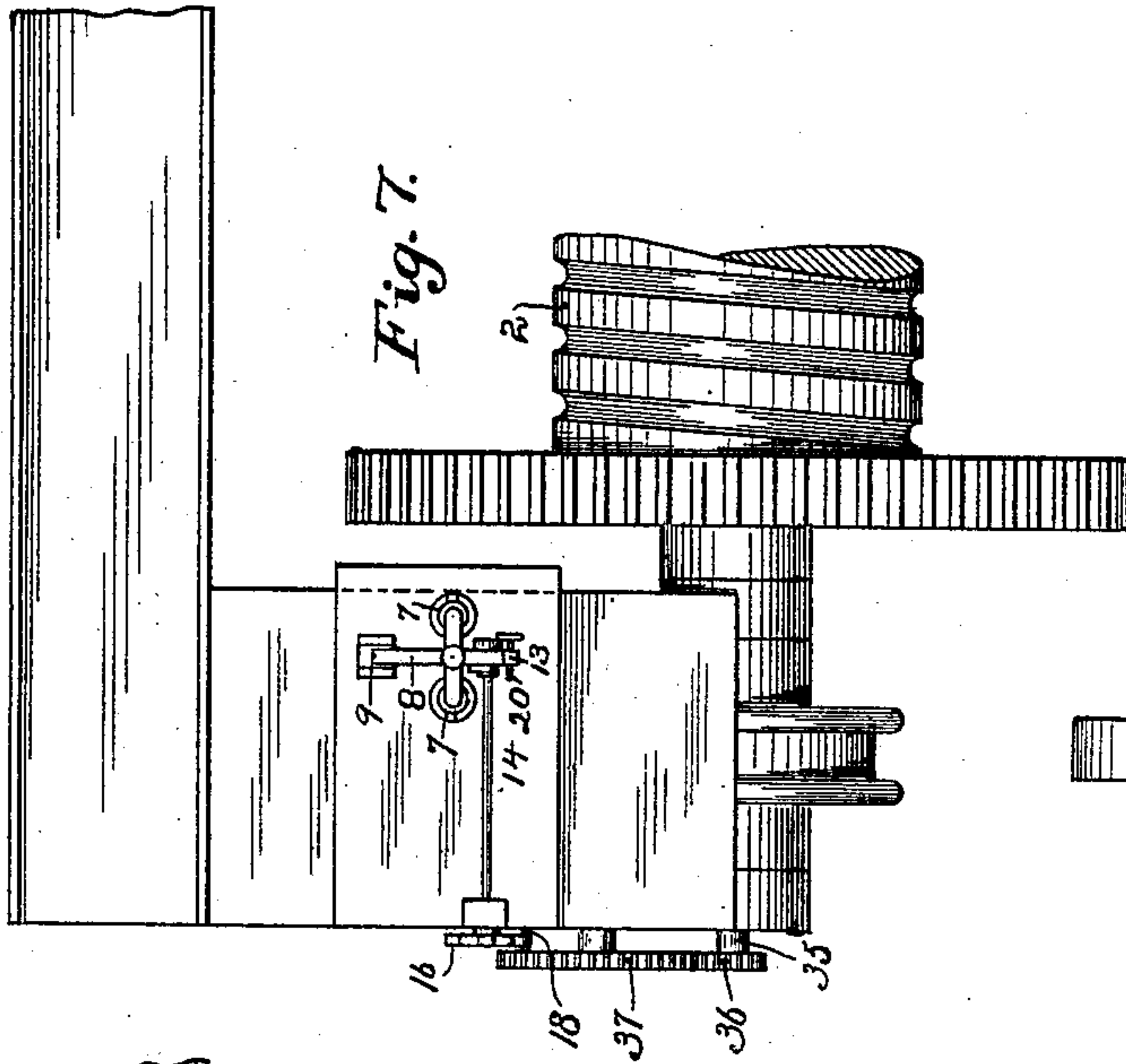
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

GUSTAV A. HASSEL, OF McKEESPORT, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO STEWART JOHNSTON, OF PITTSBURG, PENNSYLVANIA.

CUT-OUT FOR CRANES.

SPECIFICATION forming part of Letters Patent No. 689,670, dated December 24, 1901.

Application filed July 27, 1901. Serial No. 69,907. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV A. HASSEL, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cut-Outs for Cranes; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to cut-outs for hoisting apparatus, and more especially to such apparatus wherein the hoisting-drum is driven by an electric motor.

The object of my invention is to provide a cut-out in the motor-circuit which is actuated from the hoisting-drum so as to stop the motor and said drum after a predetermined number of revolutions of the latter, and thus prevent damage to the apparatus, which would result if the block or hook on the end of the hoisting chain or cable came in contact with some part of the apparatus by reason of the failure of the operator to stop the motor at the proper time.

To this end my invention consists, generally stated, of a cut-out provided with separable contacts and means controlled from the hoisting-drum for separating said contacts.

My invention also comprises certain details in the construction of the cut-out, as will hereinafter be described and claimed.

In the accompanying drawings, Figure 1 is a front elevation of so much of one form of hoisting apparatus as is necessary to disclose the application of my cut-out thereto. Fig. 2 is an elevation of the cut-out. Fig. 3 is a side view of the same; Fig. 4, an end view thereof; Fig. 5, a detail of the locking-latch. Figs. 6 and 7 are detailed front elevations of modifications. Fig. 8 is a front view, and Fig. 9 is a section, showing one manner of insulating the tappet-wheel.

In the drawings, 1 represents a portion of the frame of the hoisting apparatus—such, for instance, as the bridge or trolley of a crane—or it may be a portion of the frame of an elevator or any other hoisting apparatus. Suitably journaled on this frame is the hoisting-drum 2, which is driven from the electric motor 3 by means of any approved intermediate gearing. Also mounted on the frame 1 is the cut-out 4, which is in the motor-circuit

and which is adapted to be actuated from the hoisting-drum 2, as will now be described.

The cut-out comprises a suitable base 5, of wood, slate, or any other suitable insulating material, which is secured to the frame 1 and upon which the operative parts of the cut-out are mounted. To this base are secured the stationary contacts 6, while the movable contacts 7 are mounted on a switch arm or blade 8, which is pivoted at 9 between brackets 10, suitably secured to the base 5. A bent plate-spring 11 is also secured between the brackets 10 and bears against a lug 12 on the blade 8, said spring tending normally to hold the contacts 7 away from the contacts 6. Suitably pivoted to the base 5 is a latch 13, which normally engages the outer end of the blade 8 and prevents the separation of the contacts by the spring 11. Also mounted in suitable brackets on the base-plate 5 is the tripping-shaft 14, which is provided with an arm or finger 15, which is adapted to contact with the latch 13 or a suitable projection thereon and disengage the same from the blade 8, thereby permitting the spring 11 to separate the contacts 6 and 7. This tripping-shaft 14 is provided on its outer end with a suitably-insulated toothed wheel 16, the same being preferably formed of fiber or other suitable insulating material. This wheel is provided with teeth or projections 17, in number one more than the number of revolutions which are permitted to the drum 2 before the hook or block on the hoisting chain or cable will come in contact with any part of the hoisting apparatus. This wheel is adapted to be engaged by a suitable stud or projection 18 on the hoisting drum or gear, so that in the operation of the hoisting apparatus this projection 18 will move the said wheel forward the distance of one tooth at each revolution of the drum, so that after the predetermined number of revolutions of the drum 2 the shaft 14 will have been rotated to such position that the finger 15 thereof will come in contact with the latch 13 and disengage the latter from the switch-blade 8 and permit the spring 11 to open the said switch, as will be readily understood. The toothed wheel 16 is secured on the shaft 14 by any suitable means which will permit its ready removal and re-

placement by a similar wheel having either a greater or a less number of teeth, according to the number of revolutions which are to be permitted to the hoisting-drum. In case the hoisting-drum has a very large number of revolutions it will be advisable to interpose gearing between the drum and the part carrying the stud or projection 18, so that the latter will come in contact with the toothed wheel only after every second, third, or other multiple number of revolutions of said drum. In Fig. 7 I have shown one form of gearing suitable for this purpose. As shown, the drum-shaft is provided with a stud 35, to which is secured an ordinary spur-pinion 36, meshing with the large spur-gear 37, which carries the stud 18 for actuating the tappet-wheel 16. Various other forms of gearing suitable for this purpose will suggest themselves to those skilled in the art. Instead of using the toothed wheel 16 and stud 18 the shaft 14 may be geared directly to the hoisting-drum by such intermediate gearing as will give the shaft 14 the desired rotation by the predetermined number of revolutions of the drum. In Fig. 6 I have shown one form of gearing suitable for this purpose, and, as shown, the drum-shaft is provided with an extension having formed thereon a worm (not shown) which meshes with the worm-wheel 38 on the shaft 39, said shaft being geared to the tripping-shaft 14 by means of the bevel-gears 40. Various other forms of gearing for this purpose will readily suggest themselves to those skilled in the art.

To prevent the tripping-shaft 14 from revolving idly, a suitable friction device is provided, such as the spring 19, bearing on said shaft, or other means which will tend to hold the said shaft in the position in which it is rotated until again positively moved by the stud or projection 18. Instead of forming the toothed wheel 16 of fiber or other insulating material it may be formed of metal and suitably insulated from the shaft 14, as shown in Figs. 8 and 9, in which a sleeve of fiber or other insulating material 41 is interposed between the tappet-wheel 16 and the tripping-shaft 14, said sleeve being suitably secured, as by means of splines 42, to both the wheel and shaft.

It will be observed that with the above apparatus the switch-blade will be thrown open by the spring 11 after a predetermined number of step-by-step rotary movements of the tripping-shaft 14, and it will be further observed that when thus opened the finger or projection 15 on the said shaft 14 will be in such position as to prevent the latch 13 from again being engaged with the blade 8 to close the switch, which closing is necessary in order to again start the motor. It will of course be understood that the tripping-shaft 14 must not be rotated by hand to permit the latch to clear the finger 15; otherwise the switch will not operate at the proper time in the revolution of the drum 2. In order to permit the

closing of the switch and the engagement of the latch 13 therewith, I form the portion of the latch with which the finger 15 engages so that it can be withdrawn to permit the latch to pass the finger or projection 15 and engage the switch-blade. This portion is preferably formed as a bolt 20, which may be mounted in various ways so as to permit its withdrawal, the preferred manner, however, being that illustrated, in which the said latch is provided with a socket 21 therein, into which the bolt 20 can be withdrawn by means of its stem 22 and the insulated button or knob 23. A suitable spiral spring 24 in the socket 21 is provided for holding said bolt outward. After the switch has been automatically opened in the manner above described and it is desired to close the same the blade 8 is depressed with one hand, while the operator with the other hand grasps the insulated knob 23 and draws the bolt or projection 20 into the socket 21 in the latch, thereby permitting said latch to pass the finger or projection 15 on the tripping-shaft 14.

When the switch has been automatically opened by means of the spring 11, it is essential that it should not again rebound and momentarily close the circuit to the motor, and to prevent this the spring 11 is formed with a saddle or depression 25, and the switch-blade 8 is provided with a heel 26, which when the blade flies open passes into the saddle or depression 25, so that the spring will hold the said blade in its open position, as indicated in dotted lines in Fig. 3.

The contacts 6 and 7, as shown, are composed of broad blocks of carbon provided with flat meeting faces, thereby providing large contacting surfaces which will offer little resistance to the flow of the current. These blocks are seated in suitable cups 27, which are slitted, as at 28, so as to make them slightly yielding in order to receive the blocks of carbon and to firmly grasp and hold the same. The cups 27 for the lower carbons are provided with suitable perforated lugs 29 for receiving the circuit-wires 30, the latter being held in said perforated lugs by the binding-screws 31. Any other circuit connections, however, might be employed. The cups 27 for the upper carbons 7 are suitably secured to the ends of a leaf-spring 32, which is secured at its middle to the switch-blade 8, said leaf-spring serving as a yielding means for firmly holding the upper contacts against lower contacts, as will be readily understood, and also serving to some extent as a conductor for the passage of the current from one side to the other. I prefer, however, to provide a thin strip of copper or other good conducting metal 33 just underneath the leaf-spring 32, which strip of copper will take the principal portion of the current and will prevent the destruction of the resiliency of the leaf-spring 32 by the heat due to the current.

The operation of the switch as a whole will be readily gathered from the foregoing de-

scription. The current coming to the motor 3 enters through one of the circuit-wires 30 through the carbon blocks on that side of the switch, and thence through the copper strip 5 33 to the opposite side of the switch through the contacts on that side of the switch, and thence to the motor, thereby driving the latter and through suitable gearing rotating the winding-drum 2. A wheel 16, with the requisite number of teeth for the particular hoisting apparatus, has been placed on the tripping-shaft 14, so that during the operation of the hoisting apparatus the said shaft is given a step-by-step rotary movement, this movement being given to it irrespective of the direction in which the drum is rotated, the direction of rotation of the tripping-shaft, however, depending upon the direction of the rotation of the drum. After the latter has been 20 rotated in either direction as far as is safe the finger 15 on the tripping-shaft will engage the bolt or projection 20 on the latch 13, thereby releasing the blade 8 and permitting the spring 11 to separate the contacts. When it 25 is again desired to start the motor, the blade 8 will be depressed and the latch 13 engaged therewith, the bolt or projection 20 having been first withdrawn into the socket in said latch, so as to clear the finger or projection 15. 30 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a cut-out for hoisting apparatus, the combination with a stationary contact, of a movable contact, a lock therefor, a tripping-shaft for releasing said lock, a toothed wheel 35 on said shaft, and a stud or projection on the drum or gear adapted at each revolution to engage the toothed wheel and rotate it forward the distance of one tooth.

40 2. In a cut-out for hoisting apparatus, the combination with a switch-blade provided with a heel, of a leaf-spring for opening said blade, said spring being provided with a bend or depression for engaging the heel when the 45 blade is open, means for holding said blade closed, and means actuated from the hoisting-drum for releasing said holding means.

50 3. In a cut-out for hoisting apparatus, the combination with a stationary contact, of a movable contact, a lock therefor, a tripping-shaft for releasing said lock, and means actuated from the hoisting-drum for imparting an intermittent step-by-step rotary movement to said shaft.

55 4. In a cut-out for hoisting apparatus, the combination with a stationary contact, of a movable contact, a lock therefor, a tripping-shaft for releasing said lock, and a toothed wheel on said shaft adapted to be intermittently actuated from the hoisting-drum. 60

5. In a cut-out for hoisting apparatus, the

combination with a stationary contact, of a movable contact, a lock therefor, a tripping-shaft for releasing the lock, friction means bearing on said shaft, and means whereby 65 said shaft is rotated from the hoisting-drum.

6. In a cut-out for hoisting apparatus, the combination with a stationary contact, of a movable contact, a lock therefor, a tripping-shaft for releasing said lock, a toothed wheel 70 on said shaft, a stud or projection on the drum or gear adapted at each revolution to engage the toothed wheel and rotate it forward the distance of one tooth, and means for preventing said shaft from revolving idly. 75

7. In a cut-out for hoisting apparatus, the combination with a stationary contact, of a movable contact, a latch for holding the same closed, a withdrawable stud on said latch, a tripping-shaft provided with a finger for en- 80 gaging said stud to release the latch, and means connected to the hoisting apparatus for rotating said shaft.

8. In a cut-out for hoisting apparatus, the combination with the switch-blade, of a latch 85 for holding the same closed, a spring-pressed bolt mounted in said latch, a tripping-shaft provided with a finger for engaging said spring-pressed bolt for releasing the latch, and means connected to the hoisting appara- 90 tus for rotating said shaft.

9. In a cut-out for hoisting apparatus, the combination with two stationary contacts, of circuit connections thereto, two movable con- 95 tacts, a switch-blade, a leaf-spring on said blade on which the movable contacts are mounted, and means controlled from the hoisting-drum for separating said contacts.

10. In a cut-out for hoisting apparatus, the combination with two stationary contacts, of 100 circuit connections thereto, two movable contacts, a switch-blade, a leaf-spring secured to said blade on which the movable contacts are mounted, a separate conducting-strip uniting said movable contacts, and means 105 controlled from the hoisting-drum for separating said contacts.

11. In a cut-out for hoisting apparatus, the combination with two stationary slotted cups, of circuit connections thereto, carbon blocks 110 in said cups, a switch-blade, slotted cups mounted on said blade, carbon blocks mounted in said cups and adapted to contact with the carbon blocks in the stationary cups, and means controlled from the hoisting-drum for 115 separating said contacts.

In testimony whereof I, the said GUSTAV A. HASSEL, have hereunto set my hand.

GUSTAV A. HASSEL.

Witnesses:

F. W. WINTER,

ROBERT C. TOTTEN.