

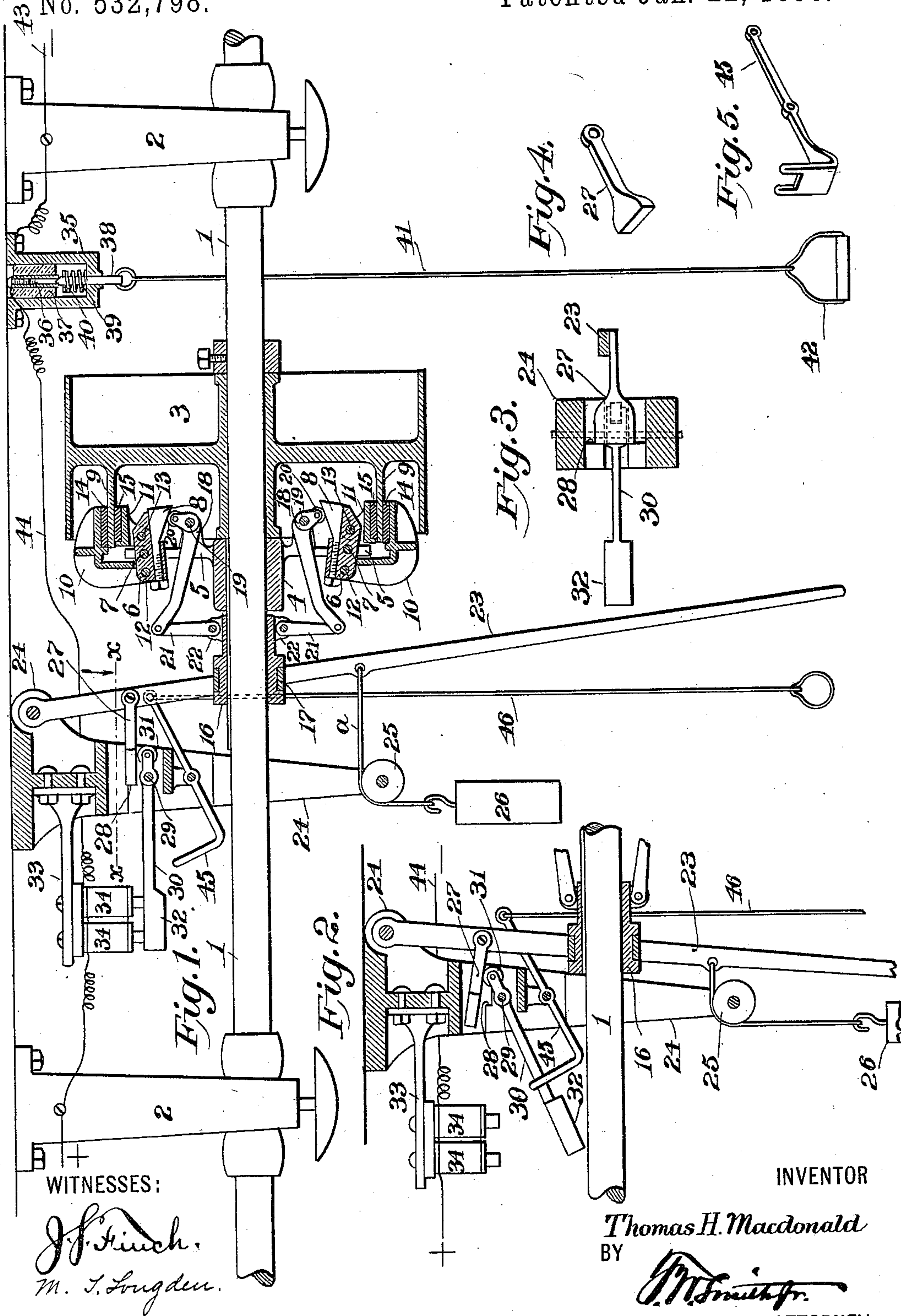
(No Model.)

2 Sheets—Sheet 1.

T. H. MACDONALD.
ELECTRICALLY OPERATED CLUTCH.

No. 532,798.

Patented Jan. 22, 1895.



WITNESSES:

J. Finch.
M. J. Longden.

INVENTOR

Thomas H. Macdonald
BY

M. Smith Jr.
ATTORNEY

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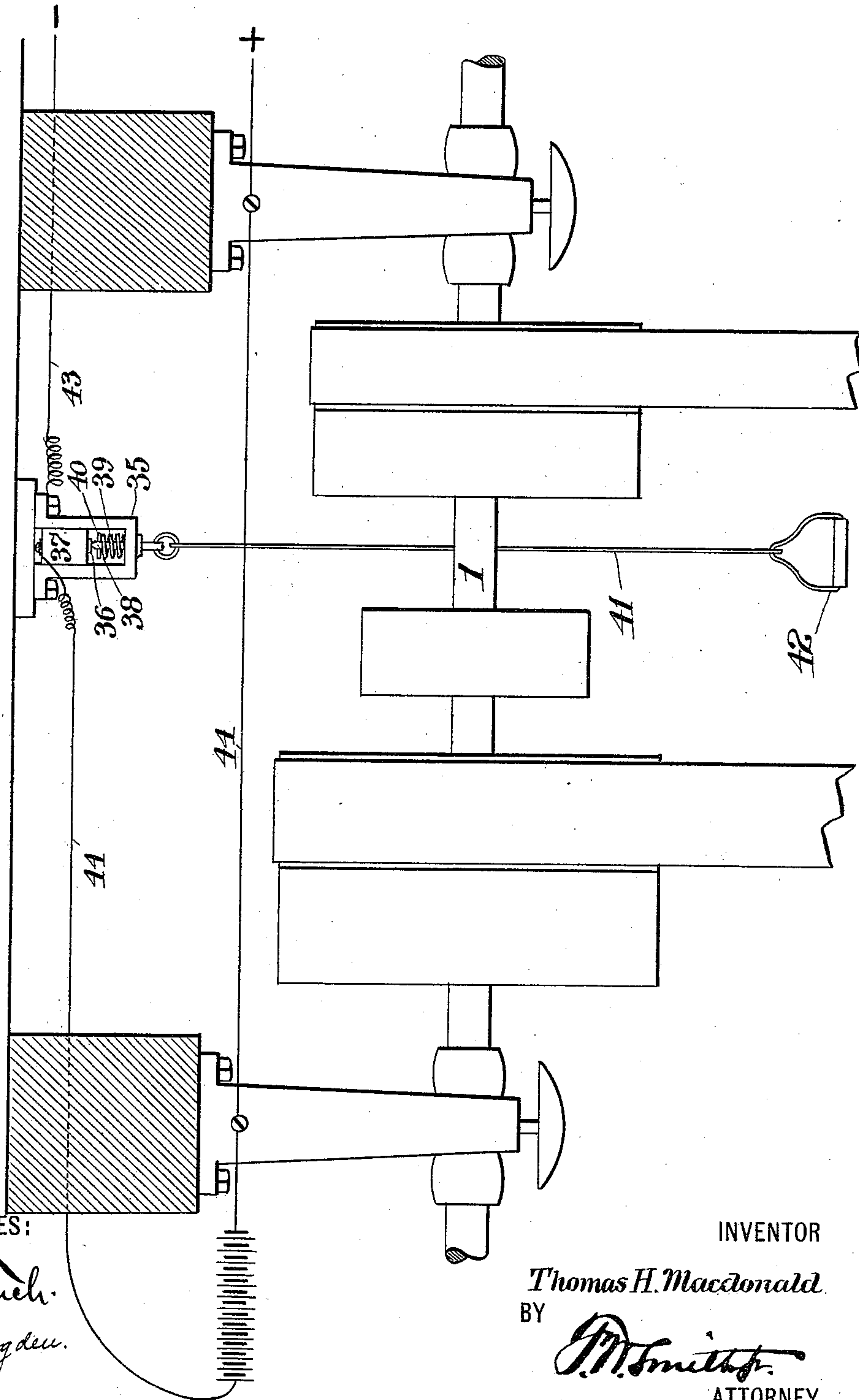
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Fig. 6.



WITNESSES:

J. F. Kitch.
M. T. Longden.

INVENTOR

Thomas H. Macdonald.

BY

J. M. Smith.

ATTORNEY

UNITED STATES PATENT OFFICE.

THOMAS H. MACDONALD, OF BRIDGEPORT, CONNECTICUT.

ELECTRICALLY-OPERATED CLUTCH.

SPECIFICATION forming part of Letters Patent No. 532,798, dated January 22, 1895.

Application filed April 28, 1894. Serial No. 509,350. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. MACDONALD, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Electrically-Operated Clutches; 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 invention relates to certain new and useful improvements in electrically controlled clutch mechanism for use in connection with shafting in factories, but my invention more particularly has reference to the provision of mechanism whereby the power may be instantaneously cast off from the shafting without stopping the engine.

The principal object of my invention is to save life, either by the act of a workman in removing the power from the shafting instantly, or by preventing any one who has been caught in a belt from being carried over the shafting.

In the accompanying drawings, which form a part of this specification, Figure 1 is a sectional elevation illustrating my invention as applied in connection with the shafting and main power pulley, the parts being shown in the position necessary for the application of power to the shafting; Fig. 2, a broken detail sectional elevation illustrating the position of the parts of my improvement when the power is removed from the shafting; Fig. 3, a detail sectional view at the line *x, x*, of Fig. 1; Fig. 4, a detail perspective of the lock dog; Fig. 5, a detail perspective of the lift finger, and Fig. 6, an elevation illustrating particularly the arrangement of the means which I employ for the purpose of preventing a person caught in a belt from being carried over the shafting.

Similar numbers and letters of reference denote like parts in the several figures of the drawings.

1 is the shaft hung in the usual hangers 2, and 3 is the main power pulley loose on said shaft and to which the power is communicated directly from the engine.

4 is a collar rigid on said shaft and having

extending radially therefrom arms 5. 6 are rocker bars pivoted at 7 to said arms and having secured to their inner faces wedge blocks 8.

9 is a hollow hub which projects from the pulley 3 concentrically therewith, and 10, 11, are jaws pivoted respectively at 12, 13, to the rockers 6 on opposite sides of the point 7. These jaws 10, 11, extend respectively outside and inside the hub 9, and are provided with suitable friction blocks 14, 15, whereby said jaws may maintain a firm grasp upon said hub as will be presently explained.

From the foregoing it will be readily understood that the rocking of the bars 6 will cause the jaws to grasp the hub 9 or to distend therefrom as the case may be.

16 is a sleeve splined on the shaft 1 so as to be capable of a free sliding movement, and 17 is a strap loosely encircling said sleeve within an annular groove therein so as not to interfere with the rotation thereof.

18 are bell-crank levers pivoted at their knees to the arms 5, as seen at 19, and having at the ends of their inner or short arms friction rolls 20.

21 are levers whose inner ends are pivoted to ears 22 projecting from the sleeve 16, the outer ends being pivoted to the outer or long arms of the bell-cranks 18.

23 is a lever pivoted at its upper end to a hanger 24 depending from the ceiling, said lever having an ordinary loose connection (not shown) with the strap 17 whereby the back and forth movements of the lever will cause the rotary sleeve 16 to reciprocate along the shafting. When this lever 23 is thrown toward the pulley 3, the levers 18, 21, will be operated, after the manner of a toggle, to force the rolls 20 firmly against the wedge blocks 8, thus clamping the jaws 10, 11, with great power against the hub 9, as shown at Fig. 1, whereby the power pulley 3 will communicate motion to the shafting. The reverse movement of this lever 23 will of course operate the sleeve to release the jaws from the hub 9, thereby casting off the power from the shafting.

This clutch mechanism which I have described is not my invention, and I do not wish to be understood as claiming the same, but I

have shown and described it merely as an approved style of clutch which I prefer to use, and I do not therefore wish to be limited to any particular kind of clutch in connection
5 with my invention.

Journalled in the bottom of the hanger 24 is a roll 25 over which is passed a cord, chain, or the like *a*, one end of which is fastened to the lever 23, while from the other end is suspended
10 a weight 26, the function of which latter is to normally draw the lever away from the pulley 3 so as to release the clutch.

Pivoted to the lever 23 near its upper end is a lock dog 27, which, when the lever is
15 thrown toward the pulley 3 to operate the clutch, will fall by gravity into a notch 28 in the hanger 24, and thereby retain said lever in such position against the action of the weight 26. When this dog 27 is lifted out of
20 the notch the weight 26 will operate to disengage the clutch as hereinbefore set forth. Pivoted at 29 to the hanger 24 is a lever 30 having its end nearest the pivotal point provided with a friction roll 31, which, when the
25 dog 27 is within the notch 28, extends immediately below said dog. The other end of this lever 30 extends outwardly and is weighted as seen at 32. When this weighted end of the
30 lever 30 drops, the other end of such lever will be forced against the dog 27, and will thereby lift the latter out of the notch 28 and release the clutch.

Secured to a bracket 33 which extends from the hanger 24 are electro-magnets 34.

35 35 is a metallic housing secured to and depending from any suitable ceiling block (not shown) and having contained therein a metallic pin 36 insulated from such housing by a hard rubber block 37.

40 38 is a pin extending through the bottom of the housing and having a free vertical play therein, said pin being normally projected upwardly by a spring 39 confined between a cross pin 40 at the upper end of the
45 pin and the floor of the housing, whereby said pin is normally in contact with the pin 36. Depending from this pin 38 is a cord 41 at the lower end of which is any suitable handle 42.

50 43 is a conductor wire connected with the housing 35, and 44 a similar wire which extends from the magnets and is connected with the pin 36, so that it will be readily understood that when the pin is in the position shown at Fig. 1 the circuit will be closed, and
55 when said pin is drawn away from the pin 36 the circuit will be open.

When the lever 30 is in the position shown at Fig. 1 and the electrical circuit is closed, said lever will be held by the attraction of the
60 magnets, but when the circuit is broken the lever will drop and thereby cause the power to be removed from the shafting as heretofore set forth.

These devices which I have described for
65 opening and closing the electrical circuit are located all over the factory in as many places as are deemed fit, so that the motion of the

shafting may be instantly stopped by almost any workman at any part of the factory. The lever 30 drops out of the field of the magnets
70 upon a lift finger 45 pivoted to the hanger 24, from the opposite end of which finger hangs a cord 46 by means of which the finger may be elevated to raise the lever 30 into its horizontal position against the magnets. Any de-
75 vice other than this lift finger may be employed for this purpose although I prefer to use such finger as it is very simple and effective.

In Fig. 2 I have shown the position which
80 the parts assume after the lever 30 has dropped, and it will be clearly seen that this lever must be elevated before the dog 27 can drop into the notch 28.

When the pin 38 is pulled down to break
85 the current and cause the power to be cast off from the shafting, such pin is immediately allowed to return to its normal position to close the circuit, so that, in applying the power to the shafting, it is merely necessary to elevate
90 the lever 30 to the position where it will be attracted and held by the magnets, and to then throw the lever 23 toward the power pulley 3 until the dog 27 drops within the notch 28.

Of course it will be readily understood that
95 any ordinary means may be employed for the purpose of breaking the electrical circuit, it being merely essential in this connection that cords, chains, switches, push buttons, or other equivalent devices, for the purpose of
100 breaking the circuit shall be within convenient reach.

Referring to Fig. 6, it will be readily seen that the wire 44 is returned in close proximity to the various pulleys on the shafting, so that
105 it will be clear that any person caught in a belt will strike such wire thereby breaking the same and opening the circuit.

I employ a closed circuit battery and therefore whenever the latter runs down the lever
110 30 will drop, thereby giving notification of such fact.

My improvement is exceedingly simple and economical in its construction, and is very efficient, and five ordinary telegraph gravity
115 sulphate of copper battery cells are sufficient for the purpose of amply equipping with my improvement a factory having five hundred feet of shafting.

Having thus described my invention, what
120 I claim as new, and desire to secure by Letters Patent, is—

1. In a mechanism of the character described, the shaft, pulley, and driving clutch, and means for automatically uncoupling the
125 same, a locking device holding the clutch normally in engagement by means of a closed electric circuit, one of the wires of the circuit being in proximity to the pulley as described, whereby a foreign object caught and carried
130 by the pulley may break the wire and circuit, and cause the uncoupling of the clutch, substantially as described.

2. In a mechanism of the character de-

scribed, the coupling clutch and gravity mechanism for uncoupling the same, a locking pawl engaging said gravity mechanism, a weighted lever having its short arm in position to lift and unlock said pawl when the weighted long arm is released, electro-magnets on a normally closed circuit sustaining this weighted arm, and means for breaking the electric circuit and releasing the weighted arm, all combined substantially as described.

3. In a mechanism of the character described, the driving shaft, pulley, and coupling clutch, the hand lever whereby said clutch may be shifted, a locking pawl connected to said hand lever to hold the clutch in engagement, and an electrically controlled lever, in position to act on and disengage

said pawl when the electric circuit is broken, substantially as described.

4. In a mechanism of the character described, the shaft, pulley, and clutch, the clutch operating lever and its locking pawl, the weighted pawl operating lever and its controlling magnets and electric circuit, and a return lever in position to engage the weighted lever and restore it to position against the magnets, all combined substantially as described.

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

THOMAS H. MACDONALD.

Witnesses:

F. W. SMITH, Jr.,

J. S. FINCH.