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AUTOMATIC STOP MECHANISM FOR POWER DRIVEN MACHINERY.

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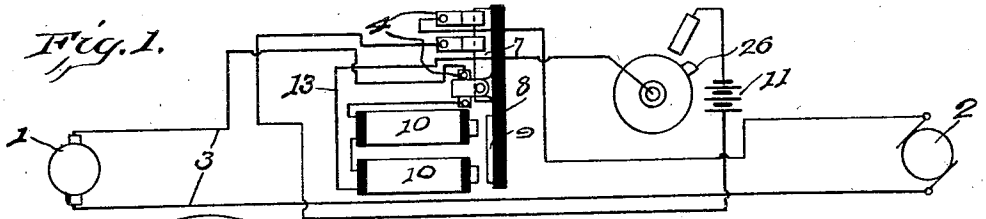
1,001,409. Patented Aug. 22, 1911.

Fig. 1.



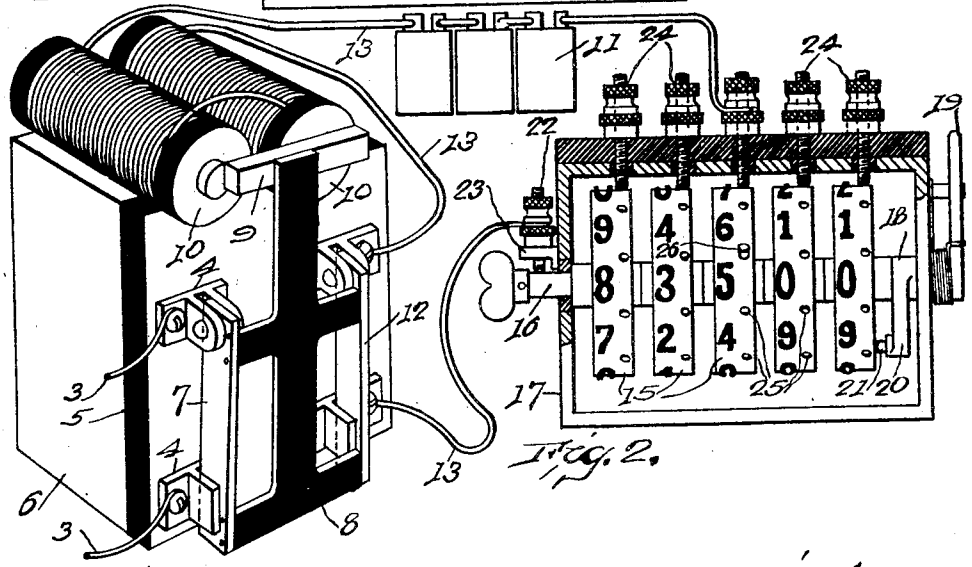


Fig. 3.

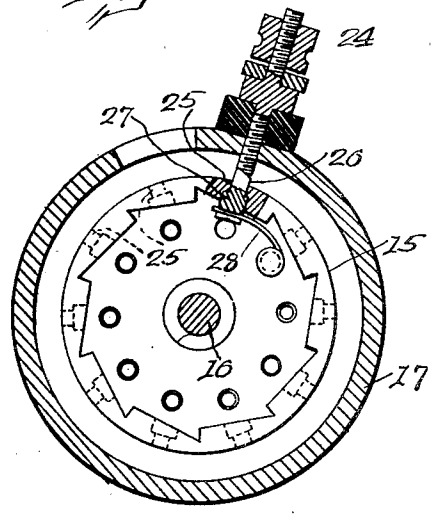
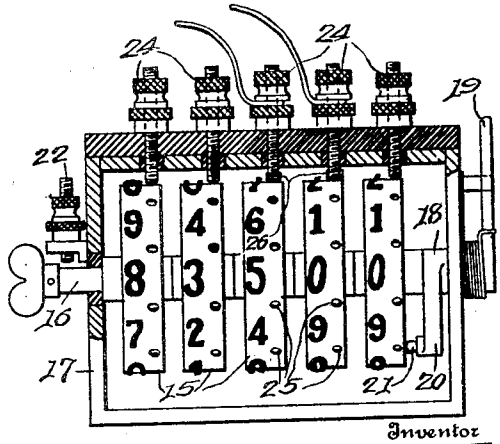


Fig. 2.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC STOP MECHANISM FOR POWER-DRIVEN MACHINERY.

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To all whom it may concern:

Be it known that I, EMERSON P. JENNINGS, Jr., a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Stop Mechanism for Power-Driven Machinery, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to automatic stop mechanism for power driven machinery.

The object of the invention is to provide means for automatically throwing off the power and stopping the machine after a predetermined number of operations, as when a predetermined number of copies have been printed on a printing press.

To this end, it is a further object of the invention to provide a counting mechanism with a circuit breaker and closer which will throw off the power by closing the circuit of an electro-magnet, which, in turn, will break the circuit of an electric motor, stop some other kind of motor, or actuate a belt shifter to shift a belt from a driving to a loose pulley.

With these objects in view my invention consists in certain novel features and in certain combinations and arrangements of parts hereinafter to be described, and then more particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a diagrammatic view of an electric motor circuit showing my invention applied thereto; Fig. 2 is a side elevation of a counting mechanism and cut-off embodying my invention; Fig. 3 is a sectional view, taken transversely to the counting mechanism; and Fig. 4 is a front elevation of the counting mechanism showing a different circuit arrangement.

In these drawings I have illustrated one embodiment of my invention and have shown the same as applied to the circuit of an electric motor. In Fig. 1 this motor is indicated at 1 and the circuit, which connects the same with the generator 2, is indicated at 3. This circuit may be controlled by a switch or cut-off of any suitable construction, and, in the present instance, I have shown the cut-off as a knife switch of ordinary design comprising two fixed contacts 4 mounted upon a base 5 of insulating material, which, in turn, is secured to a suitable support 6. The switch knife 7 is pivotally connected to the upper fixed contact 4 and is rigidly secured to a lever 8 and is insulated therefrom. This lever extends for some distance above the pivotal center of the switch knife 7 and has secured to its upper end an armature 9 of an electromagnet 10, which magnet is mounted on the support 6. The armature 9, lever 8 and knife switch 7 are so arranged that, when the armature is in engagement with the electromagnet, the knife 7 will be out of engagement with the lower fixed contact 4 and the circuit will be broken.

The electromagnet 10 is in an auxiliary circuit 13 which may be connected to any suitable source of electrical energy, such as the battery 11. The auxiliary circuit 13 is controlled by a switch which is preferably so arranged that it will be actuated to open and close the auxiliary circuit when the switch of the main circuit is actuated to open and close that circuit. To this end I have provided the auxiliary circuit with a knife switch 12 which is similar in construction to the switch for the main circuit and is here shown as connected to and moving with the lever 8 which actuates the knife 7 of the main circuit switch. Consequently, when the lever 8 is actuated to break the main circuit, the switch 12 of the auxiliary circuit will also be actuated to break that circuit, thereby avoiding any waste of current from the battery and further avoiding the heating of the magnet 12. The frictional contact between the switch knives and the fixed contacts, to which they are pivoted, will ordinarily be sufficient to retain the switch in its adjusted position, but, if found desirable, any suitable means may be provided to prevent the lever and the switch knives from dropping into engagement with the lower fixed contacts after the electromagnet 10 has been deënergized.

The circuit 13 of the electro-magnet has inserted therein a circuit breaker and closer which is controlled by the movement of a counting mechanism. This counting mechanism may be of any suitable character, but, in the present instance, I have shown the same as comprising a plurality of counters or disks 15 mounted on a resetting shaft 16, which, in turn, is journaled at one end in the wall of a casing 17 and has its other end mounted in a sleeve 18, which is jour-

naled in the adjacent wall of the casing 17 and is provided on its outer end with an actuating lever 19 and on its inner end with an arm 20 carrying a pawl 21 for actuating the first or unit counter.

Suitable transfer mechanism is provided to actuate the successive counters each time the preceding counter has made a complete revolution, but as the specific construction of the counting mechanism does not form a part of the present invention I have not shown and will not describe the same in detail, it being of a well known type.

One side of the circuit 13 is connected to the shaft 16 in any suitable manner. A convenient method of making this connection is to mount a binding post 22 upon a bracket 23 carried by one end of the casing 17 and to allow the one end of the binding post to extend beyond the bracket and into engagement with the shaft 16, but this connection may be made in any desired manner, either through the casing or directly to the shaft. A series of fixed contact points 24 are mounted in one wall of the casing and are insulated therefrom. One of these fixed contacts is arranged adjacent to each of the counters or disks 15 and has its point of contact supported slightly beyond the periphery of the counter. The opposite side of the circuit 13 may be connected to any one of these fixed contacts, which are here shown as binding posts of ordinary construction. An adjustable contact is provided which may be mounted upon any one of the counters and at any desired point upon that counter, and will be so supported that the fixed contact for that counter will lie in its path. When the counter has revolved a distance sufficient to bring the contact carried thereby into engagement with the fixed contact, the circuit 13 will be closed, the electro-magnet energized and the switch 4 actuated to break the main circuit 3, thereby stopping the motor. This adjustable contact may be of any suitable character. In the present instance each of the counters 15 has an aperture 25 arranged therein near each character thereon and the contact member is in the form of a pin 26 adapted to be movably mounted in any one of the apertures 25. This pin may be provided with a head 27 to prevent it passing entirely through the flange of the counter and may be resiliently supported in its operative position by means of a spring 28 carried by the counter. The fixed contacts are so arranged that when the character corresponding to the opening in which the contact pin 26 has been mounted is moved into registering position, the contact pin will engage said fixed contact and close the circuit 13 in this manner. If it is desired that the machine should complete five hundred operations, the contact pin 26 is set in the aperture immediately following the figure 5 on the third counter disk, and, as soon as this figure comes into registering position, the contact will be closed and the motor cut out, as described. Should it be desired to complete a number of operations, the registration of which would require the use of two figures other than ciphers, say for instance 720 operations, this may be accomplished by using two contact pins 26 and mounting one of these pins in the aperture for the figure 7 on the third counter disk and the other in the aperture for the figure 2 in the second counter disk, disconnecting the one side of the circuit from the binding post 22 and connecting the same to the fixed contact for the second counter disk. With the circuit connected in this manner it is necessary that both contact pins should be in engagement with their coöperating fixed contact before the circuit can be closed, it being understood that the circuit passes from one fixed contact through the two counter disks and their shaft to the other fixed contact. Consequently, the closing of the contacts for the second disk will not complete the circuit. Nor will the closing of the contacts for the third disk complete the circuit until the contacts for the second disk have again been closed, it being necessary that the contacts for both disks should be closed simultaneously and this can only be when the two characters 7 and 2 have been moved into registering position.

The operation of the device will be readily understood from the foregoing description and it will be apparent that I have provided an automatic stop mechanism which is of a very simple construction, very inexpensive to install and has a high degree of efficiency; that the construction and operation of the same is such that it will not be easily broken or disarranged and that its action will be positive.

It is to be understood that, although I have shown and described my invention in connection with an electric motor, some other kind of motor or other class of power may be employed, and that the means herein disclosed for controlling the motor circuit may, in such other cases, be utilized to stop the other kind of motor or throw off the other class of power, as, for instance, to stop such other kind of motor or actuate a conventional belt shifter to shift a belt from a driving to a loose pulley. With this explanation it is to be observed that the term "motor", as herein used in the claims, is used in a generic sense and means any kind or class of power, unless the motor is defined as an electric motor. Further, it will be understood that the electro-magnet, which is controlled by the counting mechanism, may be utilized for throwing into operation any auxiliary mechanism and its use is not nec-

essarily confined to the control of the main machine. It will also be understood that the specific construction of the several parts of the mechanism can be readily altered without departing from the principle of my invention and I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. The combination, with a mechanism, means for actuating the same, an electro-magnet for controlling said actuating means, and a circuit for said electro-magnet, of counting mechanism, and a circuit breaker and closer arranged in the circuit of said electro-magnet and operatively connected to and positively actuated by said counting mechanism, whereby, when said counting mechanism registers a predetermined number, said electro-magnet will be energized.

2. The combination, with a mechanism, means for actuating the same, an electro-magnet for controlling said actuating means, and a circuit for said electro-magnet, of counting mechanism having a movable part, and a circuit breaker and closer arranged in the circuit of said electro-magnet and having a movable part connected to and actuated by the moving part of said counting mechanism, whereby, when said counting mechanism registers a predetermined number, said electro-magnet will be energized.

3. The combination, with a motor, a cut-off therefor, an electro-magnet operatively connected to said cut-off, and a circuit for said electro-magnet, of a register comprising a movable part connected to one side of the circuit of said electro-magnet, a contact member adjustably mounted on said movable part, and a fixed contact member connected to the other side of said circuit and arranged in the path of the first-mentioned contact member.

4. The combination, with a motor, a cut-off therefor, an electro-magnet operatively connected to said cut-off, and a circuit for said electro-magnet, of a counting mechanism comprising a casing, a counter rotatably mounted therein and connected to one side of the circuit of said electro-magnet, a contact adapted to be adjustably mounted on said rotatable counter, a fixed contact mounted in said casing, connected to the other side of said circuit and arranged in the path of said adjustable contact.

5. The combination, with a motor, a cut-off therefor, an electro-magnet operatively connected to said cut-off, and a circuit for said electro-magnet, of counting mechanism comprising a casing, a shaft mounted in said casing and connected with one side of the circuit of said electro-magnet, a series of counter disks mounted on said shaft, each of said counter disks having a series of openings therein, a contact pin adapted to be removably mounted in any one of the openings in any of said counter disks, a plurality of fixed contacts mounted on said casing and adapted to be electrically connected to the opposite side of said circuit, each of said contacts being arranged in a position to be engaged by said contact pin when said pin is mounted in the respective counter disk.

6. The combination, with a motor, a cut-off therefor, an electro-magnet operatively connected to said cut-off, and a circuit for said electro-magnet, of a counting mechanism comprising a plurality of movable counters electrically connected one to the other, two contact members adapted to be adjustably mounted on two of said counters, and a plurality of fixed contacts arranged near the respective counters and adapted to be connected to the circuit of said electro-magnet, whereby, when said circuit is connected to the two fixed contacts corresponding to the two counters on which the adjustable contacts are mounted, said circuit will be closed when both of said adjustable contacts are in engagement with the respective fixed contacts.

7. The combination, with an electric motor, a circuit breaker and closer arranged in the circuit of said motor, an electro-magnet having its armature connected to the movable member of said circuit breaker and closer, and a circuit for said electro-magnet, of a counting mechanism having a rotatable counting disk electrically connected to one side of the circuit of said electro-magnet, a contact member adjustably mounted on said counter disk, and a fixed contact arranged in the path of said adjustable contact member and electrically connected to the other side of the circuit of said electro-magnet.

8. The combination, with a mechanism, means for actuating the same, an electro-magnet for controlling said actuating means, and a circuit for said electro-magnet, of a circuit breaker and closer arranged in the circuit of said electro-magnet, counting mechanism operatively connected to said circuit breaker and closer, whereby, when said counter registers a predetermined number, said electro-magnet will be energized, a second circuit breaker and closer arranged in said circuit independent of said counting mechanism, and means controlled by said electro-magnet for actuating said second circuit breaker and closer.

9. The combination, with a motor, a circuit therefor, a circuit breaker and closer arranged in said circuit, a lever connected

to the movable part of said circuit breaker and closer, an electro-magnet having its armature connected to said lever, and a circuit for said electro-magnet, of an auxiliary circuit for said electro-magnet, a circuit breaker and closer arranged in said auxiliary circuit, counting mechanism operatively connected to said circuit breaker and closer, and a second circuit breaker and closer arranged in said auxiliary circuit and having its movable member connected to said lever, whereby, it will be actuated in unison with the circuit breaker and closer in the motor circuit.

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

EMERSON P. JENNINGS, JR.

Witnesses:

ELZA F. MCKEE,

EDWARD L. REED.