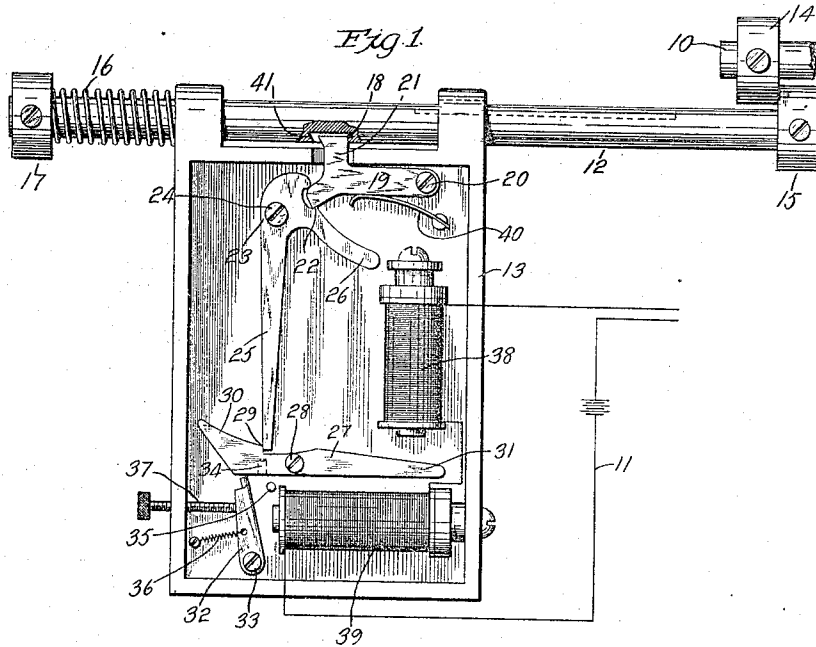
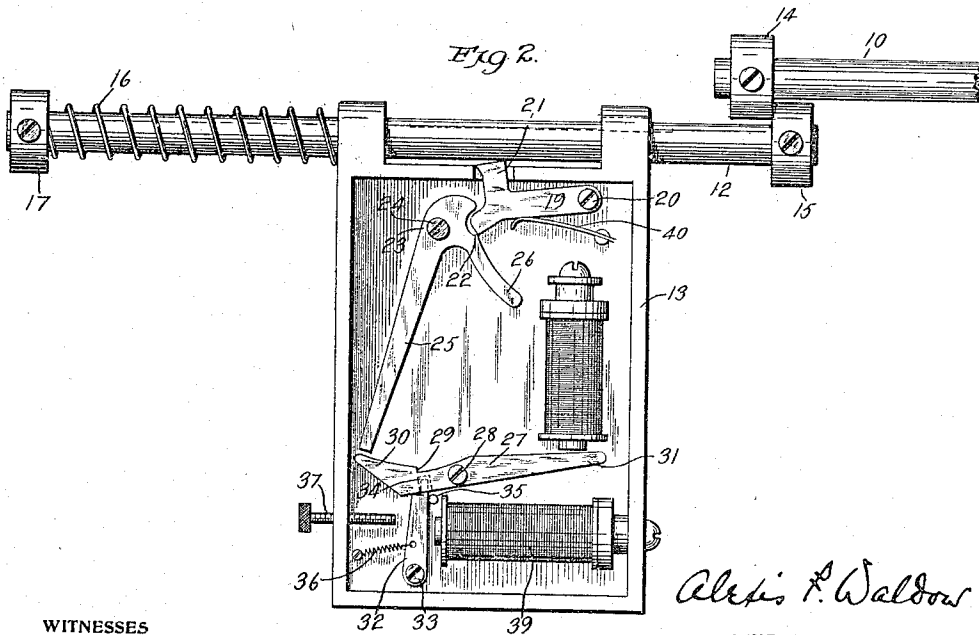


A. F. WALDOW.
STOP MOTION.

APPLICATION FILED MAY 7, 1913. RENEWED JUNE 15, 1916.

1,208,863.

Patented Dec. 19, 1916.



WITNESSES

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STOP-MOTION.

1,208,863.

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To all whom it may concern:

Be it known that I, ALEXIS F. WALDOW, a citizen of the United States, residing at Whitinsville, in the county of Worcester and State of Massachusetts, have invented the following-described new and useful Improvements in Stop-Motions.

This invention is an improved electric stop motion for throwing off the power from machinery on the occurrence of abnormal conditions as controlled by stop motions, and may be applied to any class of machine requiring automatic stoppage; the object being to guard against actuation of the knock-off mechanism by jar or vibration and thus prevent unnecessary stoppages. To this end a dual or interlocking arrangement of detents or moving parts is provided, requiring that both must be operated by electro-magnetic means responsive to a change in the control circuit in order to operate the knock-off mechanism, the construction being further characterized by the disposition of the parts so that each is non-sensitive or at least sensitive to forces of such direction as to be liable to cause undesired operation of the other.

In the accompanying drawings illustrating the preferred embodiment of the invention: Figure 1 is an elevation of the mechanism in normal condition, the cover of the inclosing casing being removed; and Fig. 2 is a similar view showing the mechanism in actuated condition, that is to say in the positions assumed by the parts when they have acted to throw off the power.

A portion of the belt shipper of the machine is illustrated and designated 10, and will serve as an illustration of a suitable power controlling member by means of which the power may be thrown on and off to start and stop the machine. Fig. 1 also illustrates a portion of a control or stop-motion circuit 11, which extends to any suitable point on the machine, where it is adapted to be closed on the occurrence of abnormal conditions. Such circuits and devices for automatically controlling them are well known in a variety of different machines, and consequently require no particular illustration here. The invention may be applied, for example, to textile machinery in which its utility will be evident.

The shipper rod 10 is engaged and

adapted to be actuated in the direction to throw off the power by a member 12, which is in the present case in the form of a slide rod mounted in bearings on the top of a casing 13, in which the remainder of the mechanism may be housed, such casing being mounted on the frame of the machine. The rod 12 has one-way engagement with the belt shipper, by means of the collars 14, 15, fixed to the respective parts, so that the shipper rod is free to be operated manually independently of the knock-off mechanism.

The rod 12 is acted upon by a spring 16, which is interposed between a collar 17 on the rod and one of the bearings on the casing, and normally compressed or under tension, as shown in Fig. 1, being of sufficient strength to operate the shipper rod to shift the belt from the fast to the loose pulley. It will be apparent that a weight could be substituted for the spring with equal effect. The rod is also provided with a recess or offset affording a shoulder 18, by which it can be engaged by an appropriate detent and held in a set position against the action of its spring, ready to perform its function when the circuit is energized and the detent released. The detent is combined with a locking mechanism, but the latter does not engage directly with the rod, since the pressure applied by the spring 16 would require a magnet of considerable power to disengage it. For this reason it is desirable to interpose connections of such character as to minimize that component of the force acting on the rod which is applied to the detent mechanism proper or to entirely relieve the detent of this pressure. In this instance, a lever 19, fulcrumed in the casing at 20, has an offset 21 which engages the shoulder 18 and an extended arm which bears downward under the action of the spring 16 on a shoulder 22 formed on a lever 23 near the fulcrum 24 thereof, this latter lever being formed with a long depending arm 25. The lever 19 is so constructed and arranged as to be adapted to be forced downward out of engagement with the recess in the rod by the movement of the latter under the action of its spring, but the relation of its fulcrum to the bearing surfaces between it and the rod, and the formation of these surfaces as well as the relative lengths of the arms of the lever, may all be such as to greatly reduce the force which it applies to the lever 23.

By the construction of the latter the pressure which will be exerted at the lower end of the arm 25 is further reduced, and obviously such pressure may be made as small as desired by causing the lever 19 to bear on the lever 23 even nearer to the dead center than shown. In fact, the lever 19 might act upon the lever 23 directly in line with its fulcrum, in which event the part engaged by the arm 25 would be entirely relieved of the pressure of the spring 16. In order to start the lever 23 or assist its initial movement when released, a weight may be employed; afforded, for example, by a lateral projection 26, which serves to guide the lever 19 back to the shoulder 22 when the parts are restored to normal position.

The arm 25 is engaged by the first of the two locking devices herein employed, the same being preferably in the form of a substantially horizontal latch lever 27, fulcrumed at 28 to the casing, and having a detent shoulder 29 behind which the end of the said arm is held against the slight pressure transmitted from the spring 16 or against the overbalancing action of the projection 26, or both, as the case may be. Beyond this shoulder the latch is provided with a suitable surface 30 along which the end of the arm 25 rides in returning to locked position; the latch being restored to and held in normal position by gravity or otherwise, but preferably by the overbalancing action of its tail or armature portion 31, which is heavier than its latch portion.

The latch lever 27 is normally blocked against movement by a second detent or locking device, preferably embodied in a substantially upright arm 32, pivoted at its lower end as shown at 33 and at its upper end engaging or standing in the way of the latch portion of the lever 27, so that the latter cannot be moved to disengage its shoulder 29 from the arm 25. The latch lever is provided, however, with a hole 34 with which the upper portion of the detent 32 is adapted to register when drawn over against a stop 35, against the action of a spring 36, which normally holds the detent against a stop 37 in blocking relation as explained. Obviously the detent could be arranged to be restored and held in normal position by gravity if desired, in place of the spring 36.

Electro-magnetic means energized by the control circuit 11 are provided for withdrawing each of the locking devices; and, as shown, comprise two magnets 38 and 39, respectively, disposed one substantially vertically over the tail or armature portion of the latch lever 27 and the other in substantially horizontal position opposite the detent 32, which constitutes the armature of this magnet.

The two magnets are included in the same

circuit, and as shown they may be connected in series. When the circuit is completed both magnets are energized, and the magnet 39 draws the detent 32 over to position where it registers with the hole in the latch lever, which is at once retracted by its magnet so as to free the arm 25. The latter now swings, either under the action of the spring 16 or by virtue of the weighting effect of the extension 26, and the lever 19 is forced downward out of the recess in the rod 12 by the movement imparted thereto by the said spring, which is thus freed to shift the belt so as to stop the machine. When the machine is again started by moving the belt shipper 10 in the opposite direction, thus pulling the rod 12 back to normal position and compressing its spring, the lever 19 is restored to normal position in engagement with the recess by the action of a light spring 40. Simultaneously the lever 23 may be restored in any suitable manner; thus, for example, it may be provided with a portion 42 extending over the lever 19, so that the latter delivers a restoring impulse to the lever 23, which it may do under the action of the spring 40, but preferably by virtue of the lever 19 being forcibly cammed upward by engagement of the surface 41 on the rod 12 with the offset on the lever when the rod is thrown as far as it will go in the operation of shifting the belt back to the fast pulley. When the arm 25 rides off the surface 30 of the latch lever over the recess therein, the latch promptly swings to reengage its shoulder with the end of the arm, and the detent 32 is now free to be restored to normal position by its spring. The stop against which the detent 32 is normally held is desirably adjustable, as indicated.

By the provision of double locking means, as above described, the chances of accidental release of the knock-off mechanism are lessened, because both devices would be unlikely to be jarred open at the same time, and the safeguarding is greatly increased by the fact that the instrumentalities are approximately at right angles, so that forces which might affect one would exert little influence on the other. Furthermore, the fact that the locking action is successive contributes to the general desired result, because the first locking device cannot be jarred open until after the second has been fully shifted, by which time any momentary jar or disturbance would have ceased. The greater the range of movement of the second locking device or detent 32 the less chance there is of its being jarred to a position where it will permit movement of the latch 27, and the adjustable stop 37 enables the extent of its movement before reaching such position to be made as great as is consistent with the strength of the magnet 39.

What is claimed as new is:

1. In a stop-motion, the combination with a suitable part adapted when released to throw off the power, of successive locking devices one being capable of holding said part and the second blocking movement of the first, said devices being arranged so as to be least affected by jars and vibration in directions approximately at right angles to each other, and electro-magnetic means for withdrawing each of said devices.

2. In a stop-motion, the combination of two magnets and their respective armatures placed at approximately right angles to each other, one armature being arranged to block movement of the other, and knock-off mechanism controlled by the latter armature.

3. In a stop-motion, the combination of a control circuit, locking devices one adapted to prevent movement of the other, knock-off mechanism adapted to be held against operation by the latter device independently of the former, and electro-magnetic means controlled by said circuit for actuating each of said detent devices.

4. In a stop motion, knock-off mechanism, and means for operating the same comprising a control circuit and electro-magnetic means including two armatures controlling said mechanism and adapted the one to lock the other.

5. In a stop-motion, the combination of two magnets and their respective armatures in angular relation, knock-off mechanism controlled by said armatures, and a stop-motion circuit for sending current through both magnets.

6. In a stop-motion, a suitable spring-actuated knock-off member combined with two locking devices arranged so that each is substantially unaffected by shocks and vibrations to which the other may be subject, a stop-motion circuit, and magnetic means therein for actuating each of said devices.

7. In a stop-motion, the combination of a control circuit, two electro-magnetic devices in angular relation actuated by said circuit, and a suitable knock-off member controlled by said devices.

8. In a stop-motion, the combination of a spring-urged slidable knock-off rod having a shoulder, a member adapted to engage said shoulder, a locking device capable of holding said member in engagement, a second locking device normally blocking the movement of the first, and electro-magnetic

means for withdrawing both of said locking devices.

9. In a stop-motion, the combination of a spring-urged slidable knock-off rod having a shoulder, a member adapted to engage said shoulder, a pivoted locking device capable of holding said member in engagement, said locking device having an opening, another pivoted device normally blocking the movement of the first and disposed substantially at right angles thereto and movable to a position in registry with said opening, and a control circuit and electro-magnetic means for actuating both of said devices.

10. In a stop-motion, the combination of a slide rod having a shoulder and adapted when released to throw off the power, a detent, connections between said shoulder and detent whereby the latter is relieved of the force acting on the rod, a magnet for withdrawing said detent, of a second detent normally preventing movement of the first, a second magnet for withdrawing said second detent, and a circuit for energizing said magnets.

11. In a stop-motion, the combination of a reciprocatory rod having a shoulder and adapted when released to throw off the power, a part adapted to engage said shoulder and to be disengaged therefrom by movement of the rod, a lever having a long depending arm and engaged near its fulcrum by said part, a substantially horizontal latch lever adapted to engage and hold said long arm, a substantially upright detent normally blocking movement of said latch, and a control circuit and electro-magnetic means for moving said detent to a position permitting movement of the latch and for disengaging said latch from said long arm.

12. In a power-controlling device, the combination with a suitable spring-urged power-changing member, of a locking device capable of holding said member against movement, a second locking device adapted to block movement of the first, and electro-magnetic means for retracting said locking devices.

In testimony whereof, I have signed this specification in the presence of two witnesses.

ALEXIS F. WALDOW.

Witnesses:

CHESTER C. LAMB,
OSCAR L. OWEN.