March 30, 1926. 1,578,370

F. N. ROSS

MACHINE CONTROL

Filed April 26, 1923 3 Sheets-Sheet 1

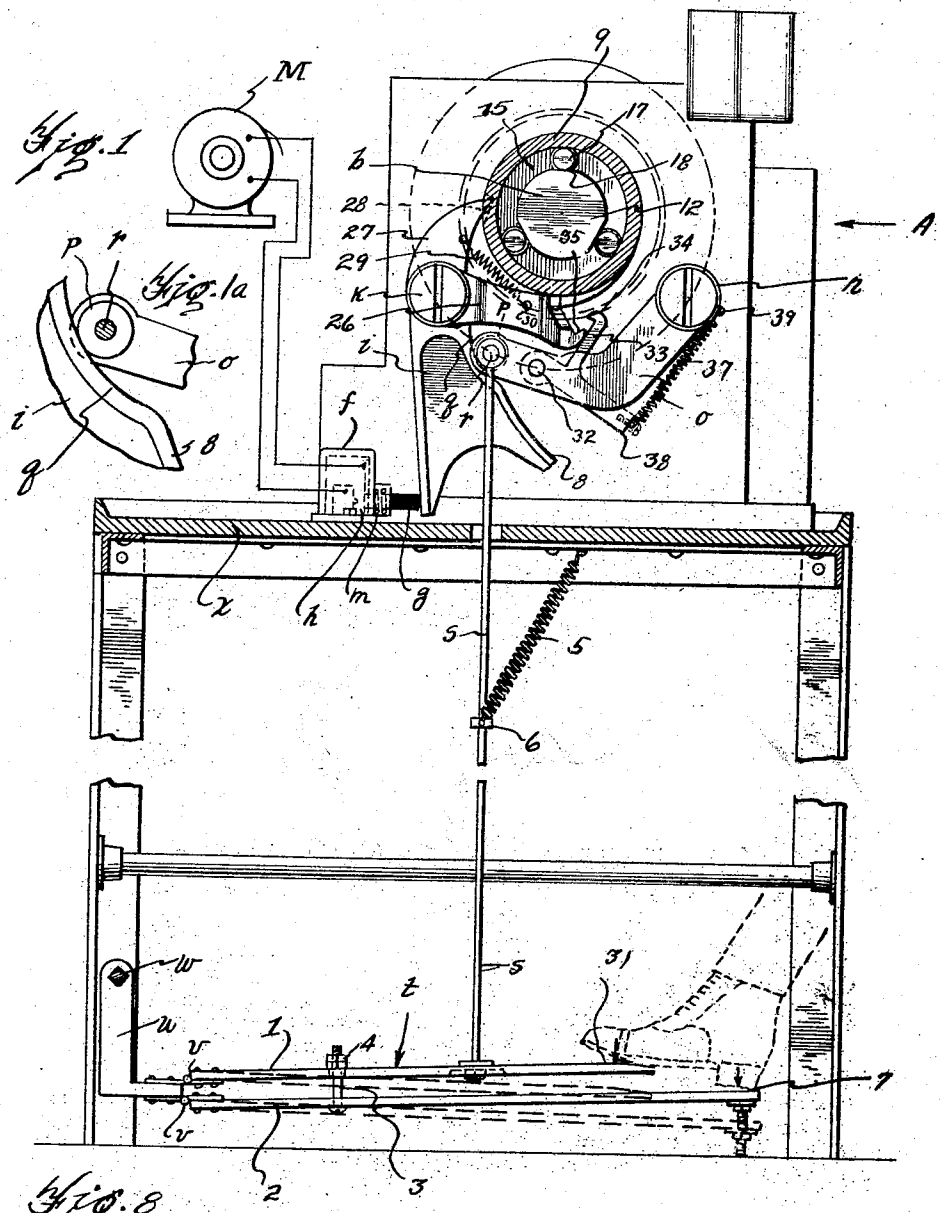
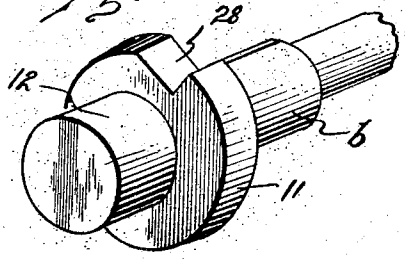


Fig. 1

Fig. 1a

Fig. 8



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Fig. 2

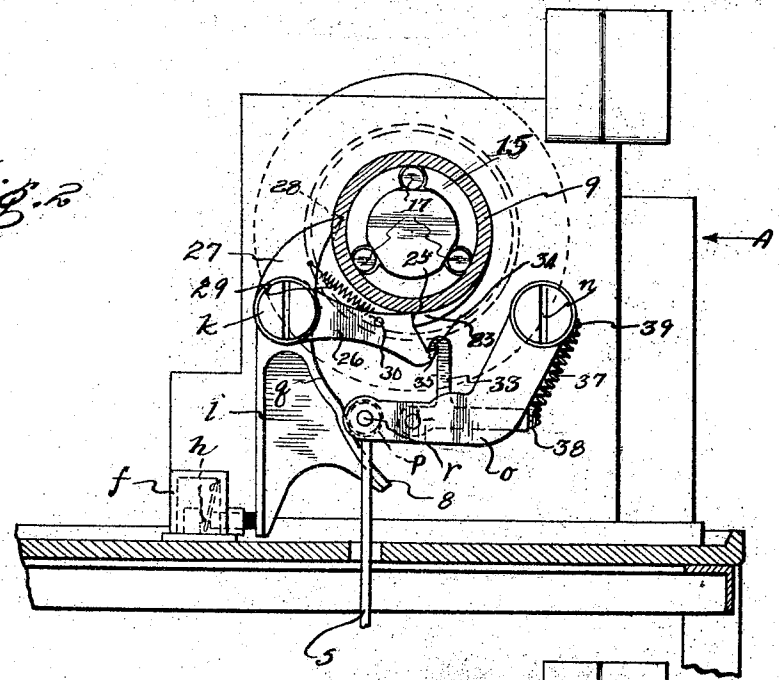
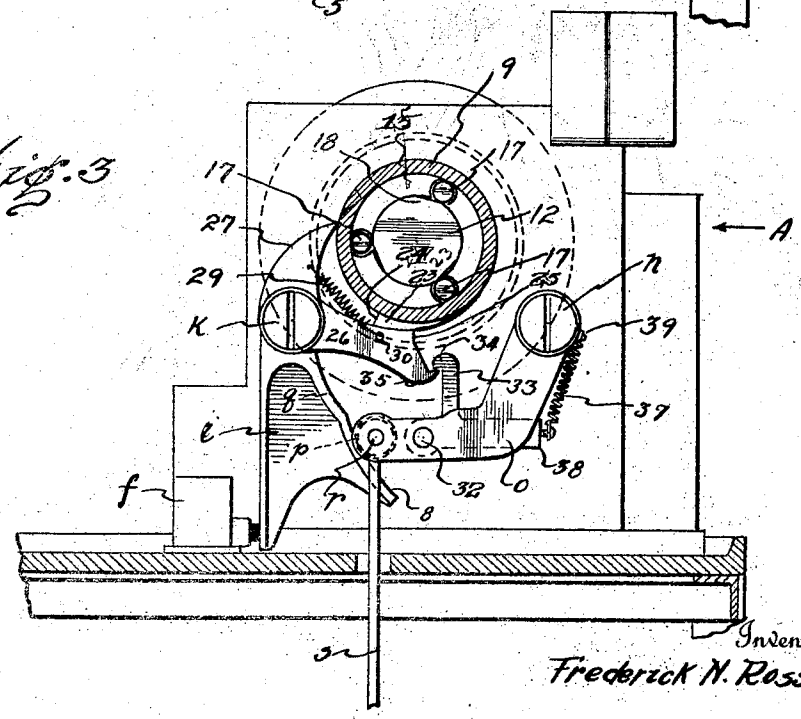


Fig. 3



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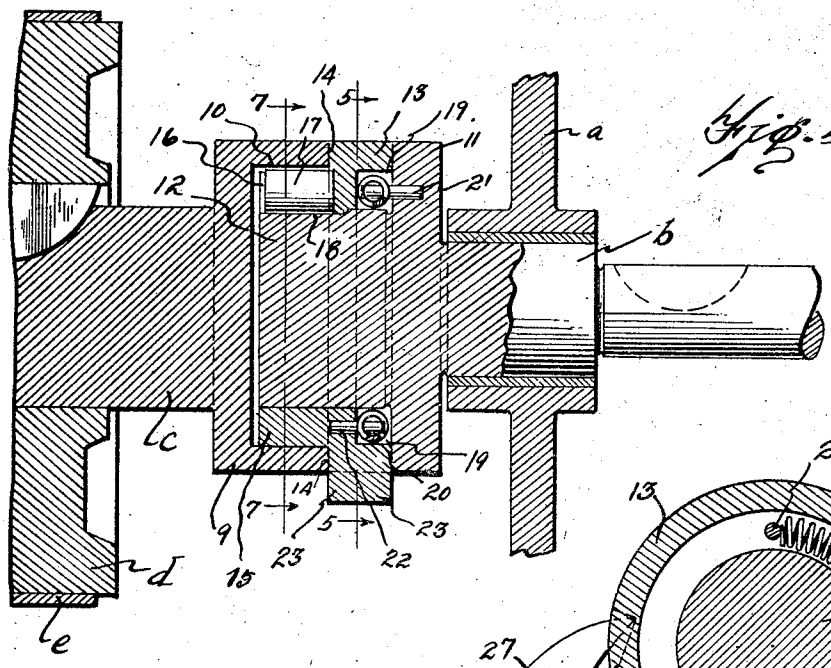


Fig. 4



Fig. 7

Fig. 5

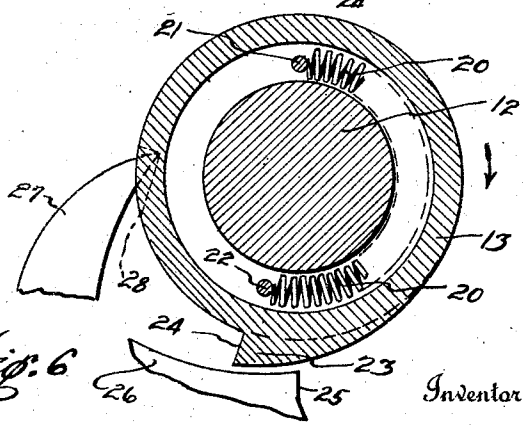


Fig. 6

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Patented Mar. 30, 1926. 1,578,370

UNITED STATES PATENT OFFICE.

FREDERICK N. ROSS, OF PONTIAC, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE PATENT BUTTON COMPANY, A CORPORATION OF CONNECTICUT.

MACHINE CONTROL.

Application filed April 26, 1923. Serial No. 634,711.

To all whom it may concern:

Be it known that FREDERICK N. ROSS, a citizen of the United States, residing at Pontiac, in the county of Oakland and State of Michigan, has invented certain new and useful Improvements in Machine Controls, of which the following is a specification.

This invention relates to machine controls and more particularly to a power control which will automatically disengage the driving member from the driven member.

The object is to provide a control that will disengage the driving parts and stop the machine at the end of one revolution.

Another object is to construct the control mechanism so as to enable the clutch tripping mechanism to be automatically reset, and positioned in readiness to repeat the clutch tripping operation when actuated.

In the drawings:

Fig. 1 is a side elevation partly in section, of a machine with my clutch and tripping mechanism attached thereto.

Fig. 1ª is a detail of the rock arm.

Fig. 2 is a view similar to Fig. 1 showing the electrical circuit closed, but with the clutch parts disengaged.

Fig. 3 is a similar view showing the electrical circuit closed and the clutch parts in engagement.

Fig. 4 is a vertical sectional view taken through the clutch parts.

Fig. 5 is a section on the line 5—5 of Fig. 4, showing the spring for causing the clutch parts to first engage.

Fig. 6 is a view similar to Fig. 5, showing the spring expanded to engage the clutch parts.

Fig. 7 is a section on the line 7—7 of Fig. 4.

Fig. 8 is a detail of the driven member.

This machine control is shown in my prior Patent No. 1,508,253, issued Sept. 9, 1924, applied to a button attaching machine, but obviously this control mechanism could be applied to any machine where it is desired to have the moving parts rotate through one revolution, and to have the clutch automatically disengage and stop the said moving parts.

I designate a machine as A, which is provided with a shaft *b* that can be suitably connected to the operating mechanism of the machine. The shaft *b* will be referred to as the driven member.

The driving member *c* may be connected or geared directly to a motor or as I have shown in Fig. 4. The driving member *c* is provided with a pulley wheel *d*, keyed thereto and a belt *e*, which can be driven from the motor M.

The electrical circuit connected with the motor M, is provided with a switching mechanism *f*, which consists of a button *g* which is adapted to be pushed in to close the contacts *h* thereby closing the circuit and starting a motor which will continuously drive the driving member *c* until such time as the contacts *h* are opened.

Referring to Figs. 1 and 2, it will be seen that the switch actuating lever *i* is pivoted on the stud *k* to the machine support *a*. The button *g* is of the usual construction and contains a spring *m* for normally pressing the button outwardly to open the contacts *h*. As shown in Fig. 1 the switch is open. Pivoted to the machine support *a* as at *n*, is a rock arm *o* which carries a roller *p* that is adapted to engage with the cam face *q* carried by the switch actuating lever *i*. Roller *p* is journalled on the pin *r* carried by the said rock arm *o*, and a rod *s* connects the pin *r* with the compound foot lever *t*, hereinafter to be described.

The compound foot lever (Fig. 1) is hinged to a support *u* as at *v*, the said support *u* being supported by the cross member *w* carried by the legs of the table *x*. The compound foot lever consists of two pedals 1 and 2, each hinged at *v*, and coupled together by the bolt 3 and nut 4. The draft rod *s* is secured only to the pedal 1 and a spring 5, having one end secured to the draft rod *s* by a collar 6, and the other end secured to the table, tends to hold the pedals, rod and rock arm in the position as shown in Fig. 1. The operator presses the heel of his foot down on the foot lever 2, as at 7, which because of the bolt and nut connection 3 and 4, causes the pedal 1 and draft rod *s* to move downwardly part way. This causes the rock arm *o* to be pulled down, causing the roller *p* to bear on the cam face *q* of the switch actuating lever *i*, causing the same to assume the position as shown in the full line position in Fig. 2. The cam surface 8, (see Fig. 2) follows the arc of a circle having its center at *n* where the rock arm *o* is pivoted, so that a further movement of the rock arm and roller, by pressing the

lever 1 down with the toe, will not affect the switch actuating lever *i*, but only prevents the switch from being opened.

The driving member *c* is provided with an enlarged portion 9 which is counterbored as at 10; the shaft *b*, or what is termed the driven member, is provided with a flange portion 11, near its outer end and a stud portion 12, which is adapted to enter within the counterbored portion 10 of the driving member. Fitted around the stud portion 12, is a roller retaining ring 13, which is shouldered as at 14. The reduced portion 15 surrounds part of the stud portion 12 of the driven member and is adapted to fit within the counterbored portion 10 of the driving member. The reduced end of the roller retaining ring is provided with a plurality of holes 16, in which rollers 17, are loosely fitted.

The stud portion 12 of the driven member is flattened as at the locations 18. The said rollers 17 which are supported in the roller retaining ring as described, are adapted to engage with these flattened portions 18 of the driven member. The roller retaining ring 13 is counterbored as at 19, and a spring 20 is contained within this counterbored portion, having one end abutting a pin 21, carried by the flange 11 of the driven member, and the other end of the spring abutting a pin 22, carried by the roller retaining ring 13. The roller retaining ring 13 is adapted to abut the flange 11 of the driven member and the end of the enlarged portion 9 of the driving member is arranged to abut the shoulder 14 of the roller retaining ring 13.

A tooth 23 is provided on the roller retaining ring 13 having a shoulder 24, which is adapted to be engaged by the shoulder 25 of the finger 26, the said finger being pivoted on the stud *k*. Finger 27 pivoted on the stud *k* is adapted to engage in the notch 28 carried by the flange 11 of the driven member, and a spring 29 has one end secured to the finger 27 and the other end secured to the pin 30 carried by the finger 26. This spring 29 forces the finger 27 into the notch 28, and also tends to keep the finger 26 bearing against the outer circumferential surface of the roller retaining ring 13, thus tending to keep the shoulder 25 of the finger 26, in engagement with the shoulder 24, carried by the roller retaining ring.

In Fig. 3, I show the position assumed by the tripping mechanism when the toe of the operator's foot presses down on the pedal 1, as at 31. (Fig. 1.) This will cause the draft rod *s* and rock arm *o* to move downwardly to complete the stroke, the roller *p* riding upon the cam surface 8. Pivoted at 32 to the rock arm *o*, is a trip lever 33, which is provided with a shoulder 34, adapted to engage the shoulder 35, carried by the finger 26. A spring 37 has one end secured to the extension 38 of the tripping lever, and the other end secured to the rock arm *o* as at 39, which will tend to hold the shoulder 34 of the tripping lever in engagement with said shoulder 35 carried by finger 26. Upon pulling the draft rod *s* secured to the rock arm *o*, downwardly to complete the stroke, the trip 33 rocks the finger 26 downwardly, and disengages the shoulder 25 of the finger 26 from the shoulder 24, carried by the roller retaining ring 13.

When the shoulders 24 and 25 are disengaged, the spring 20 which is compressed and bears upon the pins 21 and 22, will force the retaining ring 13 in a clockwise movement as indicated by the arrow in Fig. 6. As the pin 21 is carried by the flange 11, the finger 27 which engages in the notch 28 carried by flange 11, prevents the spring 20 from forcing the pin 21 in a counterclockwise movement, and as a result the only way the spring can expand is by pushing the retaining ring 13 in a clockwise movement. As shown in Fig. 3, the moving of the retaining ring 13 which loosely supports the rollers 17, will cause the said rollers to ride on the flattened cam surfaces 18 until the rollers engage the rotating driving member *c*. The driven member is thus caused to rotate with the driving member.

The tripping lever 33 is depressed a sufficient distance so that the shoulder 35 carried by the finger 26, will slip by the shoulder 34 of the tripping lever, the finger 26 then returning to bear against the circumferential surface of the retaining ring 13.

On releasing the foot pedal 1, the spring 5 attached to the table and draft rod *s* will cause the rock arm *o* of the trip lever 33, to return to the position closely approximating the position as shown in Fig. 2. When the driving member engages the driven member as described, the retaining ring 13, which is now rotating with the driving and driven members, will rotate for one complete revolution, or until the shoulder 24 of the tooth 23, carried by the roller retaining ring 13, again engages the shoulder 25, carried by the finger 26. When these shoulders engage, the retaining ring 13 will stop and the driven member *b* will continue to rotate due to the momentum of the machine, whereby the rollers 17 are caused to retreat backwardly on the flattened cam surfaces 18, the said rollers thereby becoming disengaged from the driving member *c*, which will cause the driven member *b* to also stop, thus stopping the machine mechanism to which the driven member is connected.

The relative movement between the roller retaining ring 13 and the driven member *b* will cause the spring 20 to be compressed due to the fact that the said spring is interposed

between the pin 21, carried by the flange 11 of the driven member *b*, and the pin 22, carried by the roller retaining ring 13. The finger 27 is timed to drop into the notch 28 carried by the flange 11 to prevent the reverse turning movement and to hold the spring 20 under restraint. The potential energy thereby stored in the spring is sufficient to actuate the roller retaining ring 13 to engage the driving and driven members as described when the shoulders 24 and 25 are disengaged as the operator presses the toe of his foot on the pedal 1 to actuate the tripping mechanism.

When the operator leaves his position in front of the machine, he must obviously remove his foot entirely away from the pedals, thus releasing pedal 2, which he has held down with the heel of his foot. The spring 5 causes draft rod *s* and rock arm *o* to return to the position as shown in Fig. 1, thereby allowing the spring pressed switch button *g* to push outwardly, opening the contacts *h*, the electrical circuit to the source of power being thereby disconnected.

It is not possible to trip the machine without first throwing in the switch to start the motor which drives the driving member *c*. It will be thus seen that the operator can keep the driving member *c* continuously rotating, by keeping his heel on the lever 2, and can trip the tripping mechanism at will by pressing downwardly on the pedal 1 with the toe of his foot.

The mechanism as described will positively stop the driven member at the completion of one revolution and even though the operator should keep the toe of his foot pressed down upon the pedal 1, the machine will stop because the tripping lever 33 is depressed downwardly a sufficient distance so that the shoulders 34 and 35 slip by each other allowing the finger 26 to bear upon the circumferential surface of the retaining ring 13, so that the said shoulders 24 and 25 are free to engage with each other to stop the machine.

In considering the elements above described and for broadly grouping them in classes, it will be observed that the clutch is made up of a driving member and a driven member as is usual in clutches. However, the driven member is made up of two members, to wit: the retaining ring 13, and the flange 11. These two members have relative movement which serves to throw in the gripping members, to wit: the rollers; or disengage these gripping members. This relative movement is secured by the interposition of a motor element between them, to wit: the spring motor 20. Potential energy is stored in this spring motor at the end of each revolution of the clutch parts by reason of the momentum of the parts overthrowing said parts after the ring 13 has been stopped by the tooth 23 engaging with the finger 26. This momentum overthrows the flange 11 and pin 21, compressing the spring 20. When in this compressed position before the compression of the spring can cause a reverse turning movement, the finger 27 drops into the notch 28 and holds the two relatively movable driven parts under stress from the spring 20. Hence as already explained, when the operation of the toe of the foot removes the stop finger 26, the spring 20 will cause relative movement between the two driven clutch parts thereby coupling the driven clutch parts with the driving clutch member.

What I claim is:

1. In a power control, the combination of a source of power, driven mechanism, a clutch between the driven mechanism and the source of power and provided with a stop shoulder, a pivoted clutch finger yieldingly held in engagement with said stop shoulder, and a tripping mechanism including a trip finger yieldingly held in engagement with said clutch finger whereby movement of said tripping mechanism serves to actuate the trip finger for retracting the clutch finger and disengaging the same from the stop shoulder for the purpose of releasing the clutch, said trip finger arranged to rotate about a center remote from the pivot of said clutch finger, said trip and clutch fingers separating in diverging paths when moved, whereby the trip finger disengages from the clutch finger with the releasing of the clutch to allow the clutch finger to again position itself so as to engage the stop shoulder to throw out the clutch at the completion of one revolution.

2. In a power control, the combination of a source of power, driven mechanism, a clutch between the driven mechanism and the source of power and provided with a stop shoulder, a pivoted spring pressed clutch finger engaging said stop shoulder, a movable arm pivoted on the opposite side of said stop shoulder and provided with a trip finger pivoted thereto, said trip finger engaging with the clutch finger, and a draft rod connected to said arm, whereby when the draft rod is actuated the arm and trip finger are moved, the said trip finger actuating the clutch finger to move the same, said trip and clutch fingers separating in diverging paths when moved to release the clutch and to simultaneously disengage the trip finger from the clutch finger for permitting the clutch finger to again engage the stop shoulder upon one revolution of the clutch parts for the purpose of throwing out the clutch to disengage the source of power from the driven mechanism.

In testimony whereof he has affixed his signature.

FREDERICK N. ROSS.

Certificate of Correction.

It is hereby certified that Letters Patent No. 1,578,370, granted March 30, 1926, upon the application of Frederick N. Ross, of Pontiac, Michigan, for an improvement in "Machine Controls," were erroneously issued to "The Patent Button Company," whereas said Letters Patent should have been issued to *The Button Attaching Machine Co., a Corporation of Connecticut*, said corporation being assignee, *by mesne assignments*, of the entire interest in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of June, A. D. 1926.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.