No. 685,353. Patented Oct. 29, 1901.

J. R. SCOTT.

CLUTCH.

(Application filed Mar. 21, 1900.)

(No Model.) 3 Sheets—Sheet 1.

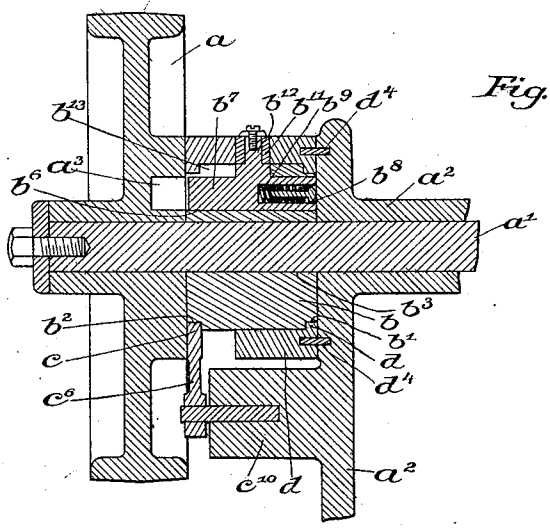


Fig. 1.

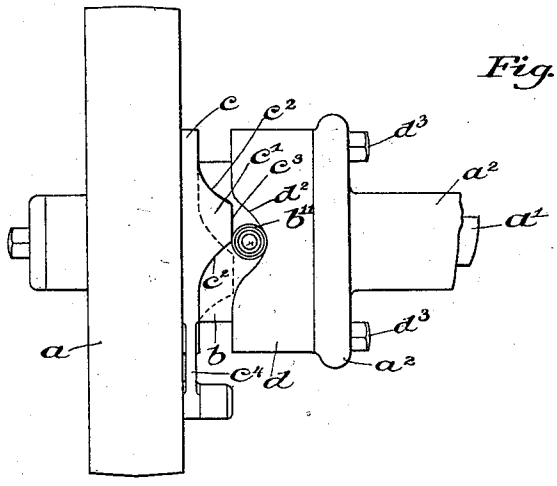


Fig. 2.

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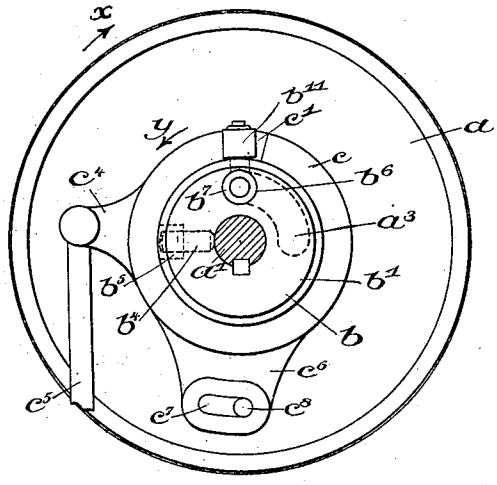


Fig. 3.

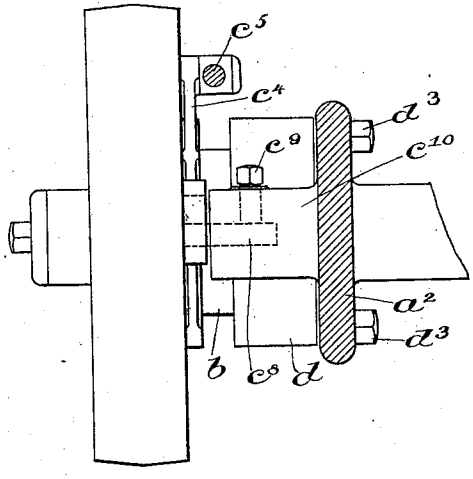


Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

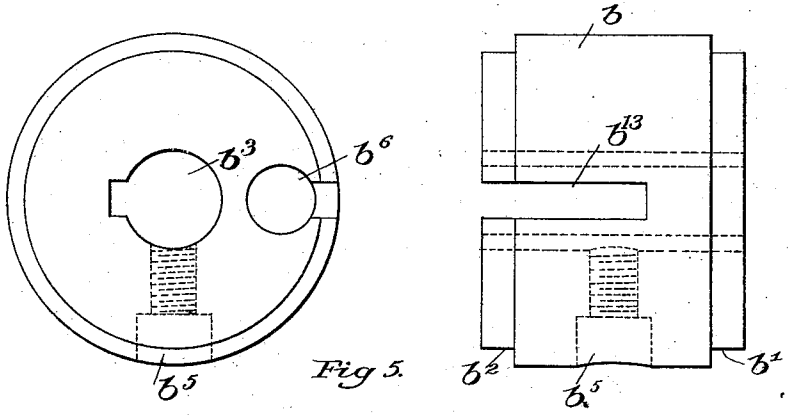


Fig 5.

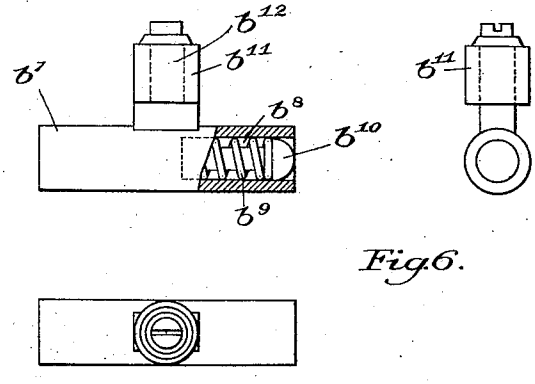


Fig 6.

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UNITED STATES PATENT OFFICE.

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CLUTCH.

SPECIFICATION forming part of Letters Patent No. 685,353, dated October 29, 1901.

Application filed March 21, 1900. Serial No. 9,495. (No model.)

To all whom it may concern:

Be it known that I, JACOB R. SCOTT, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in 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.

The present invention relates to clutches.

The object of my invention is to produce a clutch which is closed by one operation and which will remain closed for a certain cycle of operation and thereupon automatically open itself. This form of clutch is useful in many forms of machinery, and particularly in machinery designed to perform certain operations and which must then be stopped pending the mechanical or manual performance of certain other operations, after the completion of which latter the former operations are repeated.

To the above end the present invention consists of the clutch hereinafter described, and particularly defined in the claims.

In the accompanying drawings, illustrating the preferred form, Figure 1 is a sectional side elevation. Fig. 2 is a top plan. Fig. 3 is an end elevation looking from the right of Fig. 1 with the frame of the machine and the fixed cam d removed. Fig. 4 is a bottom plan of my clutch. Figs. 5 and 6 illustrate details of construction hereinafter described.

Similar letters of reference designate corresponding parts throughout the specification and drawings.

A constantly-rotating driving member, such as the pulley a, is revolubly mounted on any suitable support in operative relation to the driven member, as on the main shaft a', of any machine intended to be operated by the driving member. The shaft a' is mounted in any usual or preferred manner in bearings a^2 in the frame of the machine and communicates motion to the moving parts of the machine. The pulley a is constantly driven by a belt from any suitable source of power, and my improved clutch is designed to connect said pulley by means under the control of suitable mechanism or under the control of the operator to the driving-shaft and to release the same automatically and to stop the machine after one cycle of motion.

The improved clutch shown in the drawings comprises a clutch-box b, which, as shown, is substantially a cylindrical block having its ends reduced or rabbeted, as shown at b' and b^2. The clutch-box b is bored out centrally, as shown at b^3, to receive the driving-shaft a', to which it is fixedly secured by means of a spline connection and a set-screw b^4, the head of which is seated in a recess b^5 below the outer cylindrical surface of the clutch-box. The clutch-box is provided with a slideway b^6, in which is fitted to slide the clutch-pin b^7, said slideway and pin being preferably cylindrical, as shown. The clutch-pin is recessed or chambered at its rear end, as shown at b^8, and receives a coiled spring b^9 and pin b^{10}. The clutch-pin b^7 carries a cam-roll b^{11} upon a projecting stud b^{12}, which projects outward through a slot b^{13}, which opens into the clutch-pin slideway b^6. Suitable means are provided for positively moving the clutch-pin b^7 into and out of engagement with the slot a^3 of the pulley to close and open the clutch. These means consist of two cams which control the motions of the clutch-pin. Of these cams one is fixed and the other is movable. One of the cams is provided with a recess adapted to receive the cam-roller b^{11} and the other with a corresponding projection adapted to engage the cam-roller and force it into the depression in the other cam. In the machine of the drawings the cam c is made movable and the cam d is fixed. The movable cam c is mounted upon the rabbet b^2 of the clutch-box, and it is provided with the projection c', which is projected toward the depression d^2 of the fixed cam d. It is supported from lateral movement in one direction by the rabbet b^2 of the clutch-box and in the other direction by the surface of the pulley a. The cam projection c' of the cam is connected with the flat face c^3 of the cam by inclined faces c^2. Referring to Fig. 3, showing the cam c in elevation, it is shown as provided with a laterally-projected arm c^4, to which is attached in any suitable manner the

rod c^5, which is operated by any suitable means, as by a treadle, in the case of human operation. The said cam c is also provided with a lug c^6, slotted, as shown at c^7, to receive the stop-pin c^8, secured by means of the set-screw c^9 in a projection c^{10} from the frame a^2 of the machine. The other cam d of the clutch-controller is mounted upon the clutch-box b and provided with a flange d', which engages the rabbet b' of the clutch-box. The cam d is secured to the frame by suitable bolts d^3 and pins d^4. The depression d^2 of the cam d is located opposite the projection c' of the cam c.

The operation of the machine of the drawings is as follows: Let it be assumed that the pulley a is continuously rotated in the direction of the arrow x by any suitable means, as by a belt, and that the parts of the clutch occupy the position illustrated in Figs. 1, 2, and 3. At this time the roll b^{11} of the clutch-pin b^7 is held by the projection c' on the cam c in the recess d^2 of the cam d. If, now, it is desired to close the clutch, the rod c^5 will be depressed and the cam c will be rotated for a short distance in the direction of the arrow y. A rotation in this direction is limited by the stop c^8 engaging the end of the slot c^7 in the lug c^6 of the cam c. This motion of the cam c will move the cam projection thereon to the position shown in dotted lines in Fig. 2, thereby withdrawing the projection from in front of the clutch-pin, whereupon the spring b^9 will expand and press the clutch-pin b^7 in the direction to enter the slot a^3 in the pulley a, so that when said slot comes opposite the clutch-pin b^7 the said pin will be pressed far enough into the slot a^3 so that the end of the said pin will engage the slot. The continued rotation of the pulley a will then carry with it the clutch-pin b^7, and consequently impart to the clutch-box b an initial movement of rotation. Such rotation of the clutch-box will force the roll b^{11} against the inclined face of the recess d^2 of the cam d and positively move the clutch-pin into engagement with the slot a^3 of the pulley, thereby compelling a complete movement of the pin b^7 into the slot a^3. The shaft a' being splined to the clutch-box b will be rotated by the moving pulley a and operate the machine. The cam c remains in the position shown in dotted lines in Fig. 2 until the roll b^{11} engages it from below, as seen in Fig. 21, whereupon the inclined face c^2 tends to withdraw the clutch-pin b^7 from engagement with the slot a^3 in the pulley. This movement of withdrawal of the clutch-pin is resisted by the cam d until the cam c has been rotated by the pressure of the roll b^{11} thereagainst, which rotation will be stopped by the check-pin c^8 engaging the end of the slot c^7 of the lug on the cam c. Then the cam c will be held from further rotational movement, and the roll b^{11} will be positively forced thereby into the depression d^2 of the cam, and the clutch-pin will be completely and positively withdrawn from the slot a^3 in the pulley, and the clutch will be opened and held open until the cam c is again moved to permit the egression of the roll b^{11} from the recess d^2 of the fixed cam d. The position now occupied by the projection c' with relation to the recess d^2 will prevent further rotative movement of the shaft a' by reason of the fact that the projection c' of the cam c in this position closes the space in front of the roll b^{11} and prevents its further advance in the direction of movement of the pulley a. Thus it is seen that my clutch operates after an initial spring movement tending to close the same to positively close it into full engagement, and that the clutch is automatically and positively opened after a predetermined cycle of operation is completed, and that thereupon the shaft a', which has been rotated by the closing of the clutch, is automatically and positively disengaged from connection with the pulley a, and that the shaft is stopped in a certain and definite position and held from accidental overrunning, and that the shaft a' will continue to be so held in its fixed position until it is again desired to close the clutch.

While I have thus described the preferred form of my invention, it is by no means specifically limited thereto, as it is capable of embodiment in many different forms without departure therefrom. In this connection it is to be noted that the clutch-pin and the fixed and movable cams might be mounted on the driving member and adapted to rotate therewith and the clutch-pin engage the driven member, and that the positive forcing of the clutch-pin into its engagement with the other member would then be caused by relative movements of the two cams.

Having thus described my invention, I claim as new and desire to secure by Letters Patent of the United States—

1. A clutch, having, in combination, a constantly-rotating driving member, a rotatable driven member, a locking device, a cam for actuating the locking device to disconnect said members arranged to be returned to operative position by the rotation of said members, and means for moving said cam to allow the locking device to connect said members, substantially as described.

2. A clutch, having, in combination, a constantly-rotating driving member, a rotatable driven member, a locking device, a cam for actuating the locking device to connect said members, a cam for actuating the locking device to disconnect said members arranged to be returned to operative position by the rotation of said members, and means for moving said cams to allow the locking device to connect said members, substantially as described.

3. A clutch, having, in combination, a constantly-rotating driving member, a rotatable driven member, a locking device, relatively movable cams for successively actuating the locking device to connect and disconnect said members arranged to be relatively moved by

the rotation of said members to allow the locking device to disconnect said members, and means for relatively moving said cams to allow the locking device to connect said members, substantially as described.

4. A clutch, having, in combination, a constantly-rotating driving member, a rotatable driven member, a sliding locking device carried by the driven member, a spring for imparting an initial movement to said locking device to connect said members, a stationary cam for completing such movement, a movable cam for actuating said locking device to disconnect said members arranged to be returned to operative position by said locking device, and means for moving said movable cam to allow the locking device to connect said members, substantially as described.

5. A clutch, having, in combination, a constantly-rotating driving member, a rotatable driven member, a sliding locking device carried by the driven member, a spring for imparting an initial movement to said locking device to connect said members, a stationary cam for completing such movement, a cam for actuating said locking device to disconnect said members movably mounted concentric with the driven member and arranged to be returned to operative position by said locking device, and means for moving said movable cam to allow the locking device to connect said members, substantially as described.

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

JACOB R. SCOTT.

Witnesses:

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HORACE VAN EVEREN.