H. C. LA BATT.

CLUTCH.

APPLICATION FILED JAN. 26, 1903. RENEWED JAN. 14, 1909.

932,558.

Patented Aug. 31, 1909.

3 SHEETS—SHEET 1.

Fig. 1

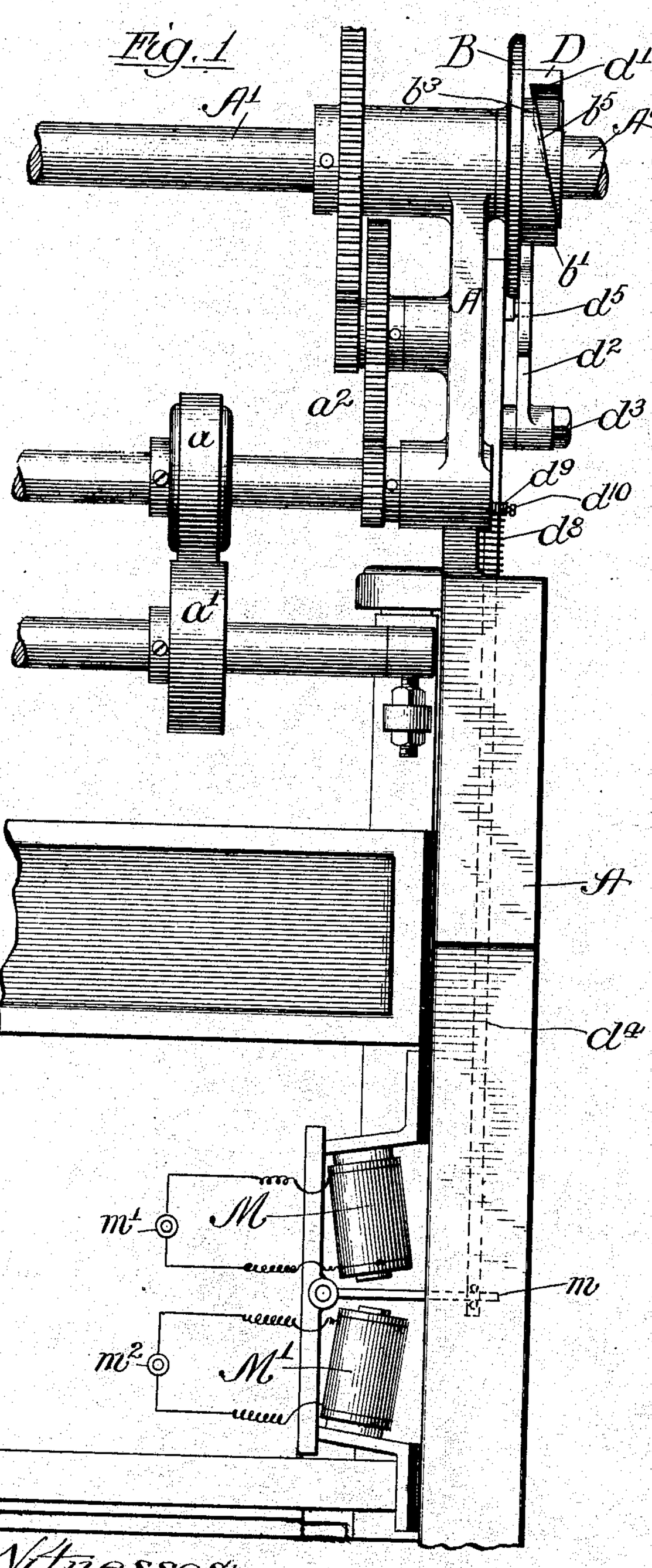
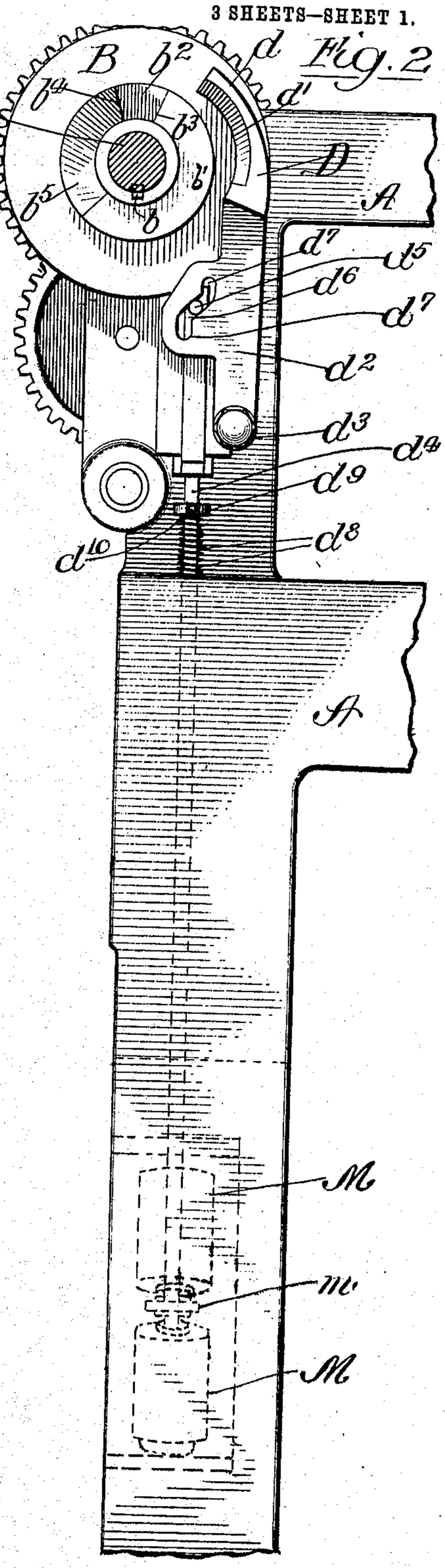


Fig. 2



Witnesses:

H. J. Barrett

Geo. R. Harbaugh

Inventor

Homer C. La Batt

By Coburn McRoberts & McElroy

Attys.

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3 SHEETS—SHEET 2.

Fig. 3

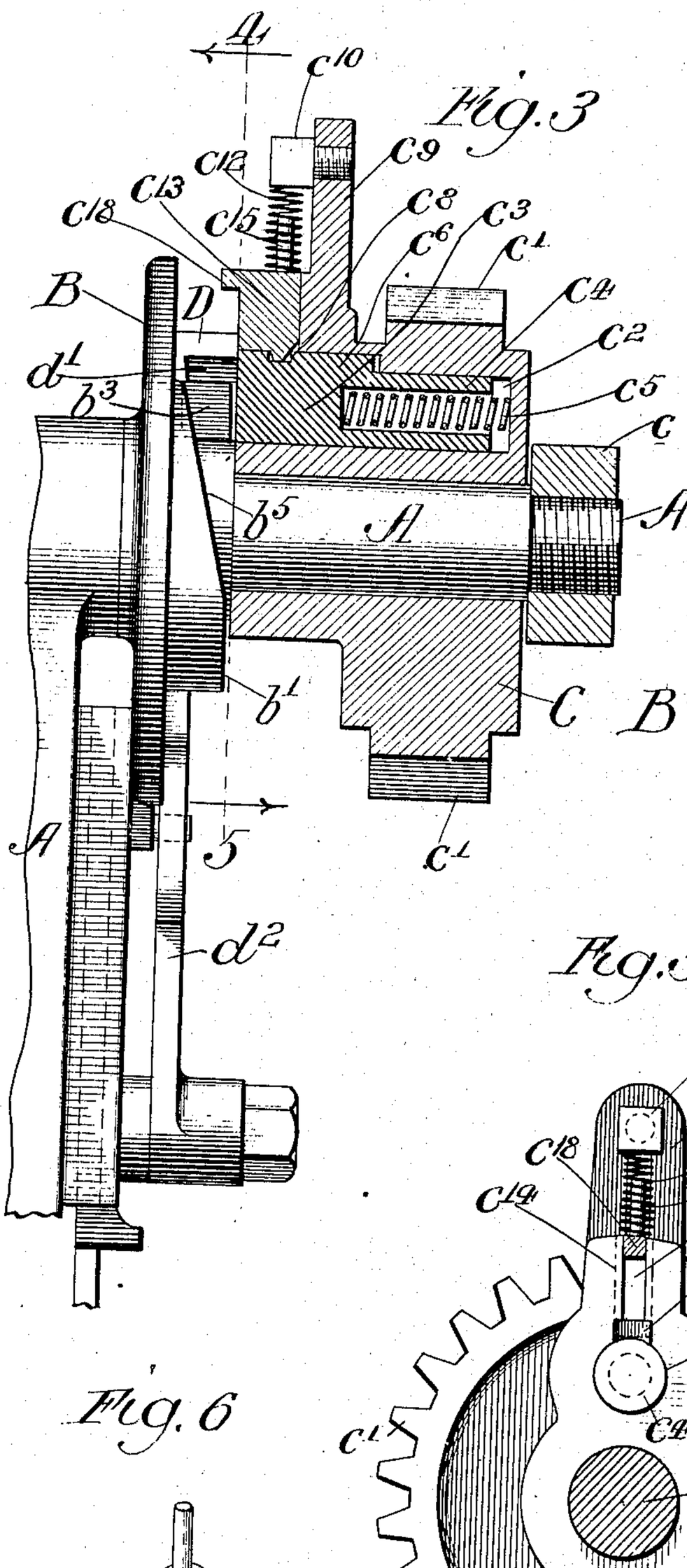

Fig. 4

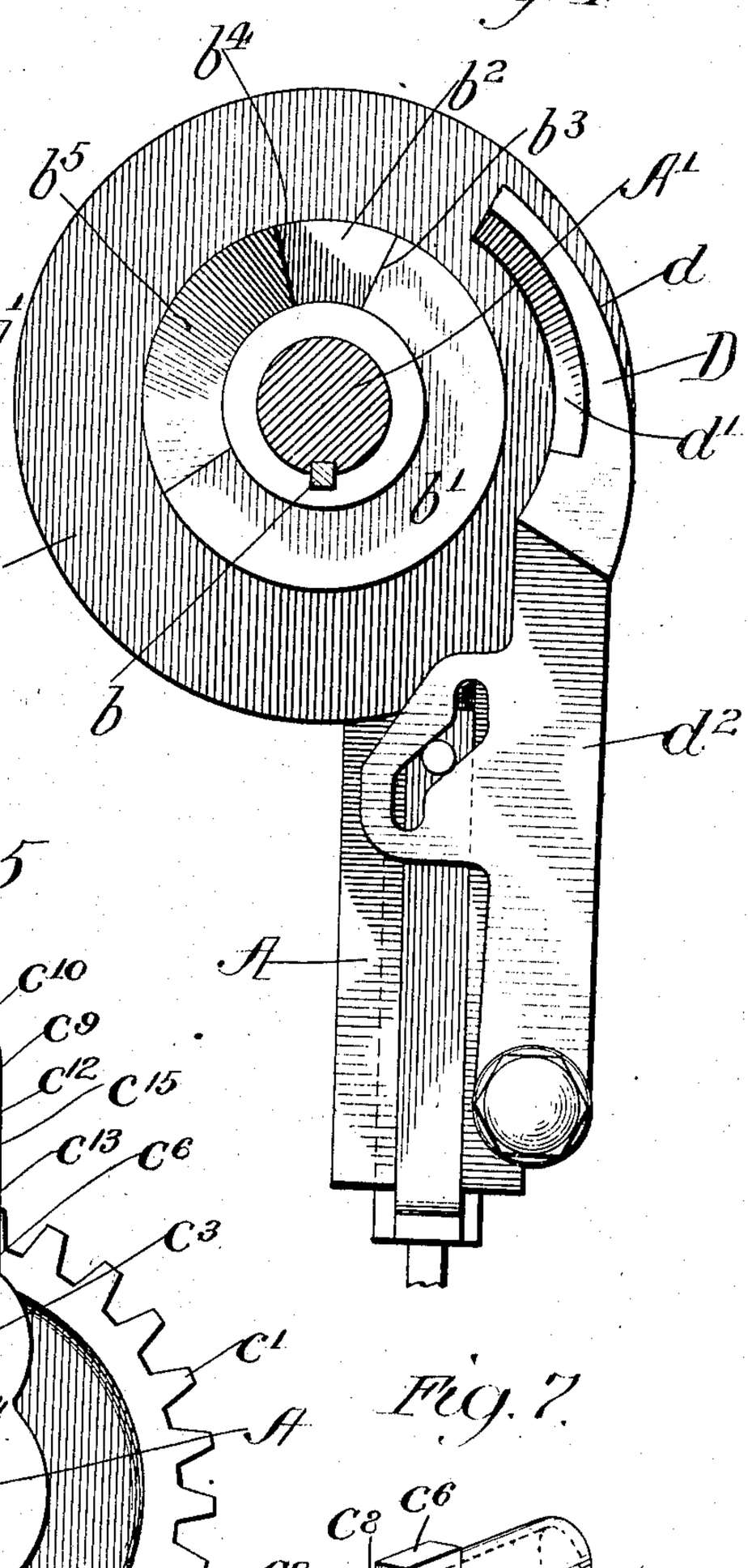

Fig. 5

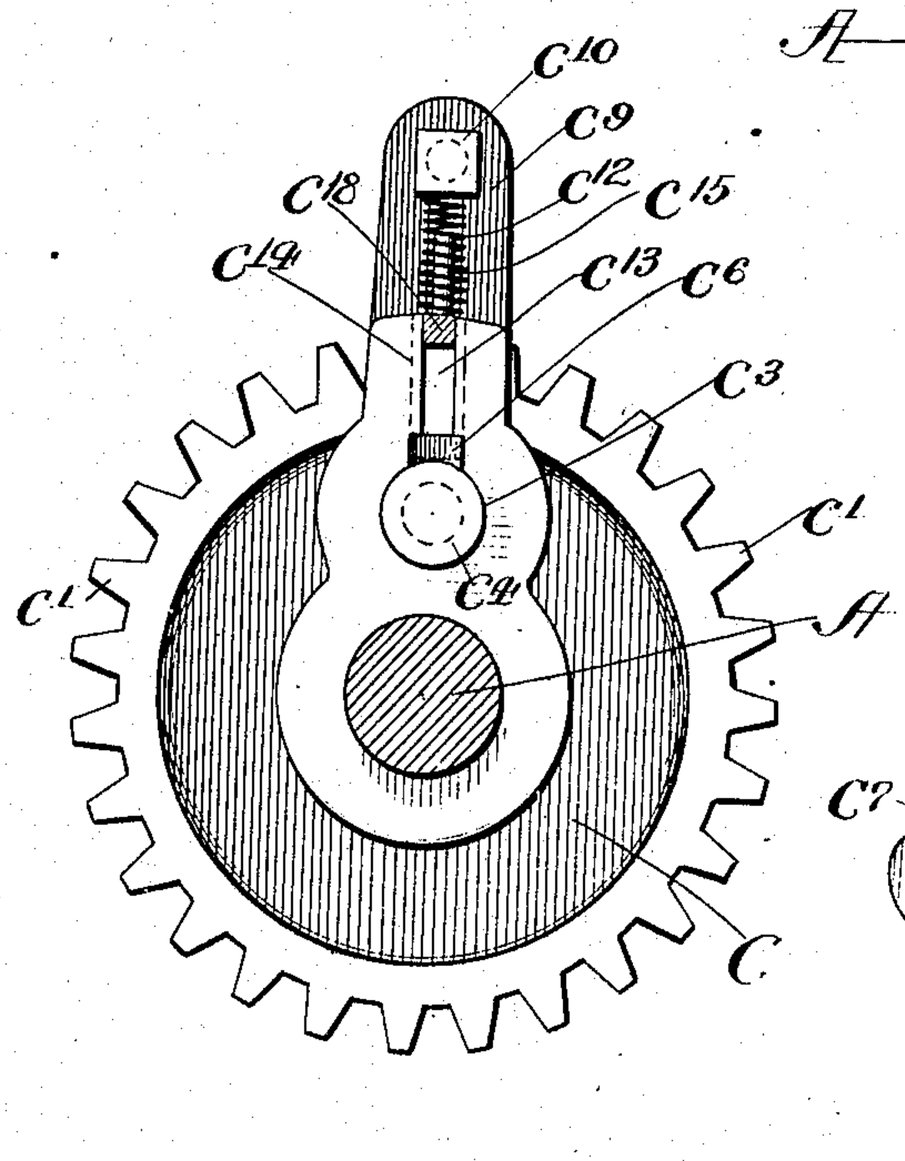

Fig. 6

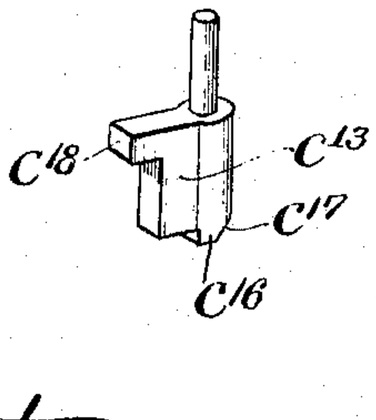

Fig. 7

Witnesses:

H. G. Barrett

George B. Harlow

Inventor:

Homer C. LaBatt

By Coburn McRoberts & McElroy

Atty's

H. C. LA BATT.

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3 SHEETS—SHEET 3.

Fig. 10.

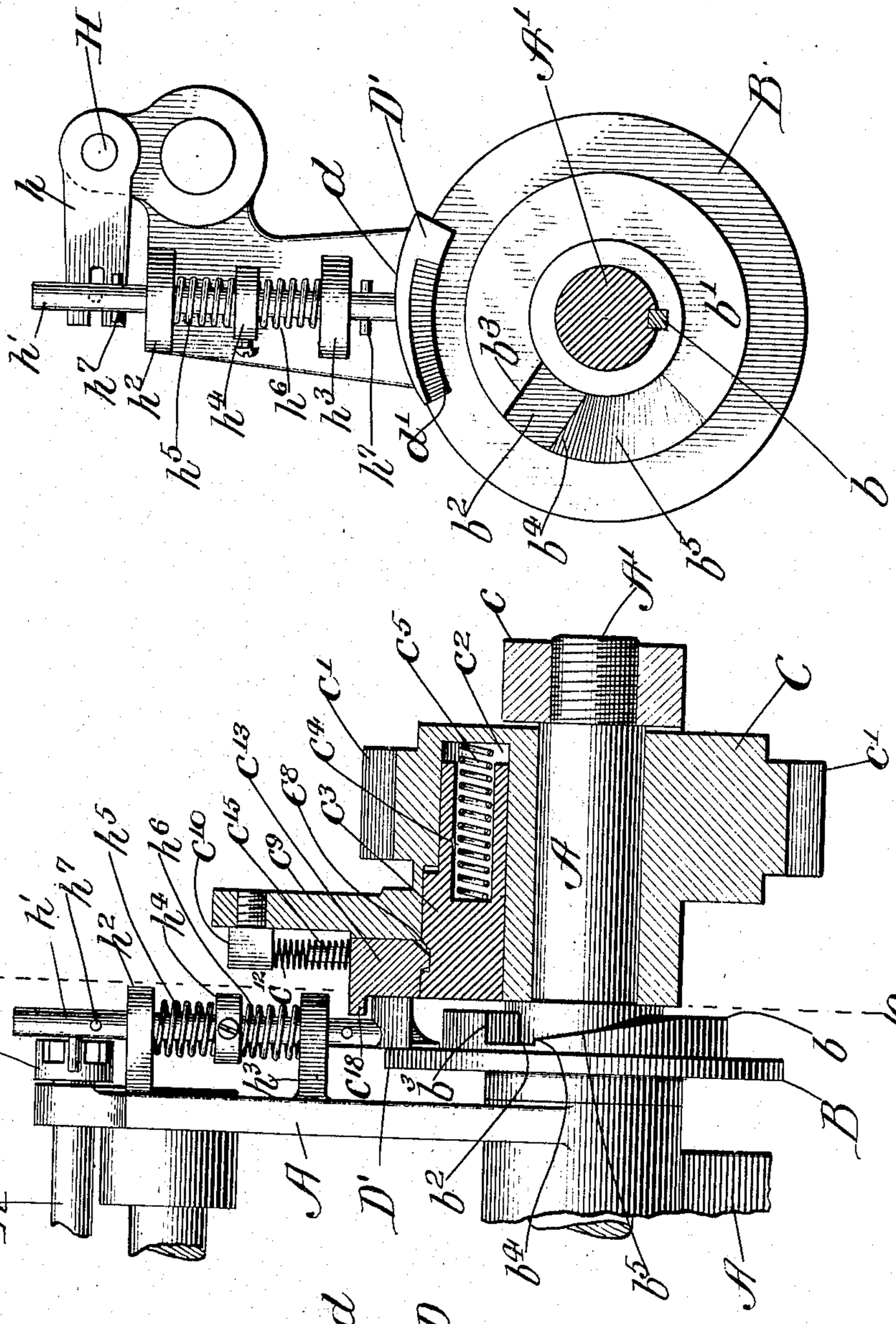

Fig. 9

Fig. 8

Witnesses:
H. G. Barrett
George R. Harlaugh

Inventor
Homer C. LaBatt
By Coburn McRoberts & McElroy
Attys.

UNITED STATES PATENT OFFICE.

HOMER C. LA BATT, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM J. HERRICK, OF CHICAGO, ILLINOIS.

CLUTCH.

932,558. Specification of Letters Patent. Patented Aug. 31, 1909.

Original application filed July 10, 1902, Serial No. 115,014. Divided and this application filed January 26, 1903, Serial No. 140,530. Renewed January 14, 1909. Serial No. 472,295.

To all whom it may concern:

Be it known that I, HOMER C. LA BATT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Clutches, of which the following is a specification.

My invention relates to clutches, and its object is to provide certain improvements in this class of devices as will be apparent from the disclosure, and which will be pointed out in the appended claims.

In order that the various features of my invention may be fully and clearly disclosed, I have shown my improved form of clutch in connection with certain parts of a paper-feeding machine, which will illustrate an application thereof in practical use.

In the accompanying drawings, in which the same characters of reference refer to the same parts in the several views—Figure 1 is a detail front elevation of a portion of a sheet-feeding machine showing an application of my improved clutch thereto, the driving disk of the clutch not being shown for convenience of illustration; Fig. 2 is a side view of the parts of Fig. 1; Fig. 3 is a view partly in elevation and partly in section along the line of the shaft upon which the clutch elements are mounted and with the latch or controller shown to illustrate its relative location; Fig. 4 is a part sectional view taken on the line 4—5 of Fig. 3 in looking in the direction of the top arrow; Fig. 5 is a view similar to Fig. 4, but taken in the direction of the lower arrow on the line 4—5 of Fig. 3; Fig 6 is a detail view of the trigger or catch; Fig. 7 is a detail view of the pin by which the parts of the clutch are connected; Fig. 8 is a detail view of the head of the latch or controller; Fig. 9 is a view similar to Fig. 3, but showing a modified form of latch-controlling mechanism that may be employed; and Fig. 10 is a part sectional view taken on the line 10—10 of Fig. 9 and looking in the direction of the arrow therein.

The clutch is illustrated in association with a sheet-feeding machine of which the frame A is of any suitable construction, and which is provided with a suitable through-shaft A′ from which the elements of the machine derive their motion. The driving-shaft A′ may of course be journaled in suitable bearings at any convenient point on the frame, and in the present instance I have shown it as carried at or near the top of the frame for convenience of illustration. The through-shaft transmits power to the various elements of its associated machine in any suitable manner and through any suitable connections; for example, the feeding-off rolls a a' are driven by an intermediate train of gears a^2.

The clutch comprises a driven disk B, which is suitably secured to the shaft by a key b, and a driving disk C, which is suitably mounted in operative relation to the disk B, as by being rotatably carried on a projection of the shaft A′, being held against displacement by a collar c, which is threaded upon the end of the shaft. It is of course understood that the driving disk may be mounted in operative position with relation to the associated disk by any suitable arrangement of parts, as upon an independent shaft. The disk C is driven by any suitable means, as the gear-wheel c', which meshes with a gear driven from any suitable source of power.

The driven disk B is provided on its operative face with a lateral flange b', which is circular or annular in outline and is cut-away or recessed at any suitable point in its face to form a seat b^2, having one wall abrupt for its full depth, as at b^3, and the other wall b^4 abrupt for a portion only of its depth and then developing into an incline b^5 which merges with the face or top portion of the flange.

The driving member C is preferably in the form of a sleeve, and is provided on its operative face with an axially extending recess c^2, in which a pin c^3 is movably seated. The pin is provided with a pocket c^4 in its rear end, which receives a protracting spring c^5, bearing between the base of the pocket and recess to throw the pin c^3 outwardly toward the driven disk B, the pin c^3 and the flange b' being on the same diameter and in line when the parts are assembled. The pin is provided on its outer face with a stop or ledge c^6, which fits in a corresponding cut-away of the recess and prevents it from turn-

ing as well as limiting its inward movement therein. The stop forms a shoulder c^7 on the front end of the pin, and is provided with a cross-cut c^8, forming a channel. The disk C is provided with a radial standard c^9, having a laterally extending bracket c^{10} at its outer end, against which one end of a coil spring c^{12} bears, its opposite end bearing upon a trigger or catch c^{13}, provided with an upwardly extending pin c^{15} about which the spring is coiled, and adapted to move in an undercut way or guide c^{14} in the casting, and having an opening or slot on its exposed face. The catch is provided with a lug c^{16} on its lower edge, having an inclined or beveled face c^{17}, and with a lateral front shoulder c^{18}, which projects through the opening of the guide into the plane of the flange b'.

The latch or controller D is located between the flange b' and the shoulder c^{18}, and moves toward and away from the shaft of the clutch to latch and unlatch the coacting pin c^3. The latch is curved to conform more or less to the curvature of the flange b', and is provided with an eccentric face or radial cam d on its upper surface, and with a lateral or axial cam d' in the line of projection of the shoulder c^7 of the pin c^3. The latch may be arranged in any suitable manner and operated by any suitable means. Its movements are inward and outward with relation to the shaft, and it normally occupies an intermediate inoperative position between the flange b' and the shoulder c^{18} and out of the path of movement of both of these elements.

The positions of the controller may be governed by any suitable means, such for example as a manually operated handle adapted to suitably control its movements, or the latch may be balanced in its inoperative position and be moved by any suitable means which automatically restores it to normal or balanced position. In the form shown in Figs. 9 and 10, a rock-shaft H is carried in suitable bearings on the frame and is provided with an arm h projecting into the plane of the latch D', and which is suitably connected to the movable stem h' of the latch, which is supported by brackets h^2 and h^3 on the frame. The stem carries an adjustable collar h^4 between the brackets and having a set-screw to lock it in position. Two coil-springs h^5 and h^6 are provided on the stem between the collar and brackets, which balance the stem and its attached latch in normal central position and return them to such position when moved in either direction, its movement being limited by suitable stop-pins h^7. It is obvious that the rock-shaft may be operated by any suitable means.

In the preferred form of the device, the stem d^2 of the controller or latch is pivoted to the frame at any suitable point, as at d^3, and is connected to a suitably guided actuating rod d^4 by any suitable means. I prefer to connect these parts by means of a pin d^5 on the rod engaging a cam slot d^6 on the latch, the slot being tangential to the pivot of the latch and extending upon either side to the frame at any suitable point, as at d^3. When the pin is moved up or down it throws the latch in or out respectively. The slot is provided with angular ends d^7 in which the pin rests at its extremes of movements, and which co-act with the pin to lock the latch against movement on its pivot when the parts of the clutch strike against it. The latch is held in its normal inoperative position by the pin d^5 normally standing at the center of the tangential slot, and the latch may be returned to this position by any suitable means; for example, the movement of the rod d^4 in one direction by gravity will restore it from one extreme of its play, and a spring d^8 may be employed to return it from the other extreme, as by employing a collar d^9 between which and a suitable abutment, such as a portion of the frame, the spring is held. The collar may have a set screw, whereby its position on the rod may be adjusted when desired. This arrangement provides for balancing the latch or controller in its normal inoperative position, and for automatically returning it thereto from either direction.

With the parts in the positions of Figs. 2, 3 and 9, the members of the clutch are disengaged, and as the sleeve C revolves the projection or shoulder c^{18} does not contact with the latch. If now the latch be moved outwardly or away from the shaft, it will project the eccentric face d, on its outer surface or edge, into the path of the shoulder c^{18}, whereby the catch or trigger c^{13} is raised against the tension of its spring from engagement with the recess c^8, and the pin c^3 will be projected by its spring against the flange b' of the disk B, and as the sleeve C revolves in the direction of the arrows x the pin will pass down the incline b^5 into the seat b^2 to lock the sleeve and disk together and impart motion to the shaft A'. The latch is then returned to its normal position, and the parts of the clutch revolve together. When it is desired to open the clutch, the latch is moved inwardly toward the shaft, whereby the lateral cam d' on the face or side of the latch is thrown into the path of the angular shoulder c^7 of the pin c^3, whereby the pin will be retracted into its recess and the lug c^{16} on the trigger or catch will engage the channel c^8, thereby holding the pin in its retracted position and the parts of the clutch disconnected. The latch is then returned to its normal position, and the parts of the clutch remain unshipped.

The working face of the shoulder c^7 is preferably angular in order to form a more extended bearing against the cam d', where-

by the wear of the parts is lessened. The lug c^{16} of the catch is likewise beveled as at c^{17}.

The latch may be operated by electromagnetic means controlled by any suitable means, such as manually operated push-buttons, or by devices operated by the article or material in the machine. As shown in Figs. 1 and 2, the rod d^4 is suitably connected to an armature m, which is adapted to be actuated in different directions by the attraction of a pair of oppositely disposed magnets M and M′. It is obvious that when the starting magnet M is energized, as by suitably closing a circuit including its winding or coil and a suitable source of electrical supply, the rod is raised, and when the stopping magnet M′ is similarly energized, the rod is lowered, being returned to central or balanced position in the first instance by gravity and in the second instance by the action of the spring d^8. The ends of the magnet coils may be included in any suitable circuit adapted to be opened and closed by any suitable means, as, for example, the push buttons m' and m^2.

The form of latch disclosed in Figs. 1 and 2 is preferred, as, among other reasons, it is readily operated on account of the ease with which it may be moved on its pivot, and its weight is removed from the operating mechanism. This last fact is of importance where electromagnetic means are employed, as the burden of the armature is thereby greatly lessened, whereby magnets of less strength may be employed.

This application is a divisional case of my earlier application filed July 10, 1902, and bearing Serial Number 115,014.

Having described my invention, I claim—

1. In a clutch, the combination of a driving and a driven member, with means to connect and disconnect the members, a latch for reversely operating the said connecting means when in its extreme positions, and means whereby the latch is automatically balanced and maintained in an intermediate position.

2. In a clutch, the combination of a driving and a driven member, with means to connect and disconnect the members, an automatically balanced latch normally in inoperative position for operating the same, and electro-magnetic devices for oppositely moving the latch into operative positions.

3. In a clutch, the combination of a driving and a driven member, with means to connect and disconnect the members, a normally balanced pivoted latch for operating the same when reversely moved, and provided with a cam-slot, and a movable pin engaging the slot to move the latch.

4. In a clutch, the combination of a driving and a driven member, with means to connect and disconnect the members, a pivoted latch for operating the same, means to move the latch, and means to hold the latch when in active position against movement on its pivot due to the thrust of the co-operating parts of the clutch.

5. In a clutch, the combination of a driving and a driven member, with means to connect and disconnect the members, a pivoted latch for operating the same, a movable rod, and a pin and slot connection between the rod and latch to move the latter, the slot having angular ends to hold the latch in its extreme positions.

6. In a clutch, the combination with a driving and a driven member, of a triggered pin on the driving member to connect the members, a latch for protracting and retracting the pin, and means whereby the latch is automatically balanced and held normally in inoperative position.

7. In a clutch, the combination with a driving and a driven member, one of the members having a triggered pin and the other a seat for the pin, of a latch to release the pin when operated in one direction and to restore the pin when operated in the other direction, and means whereby the latch is automatically returned to and maintained in its inoperative position.

8. In a clutch, the combination with a driven member having a flange, a seat in the flange and an incline on the flange leading to the seat, a driving member having a recess, a pin in the recess in line with the flange and having a ledge or shoulder provided with a recess, a spring to protract the pin, a spring catch on the driving member having a lug to enter the recess and provided with a shoulder, of a pivoted latch having a stem, means to balance the latch in inoperative position, an eccentric face on the latch normally within the path of the shoulder of the catch and adapted to engage the shoulder to operate the catch when the latch is moved outwardly, and a cam on the latch normally beyond the shoulder of the pin and adapted to engage the shoulder to retract the pin when the latch is moved inwardly.

9. The combination with a driving and a driven member, one of the members having a triggered pin and the other a seat for the pin, of a pivoted latch to release the pin when moved in one direction and to restore the pin when moved in the other direction and which latch is provided with a cam slot, a rod having a pin engaging the cam slot, an electromagnetic device whose armature operates the rod, and means to close a circuit through the magnet.

10. The combination with a driving and a driven member, one of the members having a triggered pin and the other a seat for the pin, of a pivoted latch for moving the pin into and out of engagement with the seat

and having a cam slot terminating in angular ends, a slide rod having a pin engaging the slot, a pair of electromagnets for moving the rod in opposite directions, and means to close the circuit through the magnets.

11. The combination with a shaft, a clutch therefor, and a controller to open and close the clutch, of a pair of electromagnets having a common armature to operate the controller in opposite directions, means to close the circuit through the starting magnet, and means to close the circuit through the stopping magnet, each of such means being independent of the other.

12. The combination with a driving and a driven member, one of the members having a pin and the other a seat for the pin, of a latch controlling the pin and having a cam slot, a rod having a pin engaging the cam slot and which rod is automatically moved to return its pin to a position between the ends of the slot, a pair of electro-magnets to move the rod in opposite directions, and means for closing the circuit through the electro-magnets.

13. In a clutch, the combination with a driving and a driven member, one of the members having a spring pressed pin to couple the members, of a pivoted latch to release the pin when moved in one direction and to restore the pin when moved in the other direction and which latch is provided with a cam slot, and a sliding rod having a pin engaging the cam slot to move the latch.

14. In a clutch, the combination with a driving and a driven member, one of the members having a spring pressed pin to couple the members, of a pivoted latch to release the pin when moved in one direction and to restore the pin when moved in the other direction, and which latch is provided with a cam slot terminating in angular ends, an operating rod having a pin engaging the slot and normally occupying, and automatically returned to, a position intermediate the ends of the slot.

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

HOMER C. LA BATT.

Witnesses:

GEORGE R. HARBAUGH,

J. MCROBERTS.