(No Model.)

# W. R. McDONALD.

## FRICTION CLUTCH.

No. 333,143. Patented Dec. 29, 1885.

Fig. 1

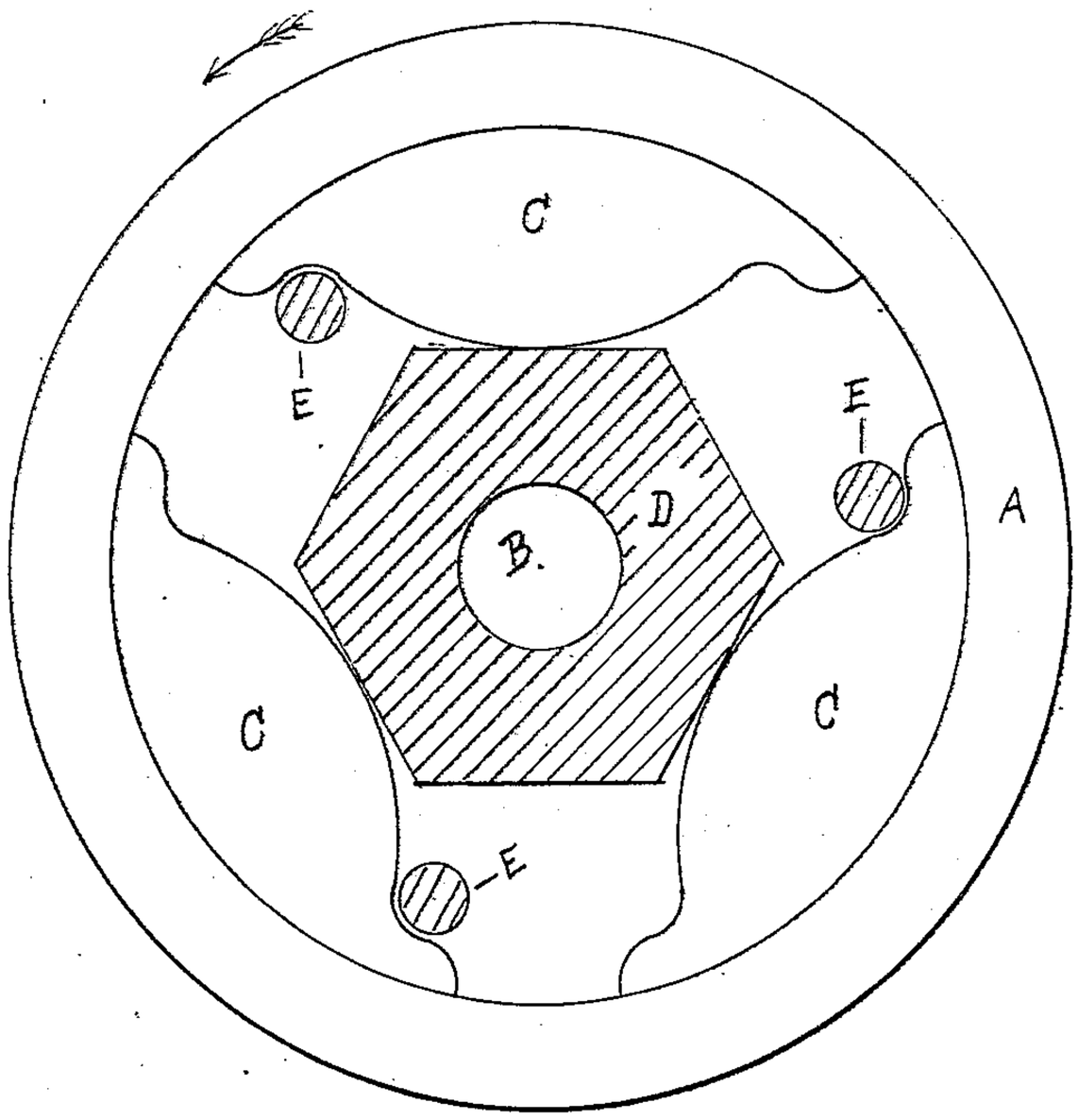
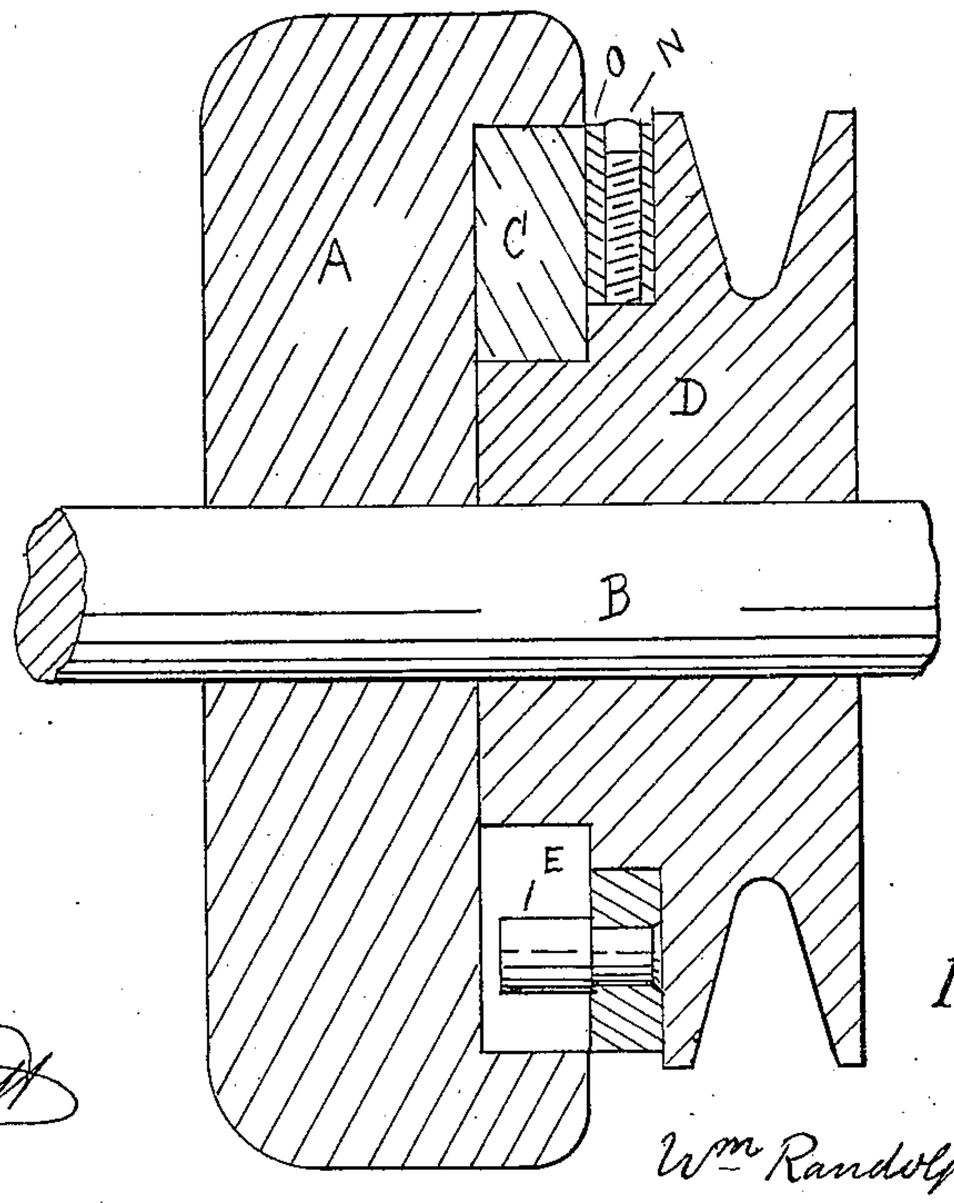



Fig. 2

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# UNITED STATES PATENT OFFICE.

WILLIAM RANDOLPH McDONALD, OF PORTLAND, MAINE, ASSIGNOR TO THE McDONALD MACHINE COMPANY, OF SAME PLACE.

## FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 333,143, dated December 29, 1885.

Application filed August 5, 1885. Serial No. 173,597. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM RANDOLPH McDONALD, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented a new and useful Friction-Clutch or Substitute for a Ratchet and Pawl, of which the following is a specification.

My invention relates to a new and improved friction-clutch or ratchet-and-pawl mechanism in which an oscillating rotary or a rectilinear reciprocating motion is converted into a uniform rotary motion in one direction without noise and with no lost motion. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of the clutch, showing part of the operating-pulley in section; and Fig. 2 is a longitudinal section of the whole clutch.

Similar letters refer to similar parts in both views.

The shaft B has on it the fixed wheel A, firmly fastened by a key or set-screw, and the actuating-pulley D, which rotates freely on the shaft B, and carries with it the ring O, with stop-pins E E E and the dogs C C C. The fixed wheel A has a recess in it to receive the dogs C C C and the hexagonal shaped portion of the pulley D, which acts as a carrier for the dogs C C C.

Parts of the clutch may be made of iron, steel, or other desirable metal.

It is obvious that rotation of the loose pulley D in any direction will force the dogs C C C outward against the ledge or rim of the recess in the fixed wheel A, and locking, by means of pressure with the wheel A, cause it and its shaft B to rotate in unison with the pulley D.

To prevent the rotation of the fixed wheel A and its shaft B in both directions, I have provided the stop-pins E E E, firmly fastened in the ring O, and held in position by one or more set-screws, as N.

To cause the uniform rotation of the shaft B and fixed wheel A in the direction indicated by the arrow, the stop-pins are brought into nearly the position shown in the drawings, and fastened there by means of the set-screw N. The pulley D being then turned in the direction of the arrow, the dogs C C C are forced outward, as previously stated, and locking with the wheel A and shaft B carry them with the pulley D. Reversing the motion of the pulley D, the dogs C C C are released from their pressure against the rim of the recess in the fixed wheel A, and before the pulley D can rotate far enough to again lock the dogs C C C on the backward motion the stop-pins E E E come into contact with the dogs and carry them around with the pins and pulley D, while the fixed wheel A and shaft B come to a state of rest, or from their acquired momentum continue in the direction of the arrow until again operated on by the rest of the clutch.

A motion in the contrary direction can readily be given the shaft B and fixed wheel A by unscrewing slightly the set-screw N and moving the ring O and stop-pins E E E until the stop-pins, traversing the open space between the dogs C C C, come into contact with the opposite sides of the dogs, when the ring being again fastened, and an oscillating motion given to the pulley D, the fixed wheel A and shaft B will rotate in a direction opposite to that indicated by the arrow.

In event of the flat surfaces of the carrier becoming worn, so as to affect the proper action of the clutch, the pulley D can be turned so as to bring the dogs to bear upon the now unoccupied sides of the carrier, thereby making the whole clutch more durable.

The groove K in the pulley D is intended for a round belt or cord to impart motion to the clutch; but other means—such as a lever or rack and pinion—will readily suggest themselves to attain the same end.

It will be noticed that, unlike many other devices for accomplishing the same purpose as this clutch, the pulley D is not wedged by the action of a single dog to the shaft B, thereby causing a loss of power in the effort required to dislodge it; but the pressure is divided equally among three or more dogs, leaving the pulley D concentric with the shaft B, and free to turn in an opposite direction when desired.

I prefer the hexagonal form of the carrier on the pulley D; but the action of the clutch will be the same if two, three, four, or any number of sides be given it, as in any case the

line of the side will be a chord of an arc of the rim or ledge of the recess in the fixed wheel A.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The dogs C C C, having two convex surfaces, one accurately fitting the periphery or ledge of the recess in the fixed wheel A, and the other resting upon a flat surface, which shall be a portion of a chord of an arc of the circle formed by periphery of the recess, substantially as set forth.

2. The carrier of the pulley, or lever, or pinion D, having a hexagonal shape or other shapes having rectilinear sides, substantially as shown.

3. The ring O, having the set-screw N and the stop-pins E E E, substantially as shown, and for the purpose specified.

4. The combination, in a friction ratchet-and-pawl mechanism, of the fixed recessed wheel A, the shaft B, the dogs C C C, the loose pulley D, having a portion of it shaped like a hexagon, and carrying the adjustable ring O and its set-screw N, with stop-pins E E E, all substantially as set forth.

WILLIAM RANDOLPH McDONALD.

Witnesses:
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