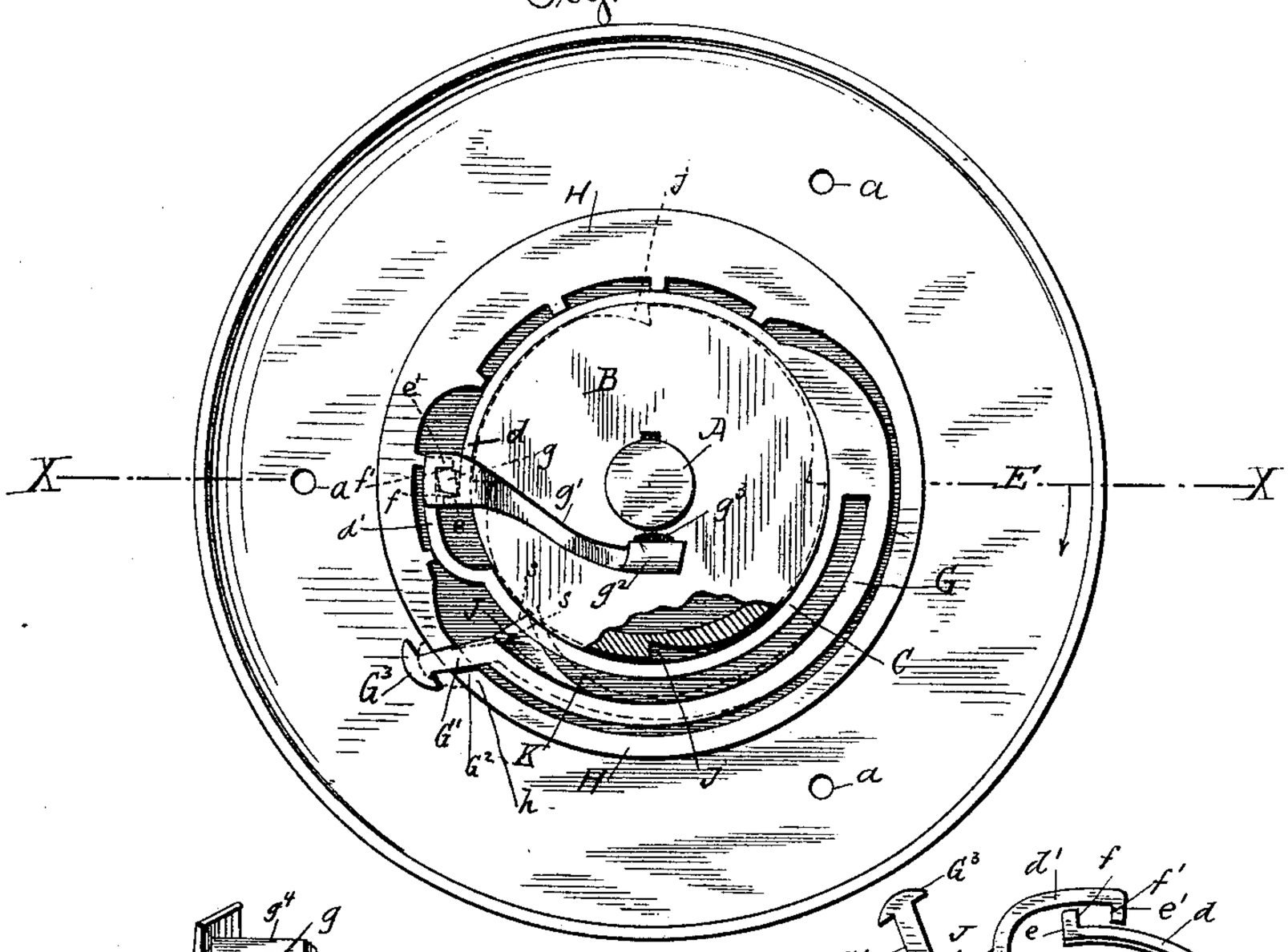
(No Model.) 2 Sheets—Sheet 1.

J. D. WESTGATE.

CLUTCH.

No. 386,948. Patented July 31, 1888.

Fig. 1.



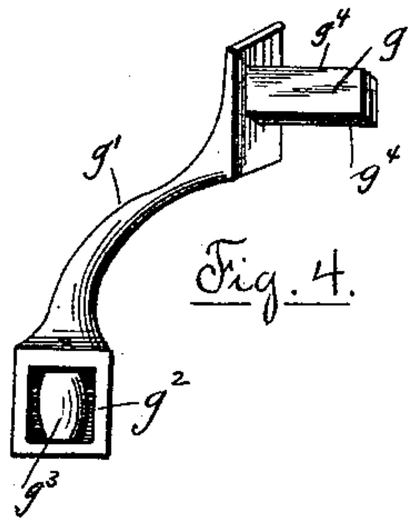


Fig. 4.

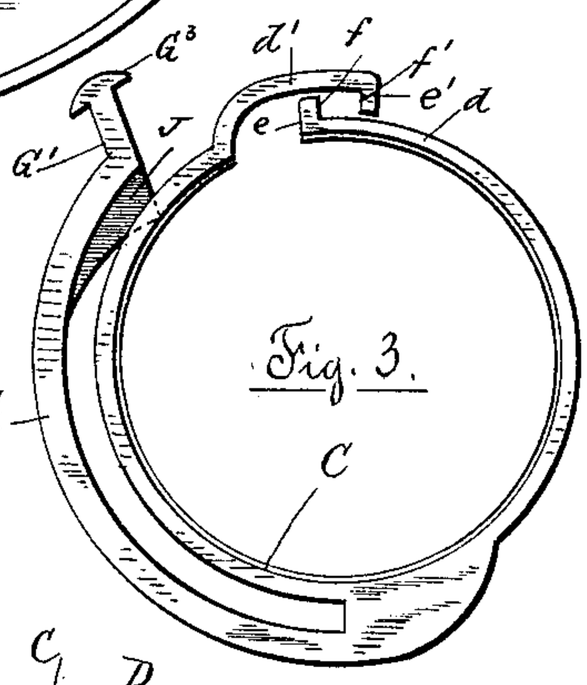


Fig. 3.

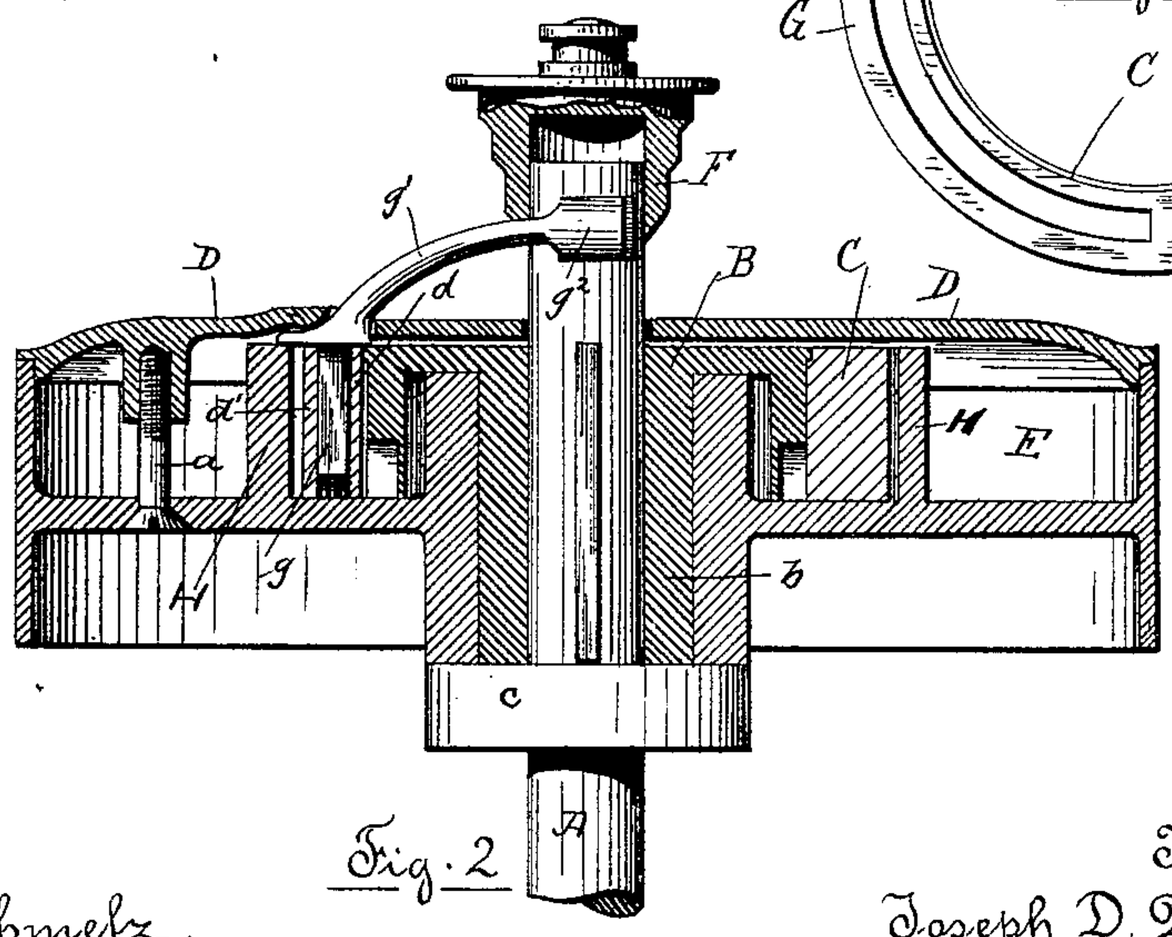


Fig. 2

Witnesses.
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Inventor,
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By his Attorney.
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(No Model.) 2 Sheets—Sheet 2.

J. D. WESTGATE.

CLUTCH.

No. 386,948. Patented July 31, 1888.

Fig. 5.

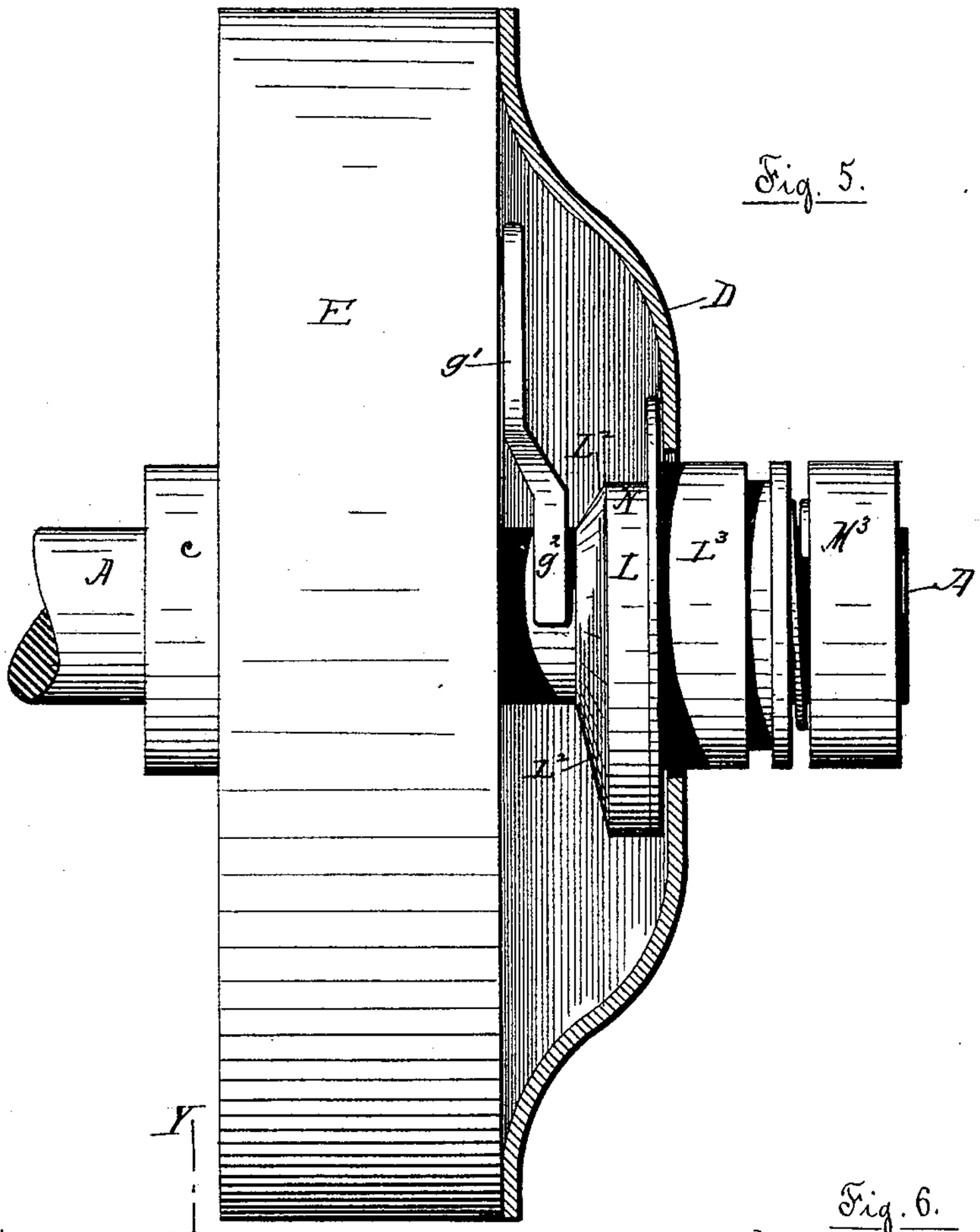


Fig. 7.

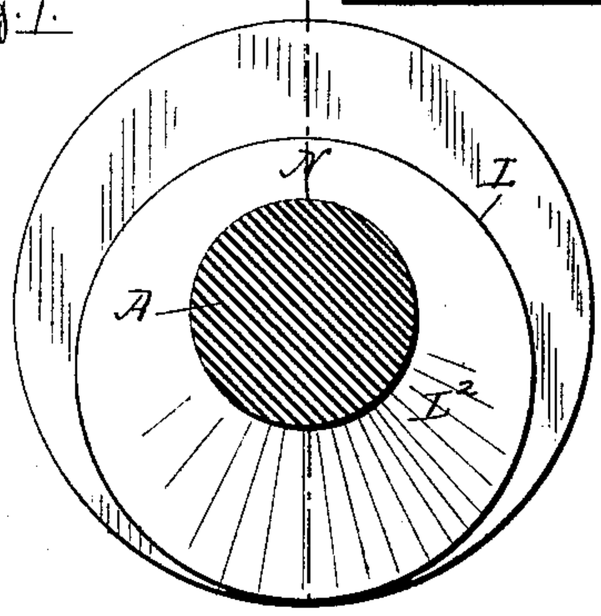
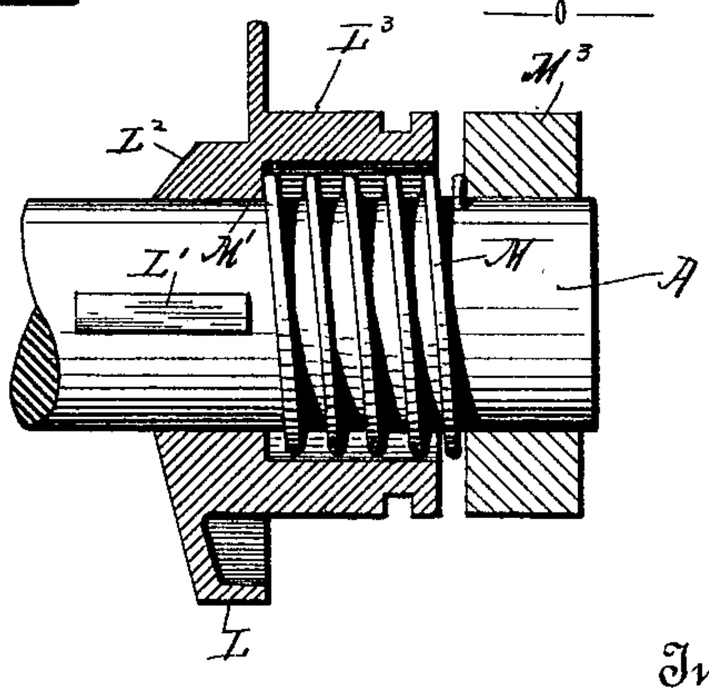


Fig. 6.



Witnesses.

Chas. F. Schmelz.

H. M. Fowler.

Inventor.

Joseph D. Westgate,

By his Attorney

Rufus Bennett Fowler.

UNITED STATES PATENT OFFICE.

JOSEPH D. WESTGATE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ARGALIS P. BUTLER, OF SAME PLACE.

CLUTCH.

SPECIFICATION forming part of Letters Patent No. 386,948, dated July 31, 1888.

Application filed December 5, 1887. Serial No. 256,963. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH D. WESTGATE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Friction-Clutches, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation with the inclosing-plate D removed. Fig. 2 is a central sectional view on line X X, Fig. 1. Fig. 3 shows a detached view of the friction ring or strap; and Fig. 4 is an elevation with the inclosing-plate D in section, and showing my improved means for actuating the clutch by means of an eccentric. Fig. 5 is a face view, a portion of the inclosing-plate D being removed to show the relation of the eccentric with respect to lever g', which it actuates. Fig. 6 is a sectional view of the actuating-eccentric on line Y Y, Fig. 7, and Fig. 7 is an end view of the actuating-eccentric.

Like letters refer to like parts in the several views.

My invention relates to a friction-clutch in which a friction-strap is compressed upon an interior drum attached to the shaft by suitable actuating mechanism, and in which the continued movement of the revolving pulley is made to operate a locking mechanism, by which the motion of the pulley is positively communicated to the shaft.

A denotes the shaft, upon which is fastened the drum B, about which I place the elastic friction ring or strap C.

D is a plate covering the side of the pulley E and attached to the web of the pulley by screws *a a a*. The pulley E runs loosely on the hub *b* of the interior drum, B, and is held in place by the collar *c*, attached to the shaft A. The elastic strap C is constructed as is usual in friction-clutches, and consists of a metallic ring open at one side, to allow the ends to be brought together, causing the ring to be compressed upon the outer surface of the interior drum, B. The means employed by me to effect the compression of the elastic ring I believe to be new.

The open ends of the ring are made to overlap each other at *d d'*, and each end is provided with a lug, *e e'*, at right angles to the ring, and presenting the opposing surfaces *f f'*, between which I place a bar, *g*, lozenge-shaped in its cross-section and having the bent lever g' attached to its outer end and carried over the center of the shaft A, the end g^2 of the bent lever having a roll, g^3, journaled in the end of the lever and with its surface projecting to rest upon the sliding cone F, which is capable of being moved on the shaft A by the ordinary shipping mechanism for the purpose of raising the end g^2 of the bent lever g' and rotating the lozenge-shaped bar *g*. The rotation of the bar *g* will cause its acute-angled corners g^4 to be brought against the opposing surfaces *f f'* of the lugs *e e'*, thereby drawing the ends *d d'* of the elastic friction ring or strap C together and compressing the strap upon the outer or friction surface of the drum B. To the friction-strap C, I attach an elastic strap, G, which extends concentrically partially around the friction-strap C, and is provided at its free end with a neck, G', at an oblique angle to a radius-line passing through the end of the strap G and indicated in Fig. 1 by the broken line *s*. The neck G' is held in an opening, G^2, in a flange, H, attached to the web of the pulley E, and outside the flange H is a head, G^3. A portion of the face of the drum B has a series of notches placed at equal intervals around the drum B and adapted to receive the tooth J, attached to the under side of the strap G.

The operation of the clutch is as follows: The sliding cone F is moved along the shaft A beneath the free end g^2 of the bent lever g', causing a partial rotation of the lozenge-shaped bar *g*, bringing the acute-angled corners g^4 against the opposing surfaces *f f'* of the lugs *e e'* and drawing the friction-strap C tightly on the surface of the drum B. This serves to hold the attached end of the strap G from rotating around the drum B, while the continued motion of the pulley E will cause the end *h* of the flange H to slide upon the oblique neck G' and carry the free end of the strap G inward toward the position indicated by the broken lines K, Fig. 1, and carrying the tooth J into the first succeeding notch *j* in the face of the drum B in case there is any movement of the friction-strap C around the drum B. Whenever the cone F is removed from beneath the end of the bent lever g', the friction-strap is

allowed to release its hold upon the surface of the drum B, and the elastic strap G will assume the position shown in Fig. 1 of the drawings, withdrawing the tooth J from the notches in the drum B. It will thus be seen that my improved clutch combines the features of a friction and a positive clutch. The first action of the clutching mechanism is to attach the strap C to the outer surface of the drum B by means of the friction between them, and the second action is to cause the continued motion, if there is any, to carry the tooth J into one of the notches in the drum and effect a positive engagement between the pulley and the drum, which, being attached to the shaft A, will cause the rotation of the pulley to be imparted to the shaft A.

I have thus far described the operation of the clutching mechanism as actuated by the sliding cone F, which is a usual and well-known method of actuating a friction-clutch; but I prefer to actuate the clutch by means of the device which is shown in Figs. 5, 6, and 7 of the drawings, in which E denotes the pulley and g' the bent lever by which the elastic friction-strap C is made to engage the drum B in the same manner as already described; but instead of a sliding cone, F, I employ an eccentric, L, capable of a sliding motion on the shaft A, but made to rotate with the shaft by means of a spline, L′. The edge of the eccentric is beveled at L^2, in order to cause it to pass readily beneath the end g^2 of the bent lever g'. A grooved hub, L^3, extends from the side of the eccentric L to receive a shipper in the usual manner, and within the hub L^3, I place a spiral spring, M, acting against a shoulder, M′, on the eccentric and a collar, M^3, on the shaft A. When the spiral spring is employed, the shipper must of course be locked in position to hold the spring M from carrying the sliding eccentric beneath the end of the bent arm g'. When it is desired to operate the clutch, the shipper is released, allowing the spiral spring M to carry the eccentric L against the end of the bent arm g', pressing the beveled side L^2 of the eccentric against the end of the arm until the arm g' is brought by the rotation of the pulley opposite the thinner side N of the eccentric, when the eccentric L will be carried beneath the end g^2 of the bent arm g'. As the arm g' is then carried around the eccentric L by the rotation of the pulley E, it will be carried upon the thicker side of the eccentric, raising the arm and actuating the friction-strap in the manner already described. A very slight spring is required to carry the eccentric beneath the end of the bent lever when the end g^2 arrives at the thinner side N of the eccentric, and the lever is then raised by the rotation of the shaft itself.

The "throw" of the eccentric should be greater than is required to raise the end of the bent lever g', in order to allow for any lost motion or wear of the parts.

I do not herein claim, broadly, the combination of a friction and a locking clutch, as such was shown in my application, Serial No. 237,932, filed May 12, 1887.

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

1. In a clutch, the combination, with a shaft, and a friction-drum provided with notches and attached to said shaft, of a revolving pulley provided with a slotted flange and having a concentric motion around the axis of said shaft, a friction-strap having connected operative mechanism, substantially as described, by which it is compressed around the outer surface of said friction-drum, an elastic arm integrally attached at one end to said friction-strap, and having at its free end a tooth adapted to engage the notches on said friction-drum, and an oblique neck held in the slotted flange of said pulley, substantially as described.

2. In a clutch, the combination, with a shaft, of a drum attached to said shaft, a friction-strap capable of being compressed on said drum, an elastic strap with one end integrally attached to said friction-strap, and the other end connected with the revolving pulley, and a revolving pulley whose motion is imparted to said drum through said elastic strap and said friction-strap, substantially as described.

3. In a clutch, the combination, with a shaft, of a drum attached to said shaft, a friction-strap inclosing said drum and provided with overlapping ends and lugs presenting opposing surfaces, a bar inclosed in and held by said overlapping ends and lugs, a lever attached to said bar and placed at an angle therewith, and a sliding cone, all arranged and operating substantially as described.

4. In a clutch, the combination, with an elastic friction-strap having connected actuating mechanism, substantially as described, and embodying a lever extending over the shaft, of an eccentric rotated by the shaft and capable of sliding thereon, substantially as described.

5. In a clutch, the combination, with a lever extending over the shaft and having connected clutching devices, substantially as described, whereby the rotary motion of the pulley is imparted to the shaft, or vice versa, of an eccentric capable of sliding on the shaft but held from rotating thereon, by which said lever is raised radially from the shaft and the clutching devices operated thereby, substantially as described.

6. In a clutch, the combination, with clutching devices, substantially as described, whereby the rotation of a pulley is imparted to a shaft, or vice versa, of a lever extending over the shaft and operatively connected with said clutching devices, mechanism by which said lever is actuated through a sliding motion on the shaft, and a spring applied to said actuating mechanism, whereby it is moved along the shaft and beneath said lever, substantially as described.

7. In a clutch, the combination, with mech-

ānism by which a rotating pulley is made to engage its shaft, or vice versa, of an eccentric capable of sliding on the shaft but held from turning thereon, said eccentric having a beveled edge and connected devices, substantially as described, whereby it is moved on the shaft, substantially as described.

8. The combination, with a friction strap and an operating-lever by which said strap is operated, of the eccentric L, provided with a beveled edge, L^2, spring M, collar M^3, and connected devices, substantially as described, by which said eccentric is moved against said spring, substantially as described.

JOSEPH D. WESTGATE.

Witnesses:
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H. W. FOWLER.