(No Model.)

J. D. WESTGATE.

FRICTION CLUTCH.

No. 386,947. Patented July 31, 1888.

Fig. 2.

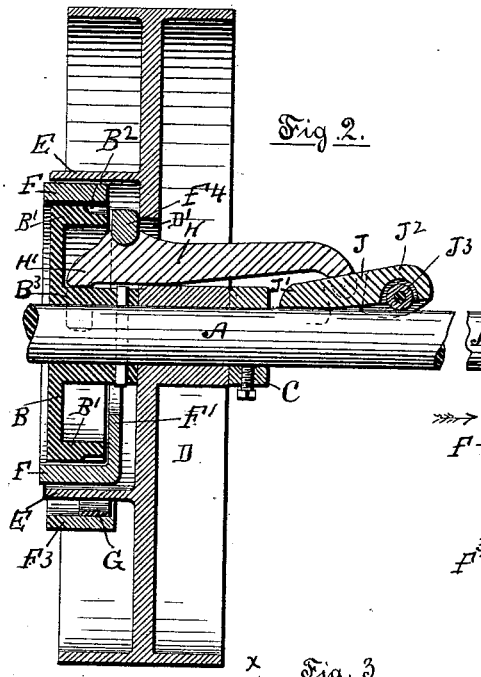


Fig. 1.

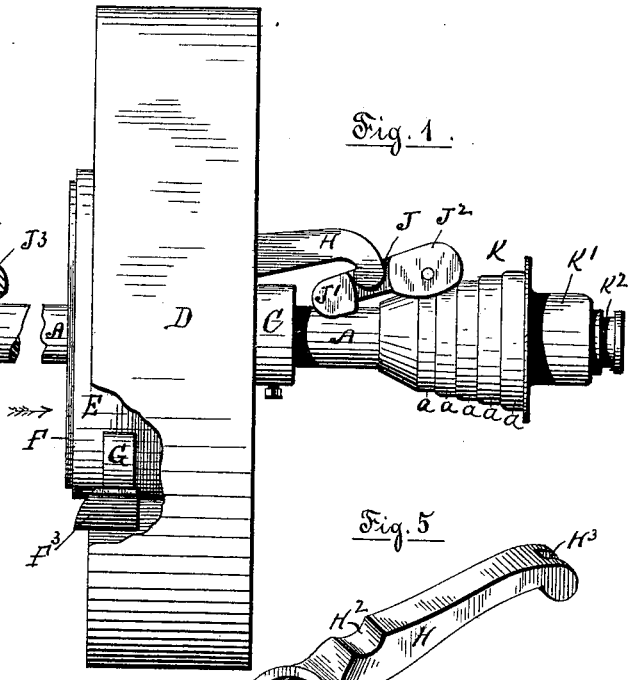


Fig. 5

Fig. 3.

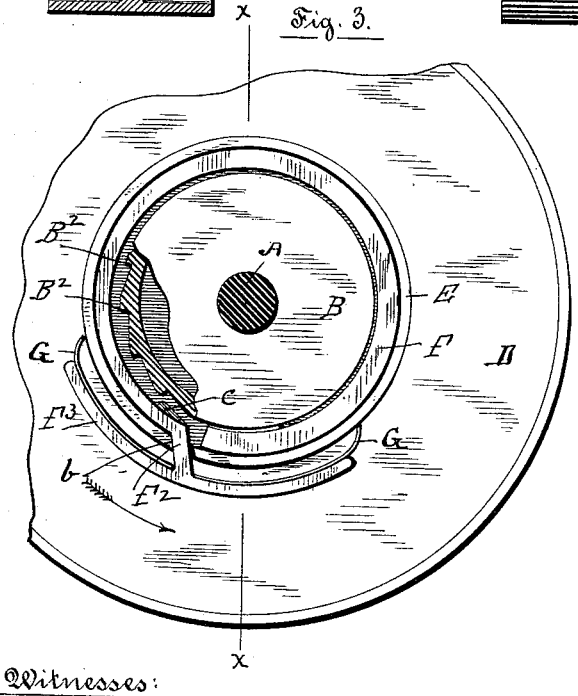
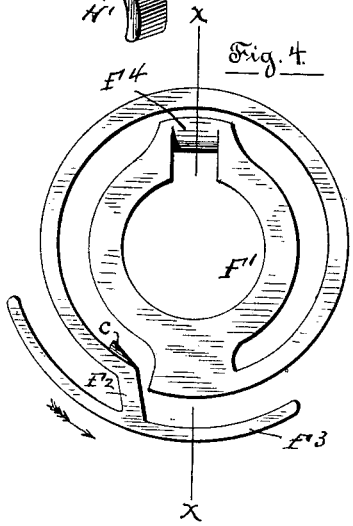


Fig. 4.



Witnesses:

Chas. F. Schmelz.

Rufus B. Fowler.

Inventor:

Joseph D. Westgate.

UNITED STATES PATENT OFFICE.

JOSEPH D. WESTGATE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS TO ARGALIS PEASE BUTLER, OF SAME PLACE, AND ELISHA YOUNG BUTLER, OF BOSTON, MASSACHUSETTS.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 386,947, dated July 31, 1888.

Application filed May 12, 1887. Serial No. 237,932. (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 Clutches, of which the following is a specification, reference being had to the accompanying drawings, forming a part of the same, and illustrating a clutch embodying the features of my invention, and in which—

Figure 1 is an elevation of my improved clutch applied to a shaft and revolving pulley. Fig. 2 is a central vertical sectional view of the same, the line of section being indicated in Figs. 3 and 4 by the lines X X. Fig. 3 is a side view of a portion of the pulley as viewed in the direction of the arrow, Fig. 1, and having a part of the flanged disk attached to the shaft shown in sectional view in order to disclose its toothed flange. Fig. 4 is a detached view of the elastic friction or clamping strap, and Fig. 5 is a detached and perspective view of the clamping-lever.

Similar letters indicate similar parts in the several views.

My invention relates to a clutching device, by which a shaft and a pulley placed loosely thereon may be engaged or disengaged, so the continuous rotary motion of one may be imparted intermittently to the other, and this result is secured by means of the mechanism hereinafter described.

In the accompanying drawings, A denotes a shaft having attached thereto a disk, B, and a collar, C, between which the pulley D runs loosely on a shaft rotated in the direction indicated by the arrow in Fig. 3 by means of power applied to its periphery. The disk B is provided with a flange, B′, forming a cylindrical surface to receive the contact of the friction-strap, and having on its inner edge a series of ratchet-shaped teeth, B^2. Integral with the spokes, or, as shown in the drawings, to the web of the pulley, is a flange, E, which I prefer to extend entirely around the flange B′, forming an inclosing shell or case. Between the two flanges B′ and E is an elastic strap, F, with one end attached to or, as shown in the drawings, integral with a yoke, F′, and its opposite end connected with the outer flange, E, by means of the neck F^2, forming an oblique angle with the strap F and extending through an opening or slot in the outer flange, E, terminating in the arc-shaped flange F^3, between which and the outer flange, E, is a blade-spring, G, with its ends bent sharply downward against the outer surface of the flange E, and serving by its tension to hold the flange F^3 away from the flange E. A lever, H, with its flanged end H′ resting on the hub B^3 of the disk B as a fulcrum, is carried through the curved yoke F′, the notch H^2 forming a seat for the bar F^4 of the yoke. The lever H passes through an opening, D′, of the web of the pulley D. The outer end of the lever H is slotted, as at H^3, to receive the neck of the lever J, whose shorter arm, J′, rests on the shaft A as a fulcrum, and its longer arm, J^2, carries a roll, J^3, beneath which the sliding cone K is moved whenever it is desired to so unite the shaft A and pulley D that the rotary motion of the latter shall be imparted to the shaft. The sliding cone K is operated by a shipper applied to the annular groove K^2 in the usual manner. The surface of the cone consists of a series of steps, *a a*, which are successively brought beneath the roll J^3 until the requisite strain is brought upon the friction-strap F.

The operation of my improved clutch is as follows: While the sliding cone K is removed from beneath the roll J^3, the outer or long arm of the lever H is allowed to fall in the position seen in Fig. 2, and the elastic strap F will maintain its normal position, with its interior diameter slightly greater than the outer diameter of the flange B′, and with the arc-shaped flange F^3 raised from the outer surface of the exterior flange, E, as shown in Fig. 3. The rotation of the pulley D in the direction of the arrows shown in Fig. 3 will carry the elastic strap F and its connected levers H and J around the shaft A. By sliding the cone K beneath the roll J^3 and raising the outer end of the lever H the yoke F′ is raised, and the end of the strap F, connected to, or, as shown in the drawings, integral with the bail, is brought firmly against the outer surface of the flange B′, the friction of the strap F upon the

surface of the flange B′ checking the rotation of the strap F around the flange B′. As the friction-strap F is thus held from turning around the flange B′, the continued rotary motion of the pulley D will cause the end *b* of the flange E to slide on the oblique neck F^2, thereby carrying the end of the friction-strap F inward, increasing the friction of the strap F upon the surface of the flange B′ at the same time by the movement of the pulley D around the elastic strap F, the end *b* of the flange E, sliding upon the oblique neck F^2, will carry that end of the strap F inward and cause the tooth *c* on the inner surface of the strap to engage one of the ratchet-shaped teeth B^2 on the outer surface of the flange B′ and effect a positive engagement of the flange E by the strap F, at the same time compressing the blade-spring G and causing the arc shaped flange F^3 to rest on the outer surface of the flange E. As the cone K is again removed from beneath the roll J^3, the outer end of the lever H is allowed to fall, releasing the connected strap F from its contact with the flange B′, when the tension of the blade-spring G will raise the arc-shaped flange from off the flange E in the position shown in Fig. 3. In Fig. 2 the lever H is shown as fulcrumed on a hub, B^3, of the disk B; but in case the hub is placed on the outer side of the disk the lever can rest directly upon the shaft with precisely the same results. The action of the sliding cone K will also raise the lever H in case the secondary lever J is omitted, as such a construction is frequently seen in clutches of this class. I have also shown the sliding cone K having a sleeve, K′, closed at its outer end, which is allowable in the case of looms and such machines as permit the cone to be applied at the end of the shaft. In other cases the sleeve may have the shaft extending through, with an annular groove on its outer surface to receive the fork of the shipper. The use of an elastic strap or band having connected actuating mechanism by which it is made to engage an opposing surface by friction is common in "friction-clutches," so called, and the employment of a sliding cone operating the elastic strap through some connecting device is also common. Such I do not claim, broadly.

In my present invention some features are embodied which I believe to be new in devices of this class. The elastic strap is connected at one end with the rotating part of the machine, and in operation the actuating devices, in the present case consisting of the sliding cone and lever H, only serve to secure the initial friction between the elastic strap and the flange B′, the rotation of the pulley through its connection with the opposite end of the strap F tending to produce a firmer contact of the strap F and flange B′. My device also secures an engagement of the rotating pulley and shaft by both a friction and a positive engagement, the frictional engagement preceding the positive, and thereby checking any sudden jarring of the operating parts of the machine, which might otherwise be caused by engagement of the positive clutch. I also employ a secondary lever, J, with its short arm resting on the shaft, or other rigid fulcrum, and its longer arm actuated by the cone. The cone is also provided with a series of steps, each one causing a positive and determinate lift of the lever H, and when the roll is brought upon one of the steps there is no tendency of the lever to push the cone away.

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

1. In a clutch, the combination of a shaft, a disk attached to said shaft and having a flange provided with teeth, a pulley running loosely around said shaft, a friction-strap provided with a tooth or spur, and an oblique neck acted on by said pulley to carry said tooth or spur into engagement with the teeth on said flange, substantially as described.

2. In a clutch, the combination, with frictional clutching devices, substantially as described, and a sliding cone, of the secondary lever J, as and for the purpose set forth.

3. In a clutch, the combination, with a shaft, and a pulley running loosely on said shaft, of a disk attached to said shaft, and having a friction-flange, a friction-strap surrounding said flange and having one end connected with said pulley, and a yoke integral with the opposite end of said strap, and by which it is connected with an operating-lever, and said operating-lever, substantially as described.

4. In a clutch, the combination, with a shaft, and a pulley running loosely around said shaft, and provided with a flange, E, of a disk attached to said shaft, and having a flange, B′, a friction-strap, F, having parts F′ F^2 F^3 *c*, a spring, G, and connected operating-lever H, substantially as described.

5. In a clutch, the combination, with a shaft, and a pulley running loosely on said shaft, and frictional clutching devices by which said pulley and shaft are united, substantially as described, and a cone sliding on said shaft, of a secondary lever, J, with its shorter arm fulcrumed on said shaft and its longer arm having a roll, J^3, as and for the purpose set forth.

JOSEPH D. WESTGATE.

Witnesses:

ARGALIS P. BUTLER,

RUFUS B. FOWLER.