(No Model.)

W. S. ROGERS.

FRICTION CLUTCH.

No. 597,434. Patented Jan. 18, 1898.

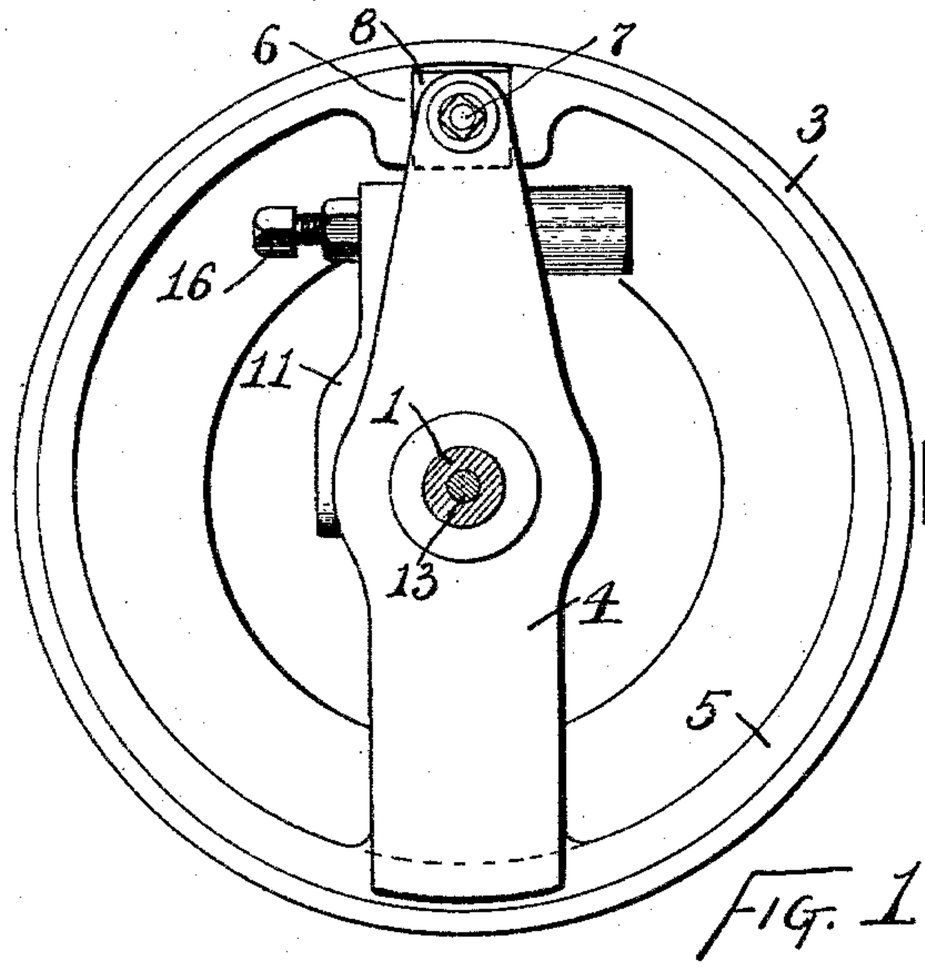

FIG. 1.

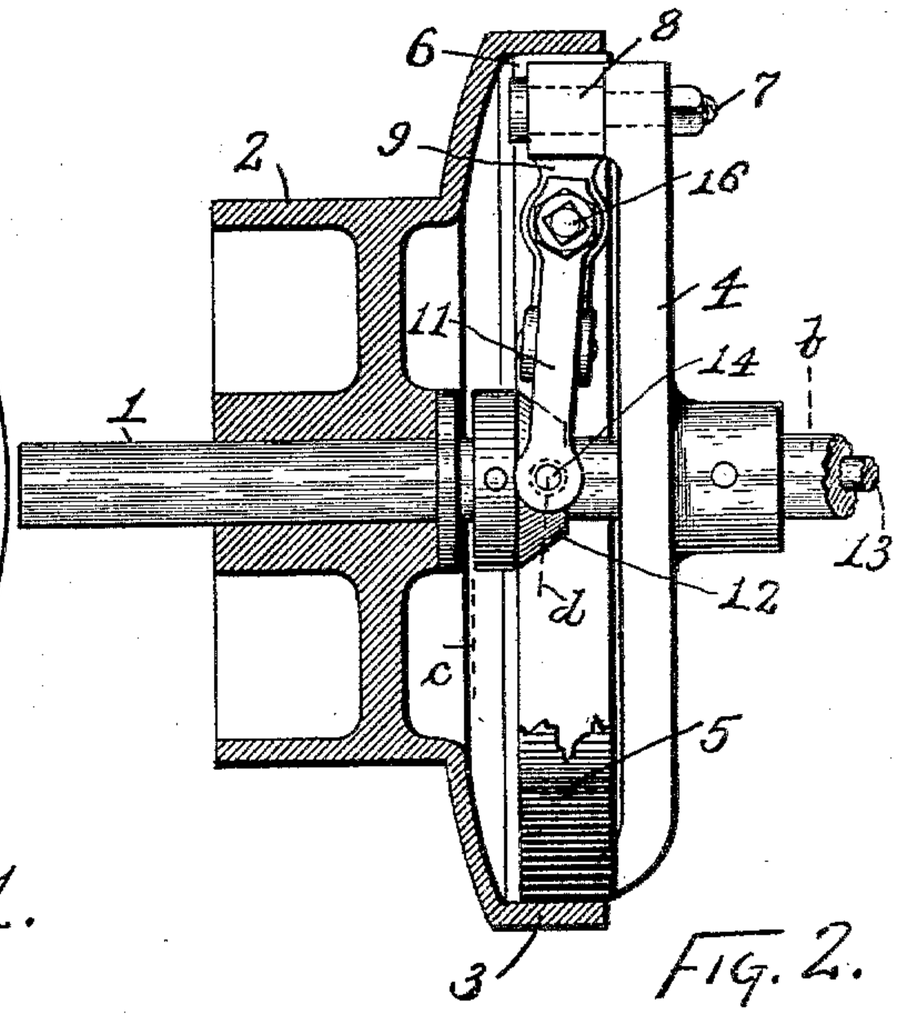

FIG. 2.

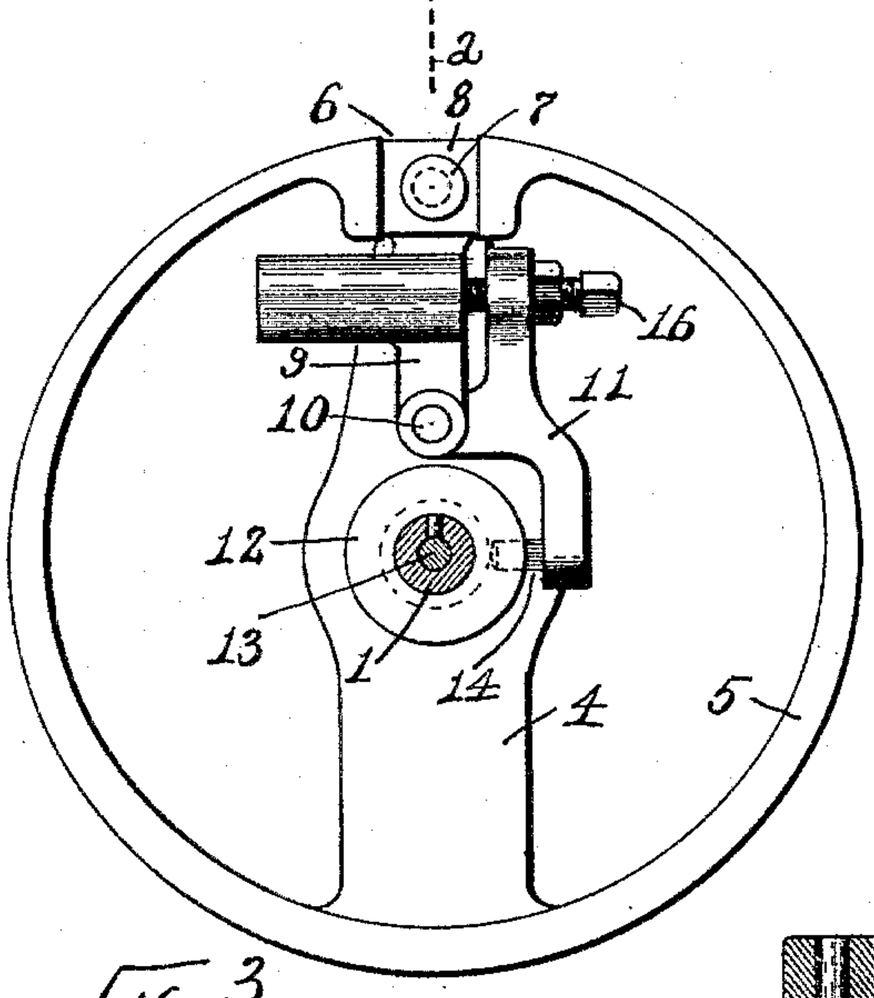

FIG. 3.

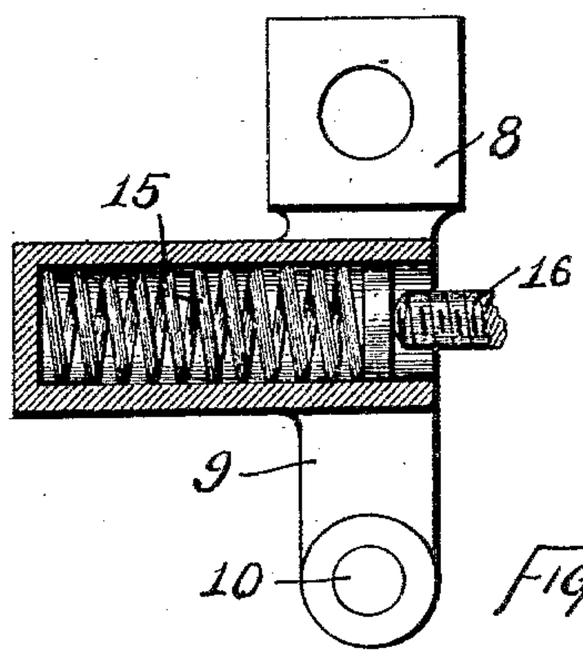

FIG. 4.

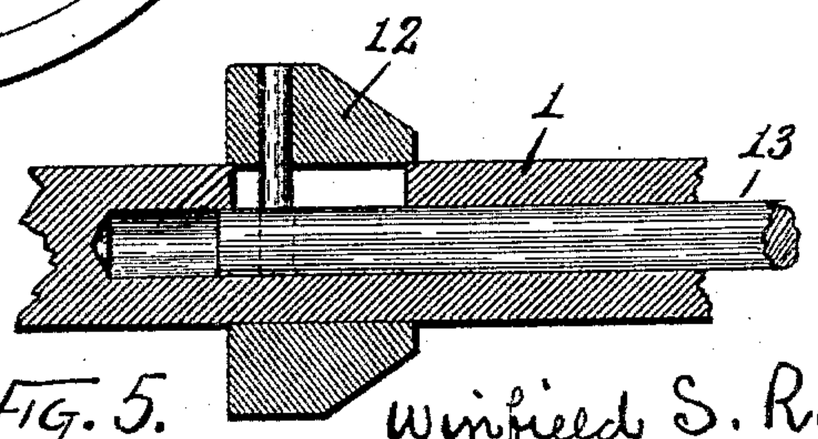

FIG. 5.

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UNITED STATES PATENT OFFICE.

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FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 597,434, dated January 18, 1898.

Application filed April 12, 1897. Serial No. 631,674. (No model.)

To all whom it may concern:

Be it known that I, WINFIELD S. ROGERS, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification.

This invention pertains to improvements in the mechanism for throwing friction-clutches into action and maintaining them in action; and the improvements will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a view of the front face of a typical friction-clutch embodying an exemplification of my invention, the shaft appearing in vertical section in the plane of line *b* of Fig. 2; Fig. 2, a diametrical section of the clutch in the plane of line *a* of Figs. 1 and 3; Fig. 3, an elevation of the rear face of the clutch, the pulley and friction-rim being removed, the shaft appearing in vertical section in the plane of line *c* of Fig. 2; Fig. 4, a detached view of the cam-lever as seen in Fig. 3, but shown on an enlarged scale, its spring-socket appearing in vertical section in the plane of line *d* of Fig. 2; and Fig. 5, a vertical longitudinal section of the shifting-cone in the plane of line *a* of Figs. 1 and 3.

In the drawings, 1 indicates the shaft; 2, a pulley loose thereon; 3, a friction-rim carried by the pulley and designed to be frictionally engaged by the clutching devices when the pulley is to be locked to the shaft; 4, a double-ended arm fast upon the shaft; 5, a friction-ring carried by one end of arm 4, the exterior of this ring fitting freely within the interior of friction-rim 3; 6, a gap in the friction-ring 5 at the point opposite that where arm 4 is attached to the friction-ring, the friction-ring thus presenting the aspect of an open ring capable of expansion and contraction, the drawings showing the ring as having its interior eccentric to its exterior, so as to equalize the springing of the ring; 7, a pivot carried by one end of arm 4 at the gap in the friction-ring; 8, a cam-block mounted on pivot 7 and engaging between the contiguous ends of the friction-ring at the gap 6, so that a partial rotation of the cam-block will tend to expand the friction-ring, and 9 a cam-lever projecting inwardly from cam-block 8 to serve in turning the cam-block to active or inactive position.

As thus far described we have an ordinary friction-clutch merely typical of the general class of clutches to which my improvements to be described are applicable. Normally the friction-ring is in non-expanded condition, and friction-rim 3 may run freely with reference to the friction-ring, and the shaft and pulley 2 may thus turn independently of each other; but if cam-block 8 be turned then the friction-ring will be expanded against the interior of the friction-rim and pulley 2 and the shaft will become frictionally locked together and will turn together, and when the power which turned the cam-block to active position is relaxed then the natural inward spring of the friction-ring will restore the friction-ring to non-expanded condition, and the pulley and shaft will be freed from each other. All this is as usual; but in the ordinary construction of friction-clutches the power for expanding the friction-ring or equivalent friction element of the clutch is transmitted through rigid means, and consequently the working of the clutch is apt to result in shocks and in damage to the friction-surfaces. I provide for a yielding transmission of the power which sets the clutch into action.

Proceeding with the drawings, 10 indicates a pivot carried by the inner end of cam-lever 9; 11, a sublever mounted on pivot 10 and having its inner end projecting downwardly alongside the shaft to form the tail of the cam-lever; 12, the usual cone sliding on the shaft and serving to rock the cam-lever; 13, a sliding rod disposed axially within the shaft and connected with cone 12 and serving to illustrate an exemplifying means for permitting the cone to be shifted when the clutch is to be engaged or disengaged; 14, a pin projecting inwardly from the tail of the cam-lever and engaging the surface of the cone, this pin being merely an expedient arming of the tail of the cam-lever; 15, a spring carried by cam-lever 9, and 16 a screw with its thread engaging the upper end of sublever 11, its inner end abutting against spring 15.

It will be observed that parts 9 and 11 form the cam-lever and that by reason of pivot 10

and spring 15 that lever is rendered flexible, the tension of the spring being adjustable by means of screw 16.

If now while the clutch is in disengaged condition cone 12 be thrown to full active position, then sublever 11 will be thrown to full active position. Cam-lever 9 will also be thrown, and the clutch-ring 5 will be expanded and the clutch will go into engagement; but it does not follow that the clutch-ring takes on its full or working degree of expansion. The clutch-rim 3 may slip more or less upon the clutch-ring, the shaft and the pulley thus not at once becoming unified in their rates of motion; but spring 15 is acting on cam-lever 9 and the slipping of the friction elements produces heat, and eventually the force of the expansion of the friction-ring under the urgency of spring 15 will cause the friction of the clutch to be sufficient to cause the pulley and shaft to move as a unit. By this means shock is avoided as is also the damaging of the friction-surfaces. By this system a heavy high-speeded machine—as, for instance, a centrifugal machine—may be started from a condition of rest and pick up this motion gradually and in a satisfactory manner not possible with friction-clutches in which the power to enforce the gripping is transmitted through rigid devices. It is quite common in friction-clutches to have springs to effect the releasing of the clutch when the gripping power is removed, but such springs are entirely apart from the office of spring 15 and are merely the equivalent of the inwardly-springing capacity of friction-ring 5 when the gripping power is removed.

The old springs referred to resist the action of the grip-applying mechanism without having any effect on the ultimate gripping action, their office being to act when the clutch is released. Such a spring-provided clutch is illustrated, for instance, in Patent No. 150,653. I disclaim such springs. In my device the spring has no tendency to release the clutch or to hold it released and its office is to act while the clutch is being gripped and after it is gripped.

Having explained the principle of my invention, I would add that the drawings and description set forth merely an exemplification showing the best mode in which I at present contemplate applying that principle.

I claim as my invention—

1. In a friction-clutch, a friction member normally loose upon the shaft, a friction member connected to and turning with the shaft, and yielding means interposed between said friction members for throwing the friction elements into contact, substantially as described.

2. In a friction-clutch, a friction member normally loose upon the shaft, a friction member connected to and turning with the shaft, a yielding lever interposed between said friction members to throw the said frictional elements into contact, and means for operating said elements, substantially as described.

3. In a friction-clutch, a friction member normally loose upon the shaft, a friction member connected to and turning with the shaft, and a controlling device acting upon one of said members to throw it into frictional contact with the other members, operating means for said controlling device, and yielding mechanism between the controlling device and said operating means, substantially as described.

4. In a friction-clutch, a friction member normally loose upon the shaft, a friction member connected to and turning with the shaft, and a controlling device acting upon one of said members to throw it into frictional contact with the other members, a yielding lever connected to said controlling device, and means for operating said lever, substantially as described.

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