

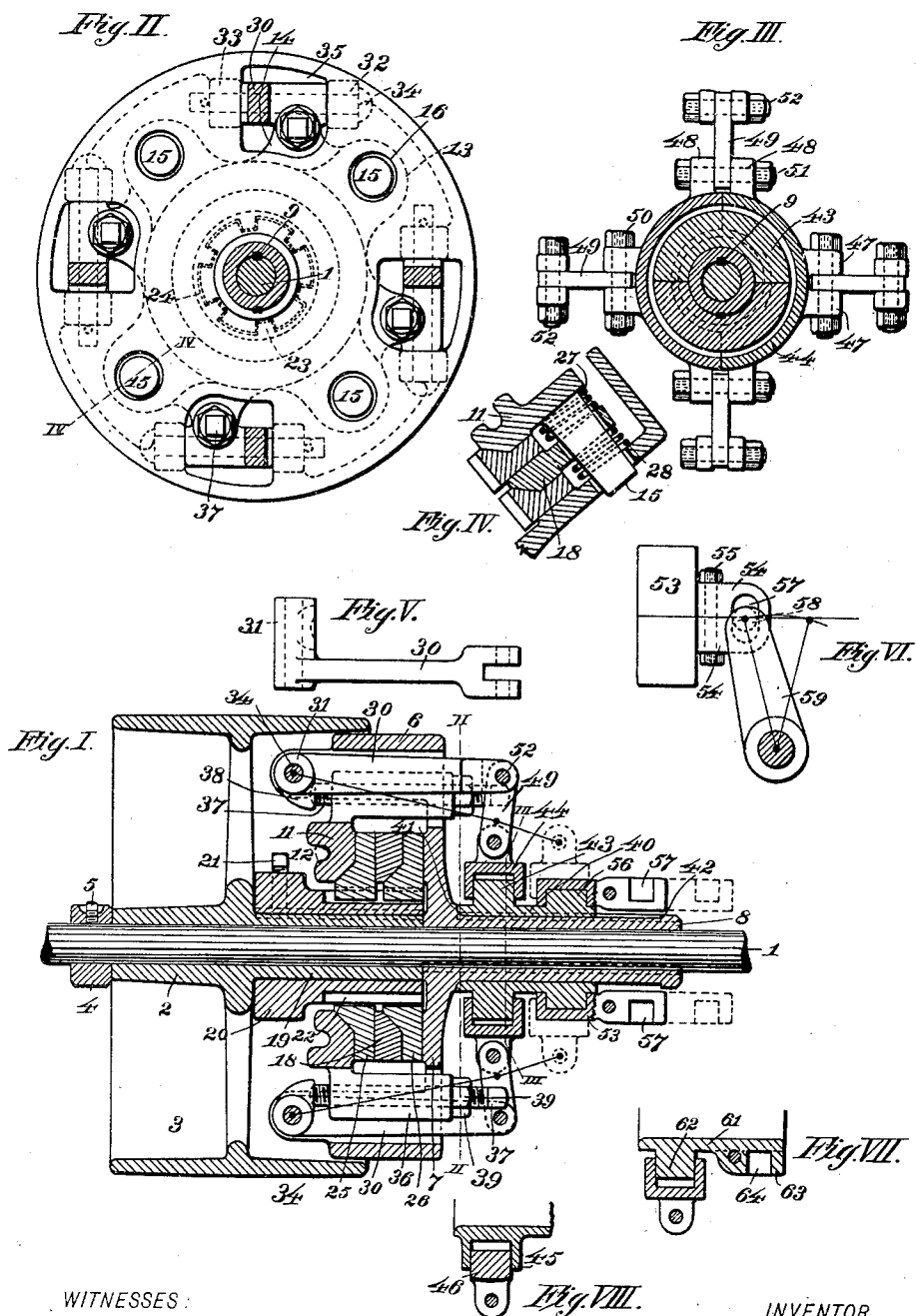
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E. V. FAUCETT.
FRICTION CLUTCH.

(Application filed Aug. 2, 1900.)

(No Model.)



WITNESSES:

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FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 681,847, dated September 3, 1901.

Application filed August 2, 1900. Serial No. 25,703. (No model.)

To all whom it may concern:

Be it known that I, EUGENE V. FAUCETT, of Wilmington, in the county of Newcastle, State of Delaware, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to produce improvements in friction-clutches by which the power and durability of the clutch are augmented, facility of operation is promoted, and equality of distribution of wear upon the abrasive surfaces of the frictional or contact-making members is secured. Such being a statement of the general scope and object of my invention, its more particular features will be hereinafter described in detail and will be succinctly set forth in the appended claims.

In the accompanying drawings, Figure I is a central longitudinal section of my clutch mounted upon its shaft, the shaft and some of the clutch members being shown in full lines. Fig. II is a section on the line II II of Fig. I looking toward the clutch-case, the adjustment-screws being shown in full lines and the pulley omitted. Fig. III is a section as on the line III III of Fig. I, the clutch-case, with the members contained therein, being omitted. Fig. IV is a partial section on the line IV IV of Fig. II. Fig. V is a side elevation of one of the actuating-levers detached. Fig. VI is a detail view illustrating in side elevation the thrust-collar and actuating-lever assembled therewith. Fig. VII is a detail view showing a substitute for my thrust-collar with the equalizer-collar. Fig. VIII illustrates in like manner a slight variation of the detail of the equalizer-collar, the male and female parts being interchanged.

Referring to the numerals on the drawings, 1 indicates, by way of example, any rotatory shaft, upon which is loosely mounted the hub 2 of the pulley 3, the longitudinal movement of the hub upon the shaft in one direction being fixed, as by a collar 4, secured to the shaft, as by a set-screw 5. Upon the end of the hub 2 opposite the collar 4 is mounted my clutch mechanism, which in its preferred form of embodiment comprehends a case comprising a peripheral rim 6, a web 7, and

a preferably elongated sleeve 8. The sleeve 8 supports the case upon the shaft 1, to which it is fixed, as by one or more keys 9. I prefer to make the periphery of the rim 6 smooth and unobstructed, so that it may fit snugly within but out of contact with the pulley 3. Within the case above described I provide a plurality of frictional or contact-making members, part of which are assembled on the case and part of which are assembled with the pulley-hub 2. This means constitutes an exceedingly compact and desirable arrangement for coöperatively uniting the several members of the machine. To this end I employ a movable friction-ring 11, preferably provided with annular stiffening-ribs 12 and around its periphery with a series of lugs 13 and 14. (Clearly shown in Fig. II of the drawings.) Each of the lugs 13 (see Fig. IV) is provided with a pin 15, preferably tapered, which, collectively engaging with their respective apertures in the web 7, afford at the same time means for supporting the ring 11 concentrically with the clutch-case or its shaft 1 and for permitting movement of the ring 11 from and toward the web 7 of the clutch-case. The pins 15 also conjointly support an intermediate friction-ring 18. The two rings 11 and 18, coöperating with the inner surface of the web 7, afford means for making frictional contact and consequent union with a member carried upon the shaft 1, as upon the hub 2. For some purposes it might be sufficient to employ only a single intermediate member upon the hub 2 in connection with the web 7 and the ring 11, working to and from the same. For practical reasons, however, I prefer, also, as above specified, to employ the intermediate ring 18, and upon the hub 2, for example, a plurality of friction-disks working, respectively, between the ring 11 and the intermediate ring 18 and the intermediate ring and the web 7. The friction-disks may be mounted directly upon the end of the hub 2 adjacent to them, it being adapted to accommodate them; but I prefer to provide a tubular end 19 upon the hub 2, upon which slips a sleeve 20, securable to the end 19 of the hub 2, as by a set-screw 21. The end of the sleeve 20 is provided with a series of longitudinally-disposed grooves 22, into which are inserted teeth

23, (compare Figs. I and II,) radially projecting inwardly from the inner periphery 24, with which the above-named friction-disks 25 and 26 are respectively provided. Through the engagement of the teeth 23 with the grooves 22, as above specified, the friction-disks are irrevolubly fixed to the sleeve 20 and through it to the hub 2, but are movable endwise of the shaft 1 and are subjected thereby to frictional engagement by such movement as may tend to urge the ring 11 and the web 7 toward each other. It will therefore be apparent upon consideration of the fact that the sleeve 8 is irrevolubly fixed to the shaft 1 and that the sleeve 20 is irrevolubly fixed to the hub 2, the friction-rings 11 and 18 being secured in the manner specified to the sleeve 8, and the friction-disks 25 and 26 being irrevolubly fixed to the sleeve 20, that if the said friction rings and disks be united the pulley of which the hub 2 is a part will be clutched to the shaft 1 and that when the said rings and disks are separated the pulley will be disconnected from the said shaft.

The normal disengagement of the several friction members is promoted by the movement of spiral springs 27 and 28, carried upon each of the pins 15 and disposed, respectively, between the ring 11, the web 7, and the intermediate ring 18. The mechanism which I prefer to employ for producing the clutch action above specified through the relative movements of the ring 11 and the clutch-case toward each other comprehends a plurality of clutch-levers 30, each provided with a hub 31, that is mounted between lugs 32 and 33, projecting from the inside of the rim 6 upon a bolt 34. Four of the clutch-levers 30 are illustrated; but it is practicable to employ two or more, as preferred. Each of the levers 30 extends from its pivot-bolt 34 beyond the width of the rim 6 and through apertures 35 in the web 7. Adjacent to the said levers and projecting through the same apertures, respectively, are provided internally-threaded pillars 36, projecting, respectively, from the lugs 14 on the ring 11. Each pillar 36 is designed to accommodate within it a set-screw 37, which is carried thereby in operative alinement with an eccentric stud 38 upon each hub 31. By the aid of the several screws 37 the parts may be so adjusted as to effect the clutching operation through the outward movement of the free ends of the respective clutch-levers 30. The adjustment is designed to establish in a general way the operative relations between the several frictional members and to take up wear, so that when the adjustment is made it is designed to be secured, with respect to each of the screws 37, as by a jam-nut 39, screwing upon it, to and from the face of its pillar 36. It would be difficult and impracticable to provide that nice adjustment which would compel equal contact between the abrasive surfaces of the several friction members. For that reason I employ for actuating the sev-

eral levers 30 equalizing mechanism that is adapted automatically to accommodate the movements of the several levers to existing conditions in such manner as shall insure that equality and uniformity of contact between the friction members which is essential to their durable and effective coöperation. The equalizing mechanism referred to consists, essentially, of a loose connection between the lever-actuating member and the respective levers, whereby the actuating member by its own movement may take up motion which would be otherwise necessarily communicated equally to the levers. Accordingly I provide upon the sleeve 8 a sliding collar 40, feathered to the sleeve 8 and movable endwise thereon between fixed limits, defined as by shoulders 41 and 42 upon the sleeve. The collar 40 is preferably split, as shown in Fig. III, and is provided with an annular boss 43, to which is fitted a channeled ring 44. The internal diameter of the ring 44 being considerably greater than the external diameter of the boss 43, as shown in Figs. I and III, the requisite looseness of fit above specified is obtained. It is obvious that the boss 43 may be channeled, as indicated at 45 in Fig. VIII, and the ring 44 solid, as indicated at 46 in said figure, since the two constructions are equivalent in function. The ring 44 is also preferably split and is provided in the form of embodiment of my invention herein illustrated with two pairs of lugs 47 and 48, respectively, each of which is designed to receive between them a link 49, which is pivotally secured in place, as by a bolt 50 or 51. The bolts 51 are distinguished in function from the bolts 50 in that each serves, through the mediation of the lugs 48, to unite the two halves of the split ring together as well as to secure one of the links 49 in place. The links 49 are respectively pivoted, as indicated at 52, to the respective clutch-levers 30, so that the ring 44, with its several links 49 and their respective levers 30, constitute a multiple toggle-lever, by which, through the movement of the sliding collar 40 toward the shoulder 42, as shown in dotted lines in Fig. I, the clutching action of the clutch mechanism is relieved and by which, through the movement of the collar 40 in the opposite direction, the clutching action is powerfully exerted. It may be observed in this connection that when the sliding collar 40 is in the position shown in Fig. I it is retained in that position by reason of the fact that the centers of the bolts 50 and 51, respectively, have passed the centers of the bolts 52. For sliding the collar 40 back and forth upon the sleeve 8 any suitable mechanism may be employed; but I prefer to employ for that purpose a split thrust-collar 53, each half of which on each side is provided with a lug 54. (See Fig. VI.) Each pair of lugs 54 is united, as by a bolt 55. The thrust-collar 53 is recessed to snugly fit an annular boss 56 on the sliding collar 40. Each conjoint

pair of lugs 54 is provided with an oblong recess 57, within which works a pin 58 of the arm 59 of an actuating-lever mounted as upon a rock-shaft 60, disposed transversely to the shaft 1. The object of this construction is to provide for the actuation of the sliding collar 40 through the employment of an irrevolvable member, so that oil supplied between the wearing-surfaces of the boss 56 and the thrust-collar 53 may not be thrown out by centrifugal force. This thrust-collar I regard as a valuable feature of my invention, important in itself as applicable to a wide variety of clutches besides my own, for which it is especially adapted. If preferred, the thrust-collar may be dispensed with, as shown in Fig. VII, in which 61 illustrates a modified form of the sliding collar 40. It is adapted to be mounted on the sleeve 8, the feather being omitted, and is provided with an annular boss 62, identical with the boss 43; but in place of the boss 56 it is provided with an enlarged end 63, in which is formed recesses 64, corresponding to recesses 57. Within the recesses 64 the pins 58 of the arm 59 of the operating-lever may operatively engage in the same manner as with the recesses 57, and the collar 61 be thereby held against rotation with the sleeve 8. If, however, the collar 61 be feathered to the sleeve 8, as in the collar 40, the device may be rendered equally operative by making the recesses 64 a continual coaxial annular one upon the collar 61.

What I claim is—

1. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case provided with a plurality of apertures, a friction-ring provided with pins entering said respective apertures, an intermediate friction-ring carried upon said pins, and friction-ring-actuating mechanism, substantially as set forth.

2. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case provided with a plurality of apertures, a friction-ring provided with pins entering said respective apertures, a spring-actuated intermediate friction-ring carried upon said pins, and friction-ring-actuating mechanism, substantially as set forth.

3. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case adapted to be secured to said shaft, a plurality of clutch-levers pivotally movable upon said case, and provided with eccentric studs connected with said levers, a friction-ring having projections in the path of movement of said studs, and

clutch-lever-actuating mechanism, substantially as set forth.

4. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case provided with a plurality of apertures, a plurality of pivotally-supported clutch-levers working in said apertures, a friction-ring having pillars working also in said apertures, set-screws threaded in said pillars, said clutch-levers having eccentric studs connected with said levers in the path of said set-screws, and means of actuating the levers, substantially as set forth.

5. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case provided with a plurality of different sets of apertures alternately disposed, respectively, a friction-ring provided with correspondingly-disposed lugs, said lugs being alternately provided with pins and pillars adapted to enter their respective apertures in the clutch-case, clutch-levers pivotally movable upon the case and working in the apertures occupied by the pillars of the ring, and provided respectively with eccentric studs, set-screws in the respective pillars working in the path of said studs, and means for actuating the clutch-levers, substantially as set forth.

6. The combination with the members of a clutch mechanism, comprising one part adapted to run loose upon a shaft, another part adapted to be secured to the shaft, friction members upon each, and friction-member-actuating mechanism, of a member for operating the actuating mechanism, movable endwise of the shaft, said member being provided with an annular boss, and a thrust-collar recessed to fit the annular boss and provided upon opposite sides with bearing-recesses adapted to receive the pins of the arms of an actuating-lever, and to be irrevolubly operated thereby, substantially as set forth.

7. The combination with means for securing a friction-disk to a rotative member upon a shaft, of a clutch-case, friction-ring and clutch-levers upon the case separated from and adapted to actuate said friction-ring, a sliding collar upon said case, a loose ring fixed to said collar, and links pivotally uniting said loose ring and the clutch-levers respectively.

In testimony of all which I have hereunto subscribed my name.

EUGENE V. FAUCETT.

Witnesses:

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FRANK A. McCLOSKEY.