No. 699,874. Patented May 13, 1902.

M. C. JOHNSON.

CLUTCH.

(Application filed Feb. 8, 1902.)

(No Model.)

Fig. 1.

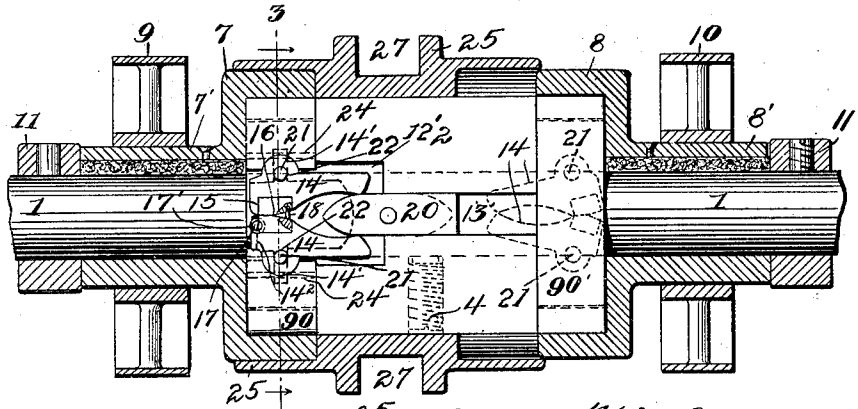


Fig. 2.

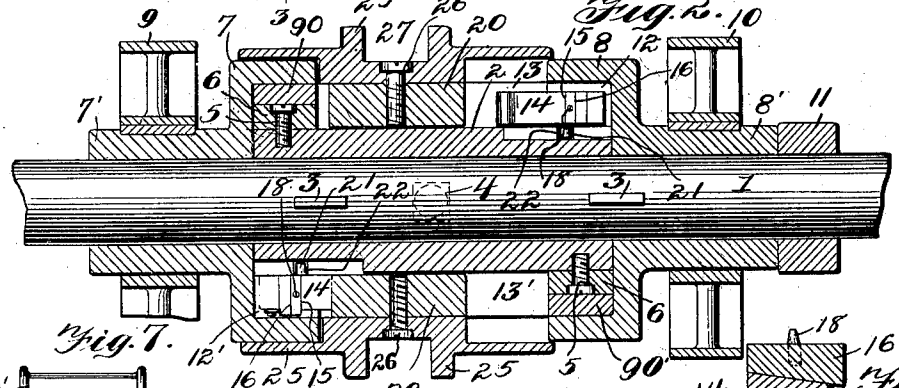


Fig. 7.

Fig. 3.

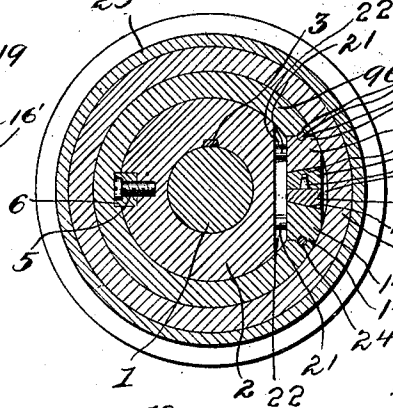


Fig. 5.

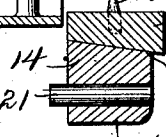


Fig. 8.

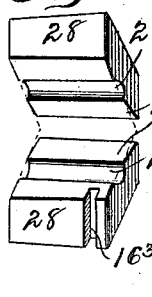


Fig. 6.

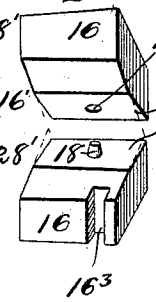


Fig. 4.

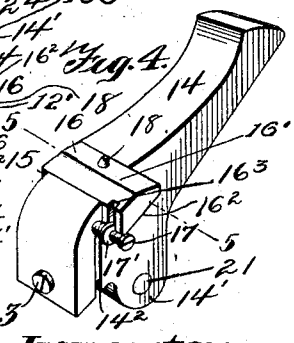
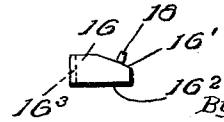


Fig. 9.



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Inventor:
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By his Attorneys
Blodgett and Peck

UNITED STATES PATENT OFFICE.

MOSES C. JOHNSON, OF HARTFORD, CONNECTICUT.

CLUTCH.

SPECIFICATION forming part of Letters Patent No. 699,874, dated May 13, 1902.

Application filed February 8, 1902. Serial No. 93,143. (No model.)

To all whom it may concern:

Be it known that I, MOSES C. JOHNSON, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Clutches, of which the following is a specification.

My invention relates to clutches generally, and more especially to that class of such devices known as "friction-clutches," although it is not limited specifically to said class.

Primarily the object of the invention is the provision of a clutch of simple construction which may readily be operated with a minimum expenditure of power and will be instantaneous and reliable in action.

A further object of the invention is the provision of a friction-clutch involving a cup loose upon the driving-shaft, an expansion-ring connected to rotate with said shaft, and means for causing said expansion-ring to engage the inner wall of the cup.

A further object of the invention is the provision, in connection with a friction-clutch, of levers for actuating said clutch and of means for so connecting said levers that they will rock in unison without liability of derangement.

A further object of the invention is the provision, in connection with the levers just mentioned, of blocks mounted in sockets of the levers and means for simultaneously adjusting said blocks.

Other objects of the invention will be set forth in the detailed description which now follows.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of my improved clutch. Fig. 2 is a horizontal section of the same. Fig. 3 is a transverse section on line 3 3, Fig. 1, looking in the direction of the arrow. Fig. 4 is a perspective view of one of the pivoted levers and the adjustable block carried thereby. Fig. 5 is a transverse section on line 5 5 of Fig. 4. Fig. 6 is a perspective view of the preferred form of adjustable blocks. Fig. 7 is a side elevation of a flanged pin or bolt employed with a modified form of adjusting-blocks. Fig. 8 is a perspective view of such modified form of said blocks, and Fig. 9 is an end view of a toothed block hereinafter described.

Like characters designate similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates a shaft and the numeral 2 a sleeve secured to said shaft by keys 3 and a set-screw 4 or otherwise. Also secured to said sleeve by set-screws 5 are keys 6, for a purpose hereinafter described.

Revolubly mounted on the shaft 1 and located at the respective ends of sleeve 2 are friction-cups 7 and 8, respectively, the hubs of said cups carrying pulleys 9 and 10, respectively, or these pulleys may be replaced by gears or other means of transmitting motion, if desired. Collars 11 are secured to the shaft 1 at points adjacent to the hubs 7′ and 8′ of the friction-cups 7 and 8, and said collars serve to hold said cups in their proper positions and to prevent displacement thereof.

As will be seen by reference to Fig. 2, the friction-cups overlap the ends of sleeve 2, and located between the inner walls of the cups and said sleeve are expansion-rings 90 90′, which are held against rotary movement on the sleeve by the keys 6, above described.

Recesses 12 12′ are formed in opposite sides of the sleeve 2 adjacent to each of its ends, and said sleeve is also grooved longitudinally on opposite sides at 13 13′, respectively, as shown in Fig. 2, the grooves leading from and communicating with the recesses. Located in the recessed portions 12 12′ of the sleeve are clutch-actuating levers 14, and each of these levers is provided with a pocket 15, having an inclined bottom wall to receive blocks 16, as illustrated in Figs. 2, 4, and 6, and these blocks have beveled or inclined faces 16′ and inclined backs 16^2, and one of the blocks is grooved at 16^3 to receive a flange 17′ of an adjusting-screw 17, which is threaded into the lever, as illustrated in Fig. 4, said screw when turned serving to adjust the blocks with relation to the inclined bottoms of the pockets in which they are seated for the purpose of taking up wear or lost motion. To enable both of the blocks to be adjusted simultaneously by said screw or otherwise, one of them is provided with a tooth or projection 18 and the other with a seat or socket 19 for the reception of said tooth when the levers are rocked to actuate and release the expansion-rings 90 90′. By this construction

when the screw 17 is actuated both blocks will be simultaneously forced toward each other in their pockets to take up wear, and in virtue of this toothed connection (for which any other device suitable to accomplish the purpose may be substituted) the levers when rocked by means hereinafter described will act positively and in unison and will impart an equal expansion force to both ends of the expansion-ring.

The long ends of levers 14 are beveled or otherwise formed to receive between them wedge-shaped blocks 20, and each lever is provided with a semicircular boss or enlargement 14′, fitting into recesses in the ends of the expansion-rings 90 90′, as shown in Fig. 1, said bosses constituting the pivotal points of the levers. Pins 21 project laterally from each lever 14, and the inner ends of said pins travel in transverse grooves 22, formed in the sleeve 2, and serve to guide said levers to prevent their displacement and to aid, by bearing against the walls of said grooves, in resisting the thrust upon the same when the levers are actuated by the wedge-block 20 to expand the ring 90. Furthermore, said pins 21, bearing, as they do, against the walls of the transverse grooves 22, prevent the expansion-rings from being forced off from the ends of the sleeve 2 when the levers 14 are actuated by the wedge-blocks 20.

To lock the adjusting-screw 17 against movement, the one of the levers 14 in which said screw is located is split at 14^2, and a screw 23 is employed for forcing the split parts together to bind said screw 17, and to prevent the levers from becoming detached or thrown out by centrifugal force from the expansion-rings 90 90′ cotter-pins 24 may be employed, said pins being driven into small grooves 100 100′, formed in the bosses 14′ of the levers and the free ends of said rings, as illustrated in Fig. 3.

Designated by the numeral 25 is a clutch-actuating ring or sleeve, to the under side of which the wedge-blocks 20 are secured by screws 26, and as these wedge-blocks slide in the grooves 13 13′ of sleeve 2 and as said sleeve is keyed to the shaft 1 it will be seen that when the shaft is rotated the clutch-actuating ring 25 will rotate with it. This ring is grooved at 27 to receive the arms of a shipper-fork, (not shown,) by which it may be reciprocated.

In Figs. 7 and 8 a modification of the device by means of which the blocks seated in the sockets of the levers are caused to move in unison for purposes of adjustment to take up wear or lost motion is illustrated, and in said modification blocks 28, having inclined surfaces 16′, and one of them having a groove 16^3, (this construction being the same as that of the preferred form of blocks,) are provided. Each block 28 is grooved at 28′ in its face, and fitted in these grooves is a bolt 29, Fig. 7, which serves as a bearing for the blocks to permit them to rock when the levers 14 are actuated. This bolt is flanged at its ends at 29′ and when placed in position in the grooves 28′ the flanges overlap the ends of said grooves and bear against the sides of the blocks, so that when one of the blocks is adjusted by the screw 17 the other block will be compelled to move with it. Both of these blocks have, like the blocks 16, inclined backs 16^2, fitting upon the inclined bottoms of the pockets 15, (see Fig. 5,) and should it be desired to adjust said blocks to take up wear or lost motion they may be forced up said inclined bottoms through either connection described by said screw 17, and consequently will be projected farther from the pockets.

If pulleys 9 and 10 are secured to the hub of the friction-cups 7 and 8, as shown, a crossed belt will be passed over one pulley and a straight belt over the other pulley, so that the mechanism actuated by said belts may be driven in opposite directions, and if gears are substituted for the pulleys they will of course operate suitable gearing for accomplishing the same results.

In the illustrations the clutch-actuating ring or sleeve 25 has been moved to the left to cause one of the wedge-blocks 20 to engage the beveled free ends of the levers 14, rock said levers upon their axis, and expand the ring 90, thereby through the connections described locking the friction-cup 7 to the rotating shaft 1. When said expansion-ring 90 has been actuated, as just described, the other wedge-block 20 has assumed the position represented by dotted lines in Fig. 1 and the long ends of the levers 14 at the right in Fig. 1 have been forced together by the contraction of the expansion-ring 90′, which will then be reduced in diameter sufficiently to permit the free rotation of the friction-cup 8. If it is desired to connect the cup 8 to shaft 1, the sleeve 25 is moved to the right, and if both cups are to be idle on said shaft said ring is moved to a neutral position, with both of the wedge-blocks 20 out of contact with the levers 14.

My invention is not limited to the precise construction shown, for modifications may be made therein, if desired.

Having thus described my invention, what I claim is—

1. The combination, with a shaft, of a clutch; means for actuating said clutch; connected devices movably mounted on said means; and means for adjusting said devices to cause them to move toward each other.

2. The combination, with a shaft, of a friction-cup; an expansion-ring; a pair of levers movably mounted on said ring; a device for actuating said levers to cause them to lock the expansion-ring to the friction-cup; connected blocks carried by said levers; and means for adjusting said blocks toward each other.

3. The combination, with a shaft, of a friction-cup; an expansion-ring located within the friction-cup; a pair of levers; mechanism

for actuating said levers to expand the ring; and a device for connecting said levers and causing them to move simultaneously.

4. The combination, with a shaft, of a friction-cup; an expansion-ring fitted within said cup; means controlled by the cup, when said ring is expanded, for actuating the shaft; a pair of levers movably mounted on the expansion-ring, said levers having pockets with inclined bottom walls; blocks having inclined surfaces fitted in said pockets; means for adjusting said blocks simultaneously transversely of the levers; and means for directly connecting the blocks so that when one is actuated the other will move therewith.

5. The combination, with a shaft, of a member loose on said shaft; an expansion-ring; a member secured to the shaft and to which the expansion-ring is connected; a pair of levers carried by the expansion-ring, the levers having pockets with inclined bottom walls; blocks with inclined surfaces fitted in the pockets of said levers; means for adjusting one of said blocks; means for connecting one block with the other block, so that the blocks will move toward each other when one of them is adjusted; and means for actuating the levers.

6. The combination, with a shaft, of a member loose on said shaft, said member having a friction-surface; an expansion-ring; a pair of pivoted levers carried by said expansion-ring; blocks fitted within pockets of said levers; means for adjusting one of said blocks transversely of the lever in which it is supported; and means for connecting said block with the other block, whereby both blocks may be simultaneously moved toward each other when one of them is adjusted.

7. The combination, with a shaft, of a friction member; an expansion-ring located within said friction member; a pair of levers pivoted on said expansion-ring, each of said levers having a pocket; blocks fitted within said levers, means for adjusting one of said blocks; and means for connecting one block with the other block, so that when actuated by the adjusting means the blocks will move in unison and will be forced toward each other.

8. The combination, with a shaft, of a friction member; an expansion-ring located within the friction member; levers pivoted on said expansion-ring; a toothed connection between the levers; and means for actuating the levers.

9. The combination, with a shaft, of a friction member; means for connecting said friction member with the shaft, said means involving an expansion-ring; levers pivoted to said expansion-ring, each lever having a socket with an inclined wall; a block having an inclined wall fitted in one of said sockets, said block having a slot; a tooth carried by the block; a screw, a flange of which is fitted in said slot; and a block having an inclined wall fitted in the socket of the other lever, said block having a recess for the reception of the tooth of the other block.

10. The conbination, with a shaft, of a friction member; means for connecting said friction member with the shaft, said means involving an expansion-ring; levers pivoted to said expansion-ring, each lever having a pocket with an inclined bottom wall; blocks movably mounted in the pockets of the levers; means for adjusting one of said blocks; and a toothed connection between the blocks.

11. The combination, with a shaft, of a friction member; means including an expansion-ring for connecting said member with the shaft; levers pivoted to the expansion-ring; a toothed connection between said levers, whereby they are caused to rock in unison; and means for actuating the levers to cause them to expand the expansion-ring and lock it to said friction member.

12. The combination, with a shaft, of a friction member; means for connecting said friction member with the shaft; said means including an expansion-ring having sockets in its free ends; levers having bosses fitted in said sockets; a toothed connection between said levers; a wedge-block for actuating the levers to expand the expansion-ring and lock it to the friction member; and means for actuating said wedge-block.

13. The combination, with a shaft, of a friction member; an expansion-ring adapted to be connected to said friction member; means for connecting said expansion-ring to the shaft; levers pivoted to the expansion-ring; each lever having a pocket; blocks fitted in the pockets of the levers; means for connecting the blocks; means for adjusting one of said blocks; and means for actuating the levers to cause them to lock the expansion-ring to the friction member.

14. The combination, with a shaft, of a friction member; an expansion-ring; levers pivoted to the expansion-ring; engaging surfaces on the levers; a toothed connection between said surfaces; and means for actuating the pivoted levers to cause them to lock the expansion-ring to the friction member.

15. The combination, with a shaft, of a friction member; an expansion-ring; lever mechanism for expanding the expansion-ring; a device for connecting the elements of the lever mechanism so that they will move in unison; means for adjusting said device; and means for actuating said lever mechanism.

16. The combination, with a shaft, of a friction member; an expansion-ring; levers pivoted on the ends of the expansion-ring; said levers having straight and inclined engaging surfaces; a toothed connection between said engaging surfaces; and means for actuating the levers.

17. The combination, with a shaft, of a friction-cup; an expansion-ring; means for connecting said ring with the shaft; levers pivoted to the expansion-ring, and each having a pocket with an inclined bottom wall; blocks seated in said pockets and having inclined portions fitting against said bottom walls,

one of said blocks having a slot; a screw having a projection engaging said slot; a connection between the blocks; and means for actuating the levers.

18. The combination, with an expansion-ring, of means for supporting said ring; levers having enlargements fitted in sockets of the ring; means for actuating the levers; and means engaging with said enlargement for preventing disengagement of the levers from the ring.

19. The combination, with an expansion-ring having sockets in its free ends, of a support for said ring; levers having grooved enlargements fitted in said sockets; means for actuating the levers; and pins passing through the ring and entering the grooves in the enlargements of said levers.

In testimony whereof I affix my signature in presence of two witnesses.

MOSES C. JOHNSON.

Witnesses:

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FRANK G. CAMPBELL.