No. 840,847. PATENTED JAN. 8, 1907.

W. A. E. HENRICI.

CLUTCH.

APPLICATION FILED JAN. 22, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

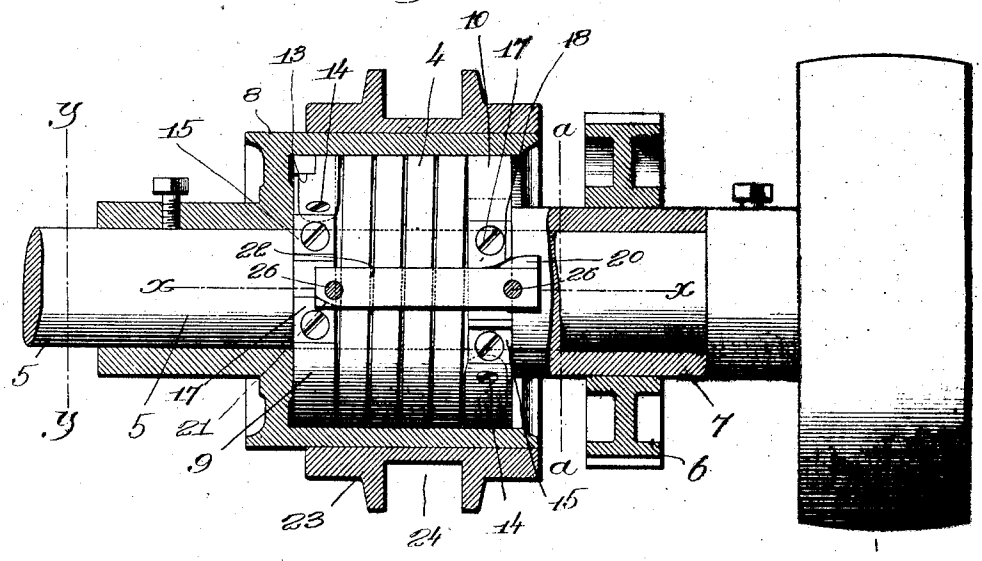


Fig. 2.

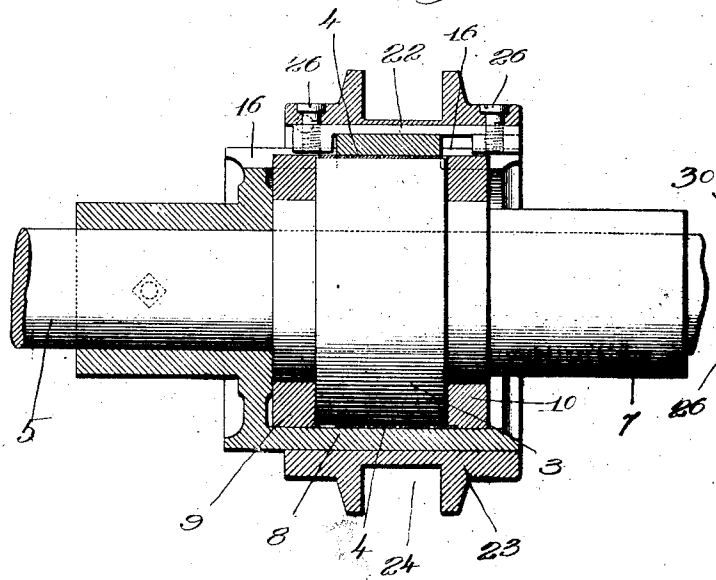


Fig. 3.

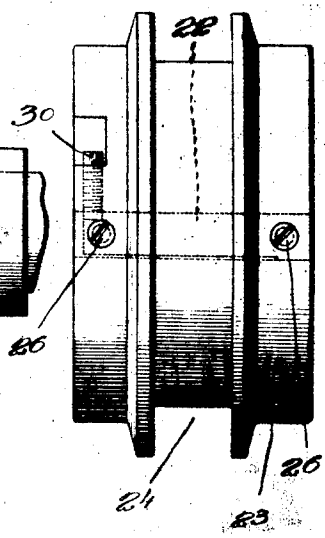
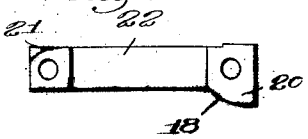


Fig. 14.



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2 SHEETS—SHEET 2.

Fig. 4.

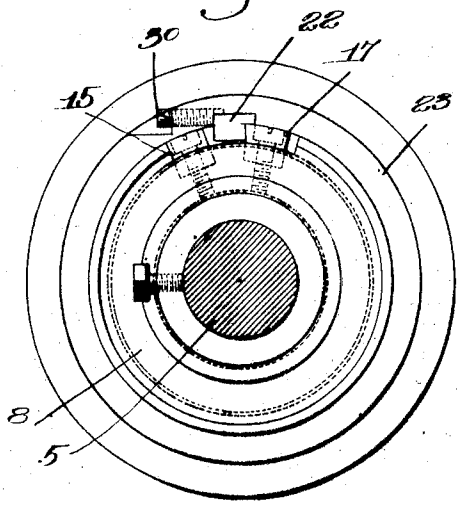


Fig. 5.

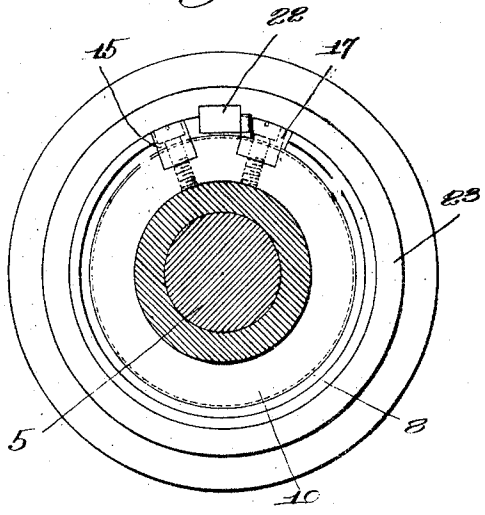


Fig. 12.

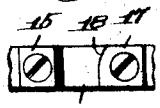


Fig. 6.

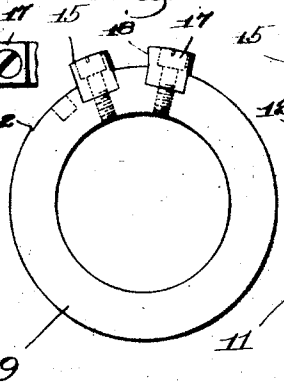


Fig. 7.

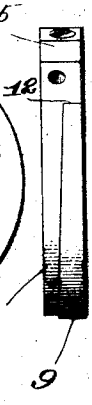


Fig. 8.

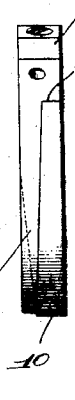


Fig. 9.

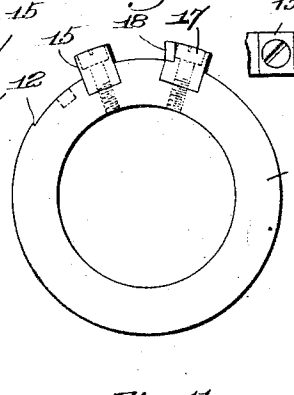


Fig. 13.

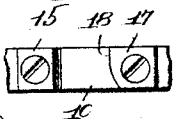


Fig. 10.

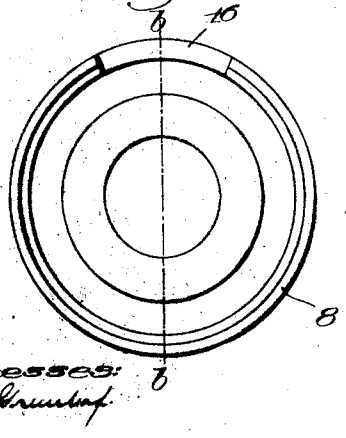
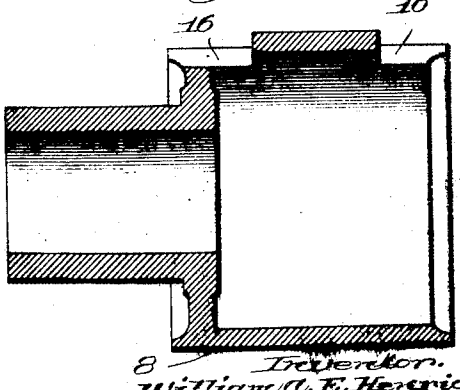


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM A. E. HENRICI, OF BOSTON, MASSACHUSETTS.

CLUTCH.

No. 840,847. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed January 22, 1906. Serial No. 297,113.

To all whom it may concern:

Be it known that I, WILLIAM A. E. HENRICI, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Clutches, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to that type of friction-clutch in which one clutch member is in the form of a drum and the other in the form of a friction-coil encircling the drum.

A clutch embodying my invention will first be described, and then the novel features thereof will be pointed out in the claims.

In the drawings, Figure 1 is a sectional view of a clutch embodying my invention. Fig. 2 is a section on the line *x x*, Fig. 1. Fig. 3 is a view of the clutch-actuating sleeve. Fig. 4 is a section on the line *y y*, Fig. 1, looking to the right. Fig. 5 is a section on the line *a a*, Fig. 1, looking to the left. Figs. 6 to 9, inclusive, are front and side views of the collars to which the friction-coil member is attached. Fig. 10 is an end view of the driving member of the clutch. Fig. 11 is a section on the line *b b*, Fig. 10. Fig. 12 is a top view of the collar 9. Fig. 13 is a top view of the collar 10, and Fig. 14 is a bottom view of the actuator.

As stated above, my improved clutch is of that type in which the two clutch members, respectively, are in the form of a drum and a friction-coil encircling the drum, and in the drawings 3 designates the drum, and 4 the friction-coil encircling the drum. In this embodiment of my invention the drum 3 is connected to the driven element and the friction-coil 4 is driven from the driving element, which is herein shown as a shaft 5. The driven element may be any suitable device—such, for instance, as a gear or pulley 6. It is within the scope of the invention, however, to employ the drum as the driving element of the clutch and the coil as the driven element thereof. As herein shown the element 6 to be driven is fast on a hub 7 of the driven element 3 of the clutch.

The friction-coil 4 or driving element of the clutch is driven from the shaft 5 by means of a driving member 8, which is fast to the shaft and within which the friction elements 3 and 4 of the clutch are confined.

The ends of the friction-coil 4 are connected to two collars 9 and 10, respectively, which collars are loosely mounted upon the driven element 3 of the clutch. Preferably these collars 9 and 10 are each shaped or rabbeted, as at 11, to receive the friction-coil 4 and are each provided with a shoulder 12, against which a shoulder 13 of the coil 4 rests, the ends of the coil being held to the collars by any suitable means, such as screws 14. Each collar has projecting therefrom a lug 15, which extends through an opening 16 in the driving member 8, and each collar also has secured thereto and projecting therefrom an abutment 17, provided with a cam-surface 18. The cam-surfaces 18 of the two collars 9 and 10 are oppositely disposed and are adapted to be acted upon by cams 20 and 21, respectively, carried by an actuator 22, which is slidably mounted in a groove in the clutch-operating sleeve 23. This clutch-operating sleeve surrounds the driving member 8, as best seen in Figs. 1 and 2, and is provided with a suitable groove 24, in which the fork of a clutch-operating arm or lever may be received.

The actuator 22 is rigid with the sleeve 23, it being secured thereto in any suitable way, as by means of screws 26, so that the longitudinal movement of the sleeve on the driving member 8 acts to move the actuating member 22, and consequently the cams 20 and 21, longitudinally.

The operation of the device is as follows: Under normal conditions when the clutch is running free the parts are in the position shown in Figs. 1 and 2—that is, the actuator 22 is in its inoperative position. The rotation of the shaft 5 gives rotation to the driving member 8, and the latter, by engaging the projection 15 of one or the other collar, depending on the direction in which the driving member 8 is rotating, rotates said collars and the friction-coil about the clutch element 3. The resiliency of the friction-coil 4 is such that normally it will unwind as much as the driving member 8 will permit and will be sufficiently loose about the drum 3 so that it can freely turn thereabout, and the tension of said friction-coil is such that if the wall of the slot 16 of the driving member engages a projection 15 on one collar the rotation of said driving member will rotate said collar and through the coil 4 rotate the other collar without winding said friction-coil sufficiently to cause it to grip the drum 3. If, for instance, the shaft 5 is rotating in such a direc-

tion that when the clutch is disengaged the wall of the slot 16 in the driving member 8 is in engagement with the projection 15 of the collar 9, said collar will be caused to rotate, thereby rotating the friction-coil 4 and the collar 10, the latter receiving its motion directly from the friction-coil. As stated above, however, this coil is stiff enough so that the force required to give rotation to the collar 10 is not sufficient to cause the coil to wind up sufficiently to grip the drum 3. Whenever it is desired to clutch the two elements of the clutch together, the sleeve 23 is moved to the left, Figs. 1 and 2, by any suitable mechanism, thereby moving the actuator 22 to the left. This movement of the actuator brings the cams 20 and 21 thereon against the cam-faces on the abutments 17 and gives the collars a relative rotary movement in opposite directions, thereby tightening the friction-coil about the drum 3. When the coil is sufficiently tightened, the said drum will be driven from the shaft 5, as will be obvious. To unclutch the clutch members, the sleeve 23 is moved in the opposite direction, thereby withdrawing the cams 20 and 21 from the abutments 17 and permitting the resiliency of the friction-coil 4 to unwind the latter sufficiently from the drum 3 to permit it to run loose thereon.

One end of the actuator 22 rests against a suitable adjusting-screw 30, so that as wear occurs between the cam-surfaces 20 21 and the corresponding abutments such wear may be taken up by setting up said screw slightly.

Preferably I will make the interior diameter of the driving member 8 just sufficiently larger than the exterior diameter of the drum 3 to admit the friction-coil 4 loosely, and said coil is so constructed that it will tend to expand to a larger diameter than the interior diameter of the driving member 8. The result is that when the clutch members are disengaged from each other the coil 4 is permitted to unwind by its resiliency only sufficiently to release the drum 3; but when it comes in contact with the interior surface of the driving member 8 it is thereby prevented from further unwinding.

It will be noted that in this embodiment of my invention both ends of the friction-coils are free to be moved relative to both the drum and the driving element of the clutch or the shaft 5 and that the actuator acts upon both ends of the coil and tightens it from both ends.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a clutch, a driving member, a driven member, a drum rigid with one of said members, two collars rotated by the other member but capable of turning relative to each other, a friction-coil encircling the drum and having one end fast to each collar, and means to turn the collars in opposite directions, thereby to tighten the coil at both ends about the drum.

2. In a clutch, a driving member, a driven member, a drum rigid with one member, a friction-coil encircling the drum and connected with the other member to rotate therewith, both ends of the coil being free to be moved relative to said member, and means to act on both ends of the coil to tighten it about the drum when the clutch is to be applied.

3. In a clutch, a friction-drum, a friction-coil surrounding the drum, two loosely-mounted collars, one connected to each end of the coil, each collar having an abutment and an actuator-cam to act on the abutments and thereby give the collars a relative rotary movement in opposite directions.

4. A clutch comprising a drum, a friction-coil encircling the drum, two loosely-mounted collars, each connected to an end of the coil and each carrying an abutment, an actuator having two cam-surfaces, one to act on each abutment, and means to move the actuator thereby to give the collars a relative movement in opposite directions.

5. In a clutch, a shaft, a friction-drum loosely mounted thereon, a friction-coil encircling the drum, loosely-mounted collars to which the ends of the friction-coil are secured, means to rotate the collars in the same direction from the shaft, and a clutch-actuator to give the collars a relative turning movement in opposite directions.

6. In a clutch, a shaft, a drum loosely mounted thereon, a friction-coil surrounding the drum, two loosely-mounted collars to which the ends of the coil are connected, a driving member fast to the shaft and inclosing the drum and friction-coil, said collars having projections to be engaged by the driving member, whereby the collars are driven thereby, and means to give the collars a relative turning movement in opposite directions, thereby to wind the friction-coil onto the drum.

7. In a clutch, a shaft, a drum loosely mounted thereon, a friction-coil surrounding the drum, two loosely-mounted collars to which the ends of the coil are connected, a driving member fast to the shaft and inclosing the drum and friction-coil, said collars having projections to be engaged by the driving member, whereby the collars are driven thereby, a sleeve slidably mounted on the driving member and carrying means to engage the collars, whereby sliding movement of the sleeve turns the collars in opposite directions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

W. A. E. HENRICI.

Witnesses:
BERTHA F. HEUSER,
LOUIS C. SMITH.