No. 833,982. PATENTED OCT. 23, 1906.

C. O. SNYDER.

CLUTCH.

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Fig. 1.

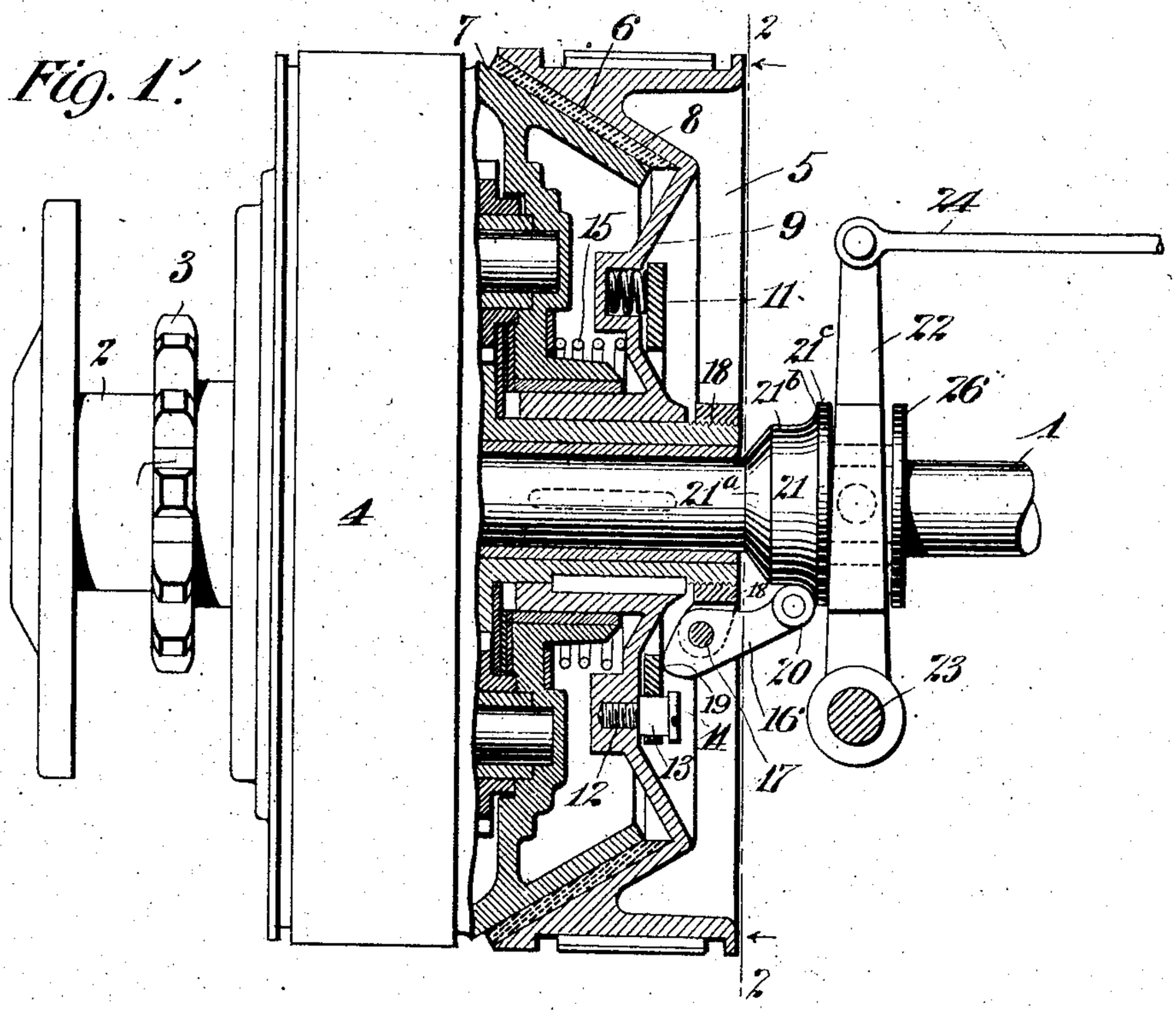
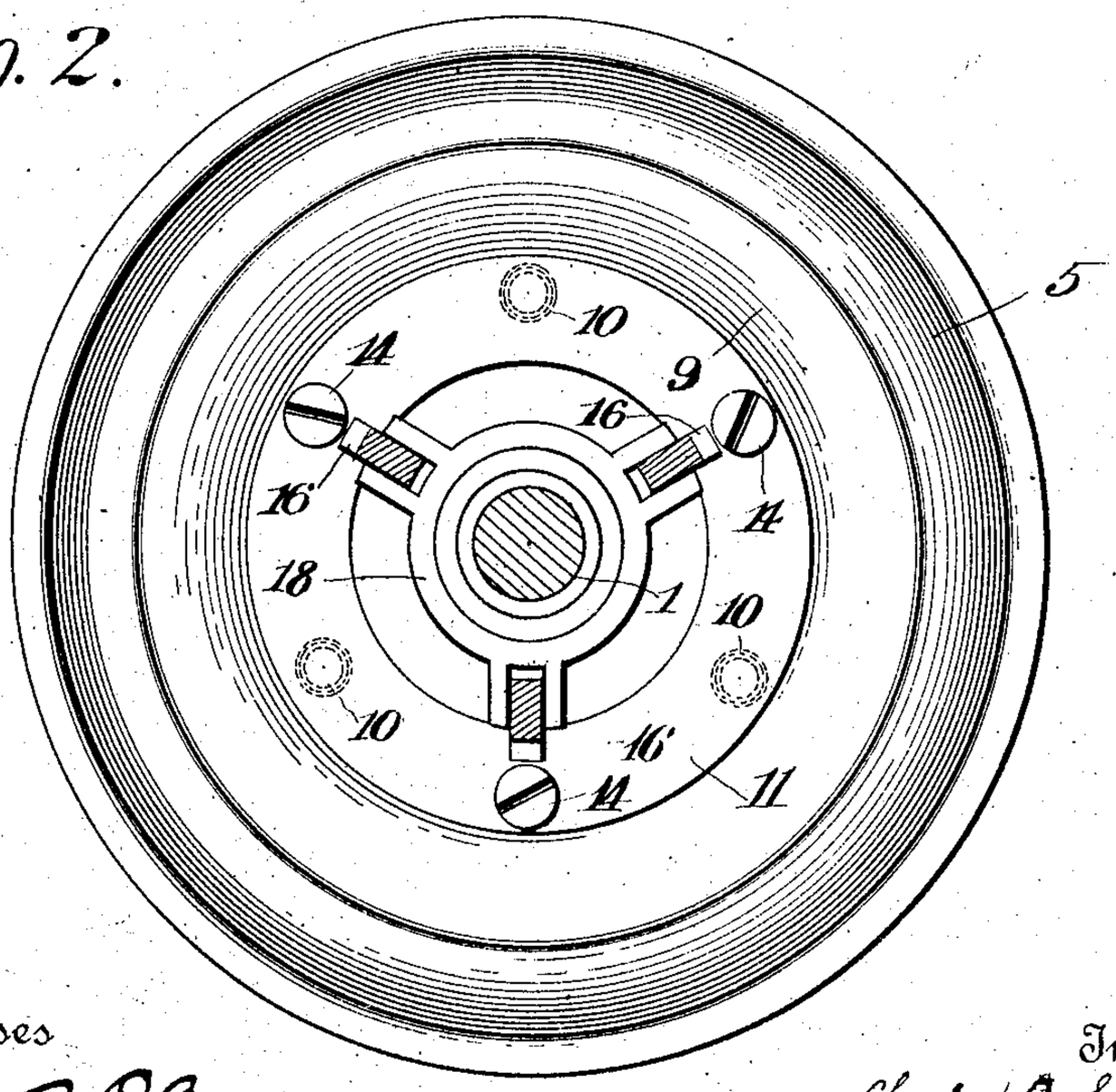


Fig. 2.



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CLUTCH.

No. 833,982. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed July 20, 1905. Serial No. 270,452.

To all whom it may concern:

Be it known that I, CHARLES O. SNYDER, a citizen of the United States, residing at the city of New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Clutches, of which the following is a full, clear, and exact description.

My invention relates to clutches.

One of the serious difficulties which is found in the use of friction-clutches is the slipping of the parts when they have become worn. A well-known form of friction-clutch includes a pair of cone-surfaces, having a packing of leather or similar substance between them, which are forced into gripping relation when it is desired to actuate the clutch. In course of time the packing material becomes worn, and as the take-up or total motion of the parts remains the same it is apparent that the clutch cannot grip so tightly and slipping will ensue. Of course adjustments are generally provided to compensate for this wear, but it is inconvenient to manipulate the adjustments as often as the wear of the parts really necessitates.

It is the purpose of my invention to devise a construction by which this wear may be compensated for within certain limits entirely automatically, so that the packing-surface may wear to a considerable extent before manipulation of the hand adjustment becomes necessary.

A further object of the invention is to provide a device of this character which shall be of simple construction, convenient to manufacture, and efficient in operation.

With these and other objects in view my invention consists in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally particularly pointed out in the appended claims.

Figure 1 is a longitudinal sectional view, partly in side elevation, of a friction-clutch embodying the principles of my invention. Fig. 2 is a sectional view on the line 2 2 of Fig. 1 looking in the direction of the arrows.

Referring now to the drawings and to the various views and reference-signs appearing thereon, of which like parts are designated by the same reference-signs wherever they occur, 1 indicates the driving part, comprising the main drive-shaft of the engine in the particular embodiment of my invention illustrated.

2 denotes the driven part, which may be provided with a sprocket-wheel 3 for connection to the driving-axle of a motor-vehicle or any other mechanism.

In the form of clutch which I have shown there is included the usual gear-box 4, having the reverse-speed mechanism therein. In this form of clutch the two frictional surfaces, which move unitary with the driving and the driven parts, respectively, when the clutch is in normal operation, are adapted to have other movements under certain conditions due to the change-gear mechanism; but a consideration of these features is unnecessary in the present case, since they form no part of my invention.

For the purpose of the present case it is merely necessary to consider the relation of the parts under normal conditions when the driving-cone of the friction-clutch rotates with and is virtually a part of the driving-shaft 1.

5 designates the driving part of the friction-clutch proper and comprises a revoluble drum having an internal annular face 6 of flaring or conical shape.

7 denotes the coacting driven part of the clutch and comprises a conical extension of the casing 4, having a pitch to accord with the annular conical face 6, so that the two may be forced into intimate contact over their entire surfaces.

8 denotes a packing material, of leather, fiber, wood, fabric, or other similar or analogous material, which is placed between the opposed surfaces 6 and 7.

The foregoing parts are of the usual and well-known construction and form no part of my present invention. They are taken merely by way of example to show the application of the real features of my invention, and it is obvious that any other form of parts may be used in lieu thereof.

Upon the outside face of the drum 5 I arrange what I shall term a "compensating" member. This in its preferred form includes a plate, ring, or other member having a limited movement with relation to said drum and resiliently pressed outward therefrom. I have shown a practical construction of compensating member constituted by form-

ing on the outside face of the drum 5 a series of cavities 9, and within them I provide a plurality of springs 10.

11 denotes a ring or member mounted to have a movement relative to the drum 5, and for this purpose I have provided screws 12, having upper cylindrical shanks 13 and heads 14, the shanks 13 engaging holes within the member 11, so as to hold and guide said member, permitting a slight longitudinal movement thereof outward and away from the casing 5. The springs 10, before mentioned, coöperate with and bear upon this ring or member 11 with considerable force, so as to maintain it normally at its limit of outward movement against the heads 14 of the screws 12.

15 indicates a comparatively large spiral spring bearing upon the drum 5 to force it into unclutched relation. It is obvious that springs of other forms than those above mentioned or resilient pads, of rubber, or other articles may be employed and still fall within the spirit and scope of my invention.

16 denotes levers or cam-fingers fulcrumed at points 17 on a flange 18, screw-threaded on a portion of or otherwise adjustable with relation to the drum 5. Each of the fingers has a toe 19 bearing against the outer face of the ring 11 and is also provided with a cam-roller 20, arranged to coöperate with the cam 21, which is arranged to slide longitudinally of the shaft 1 in the form of my invention shown. The cam 21 has a steeply-inclined face 21^a and a longitudinal cylindrical portion 21^b, terminating in a rounded collar or flange 21^c.

22 indicates a lever fulcrumed at 23 and having a link 24 and adapted for operating the cam 21. For this purpose it is provided with studs or pins 25, engaging a collar 26, which forms a part of said cam.

The general operation of the clutch will be understood from the preceding description, reference being had to Fig. 1, which illustrates the clutch in its gripped relation. It will be seen that when motion is given to the link 24 the cam 21 is slid back and forth upon its shaft 1, thereby rocking the fingers 16 about their fulcrum-point. The toe 19 of each lever bears upon the compensating ring 11 and applies movement thereto.

I will now describe the operation of the parts which relate more particularly to the features of my invention.

The springs 9 normally maintain the compensating ring 11 at its limit of outward movement against the heads 14 of the screws 12. In order to make this possible, the aggregate pressure of the springs 10 is conveniently made greater than that of the spring 15. When now movement is applied to the compensating ring 11, force is transmitted through the springs 10 to the drum 5 and the drum-casing is moved to grip the clutch with a force equal to the aggregate tension of said springs 10 minus that of the returning-spring 15. I adjust the relative tension of the various springs so that this gripping pressure is sufficient for practical purposes, amounting to about forty pounds in actual use. The casing 5 moves under the applied force and impels the packing material 6 into contact with the casing 7, after which further movement is impossible. If the packing material is new or has not been worn to any extent, this will occur almost immediately and the subsequent movement of the compensating ring 11, induced by the levers 16 and the cam 21, which has a definite and fixed throw, is taken up by the relative movement of the compensating ring 11 and the drum 5, the springs 10 yielding for this purpose. As the packing material 6 becomes worn, the throw of the drum 5 to grip the clutch becomes necessarily greater, and as the levers 16 and compensating ring 11 move the same distance as before the force is transmitted through the springs 10 without compressing them to so great an extent. Such wear may continue and the clutch be as effective as ever until the point is reached where the movement of the compensating plate is transmitted to the drum 5 without compressing the springs 10 at all, after which the usual adjustment of the clutch must be manipulated—as, for example, the screw-flange 18 in the construction illustrated.

It will be seen that the packing-surface 8 of the clutch may be allowed to wear through the entire distance of movement of the compensating ring 11 before hand-adjustment is necessary, so that the clutch may be used without attention through much greater distances or longer periods than heretofore.

While I have shown a particular form of construction embodying the principles of my invention, I do not desire to be limited or restricted thereto, since it is evident that the invention may be embodied in widely-varying forms of mechanism. For example, it is not essential that the compensating member should coöperate with the driving parts, but it is my act to move the driven parts, if desired, acting in substantially the same way as it now does in connection with the driving parts.

What I claim is—

1. A clutch comprising a driving and a driven part, a ring having spring connections with one of said parts, and means for moving said ring through the instrumentality of said spring connections.

2. A friction-clutch comprising a driving and a driven part having opposed friction-faces, a packing material between said faces, a compensating ring, means upon one of said parts for guiding said compensating ring to have a movement relative thereto, a spring interposed between said part and ring, and

means for applying clutching movement to said ring.

3. A friction-clutch comprising a drum having a friction-face, a driven casing having an opposed friction-face, a compensating ring guided by said drum and having a movement relative thereto, a spring between said ring and drum, and fingers engaging said ring.

4. A friction-clutch comprising a driving and a driven part, means for moving them into frictional engagement, a clamping-ring in the path of said means, and springs intermediate said clamping-ring and the driven part, whereby the wear of the frictionally-engaging surfaces is compensated for.

5. In a friction-clutch, a main shaft having a sliding cam thereon, a plurality of fingers bearing on said cam, a member contacting with said fingers, a drum and casing having opposed frictional faces and arranged to have a relative movement, and resilient connections for imparting said movement from said member.

6. In a friction-clutch, a drum having a plurality of recesses in its face, a compensating ring guided and spring-pressed outward therefrom, and a plurality of cam-operated fingers engaging said ring.

7. In a friction-clutch, a drum having a plurality of headed studs on one of its faces, a compensating ring upon said studs, resilient means between said drum and ring, and cam-fingers for engaging said ring.

8. In a friction-clutch, a drum having a plurality of studs on one of its faces and a plurality of recesses between said studs, a ring slidable upon said studs, springs within said recesses and bearing on said ring, and means for applying movement to said ring.

9. In a friction-clutch, a drum having an internal annular friction-face and recesses on its opposite side, a driven drum having a face opposed to said annular face, a packing material between said faces, a ring guided to have a movement relative to said drum, springs within said recesses and bearing on said ring, and cam-fingers arranged to engage said ring.

10. In a friction-clutch, a driving and a driven part having a relative movement and spring-pressed into separated relation, a member guided by one of said parts and having a movement relative thereto, resilient means intermediate of said member and parts, means for applying movement to said member, and means for adjusting the range of said movement.

11. In a friction-clutch, a driving and a driven part having a relative movement and spring-pressed into separated relation, a member guided by one of said parts and having a movement relative thereto, resilient means intermediate of said member and parts, means for applying movement to said member, including a collar having threads thereon to adjust it longitudinally.

12. A friction-clutch comprising a driving-drum having recesses in its outer face, a series of screws having cylindrical shanks and enlarged heads thereon and located in said face and between said recesses, a ring having holes engaging said screw-shanks and arranged to have a movement outward and from the drum limited by said screw-heads, resilient means located in said recesses and bearing on said ring, a collar having threads thereon to adjust it longitudinally, a plurality of cam-operated fingers fulcrumed on said collar and bearing on said ring, a driven casing having a friction-face opposed to said driving-drum and containing change-gears, and connections for operating said cam-fingers, whereby relative movement is imparted to said friction-faces to operate the clutch.

In witness whereof I subscribe my signature in the presence of two witnesses.

CHAS. O. SNYDER.

Witnesses:
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