

No. 816,906.

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G. E. FRANQUIST.
CLUTCH.

APPLICATION FILED JUNE 1, 1905.

Fig. 2.

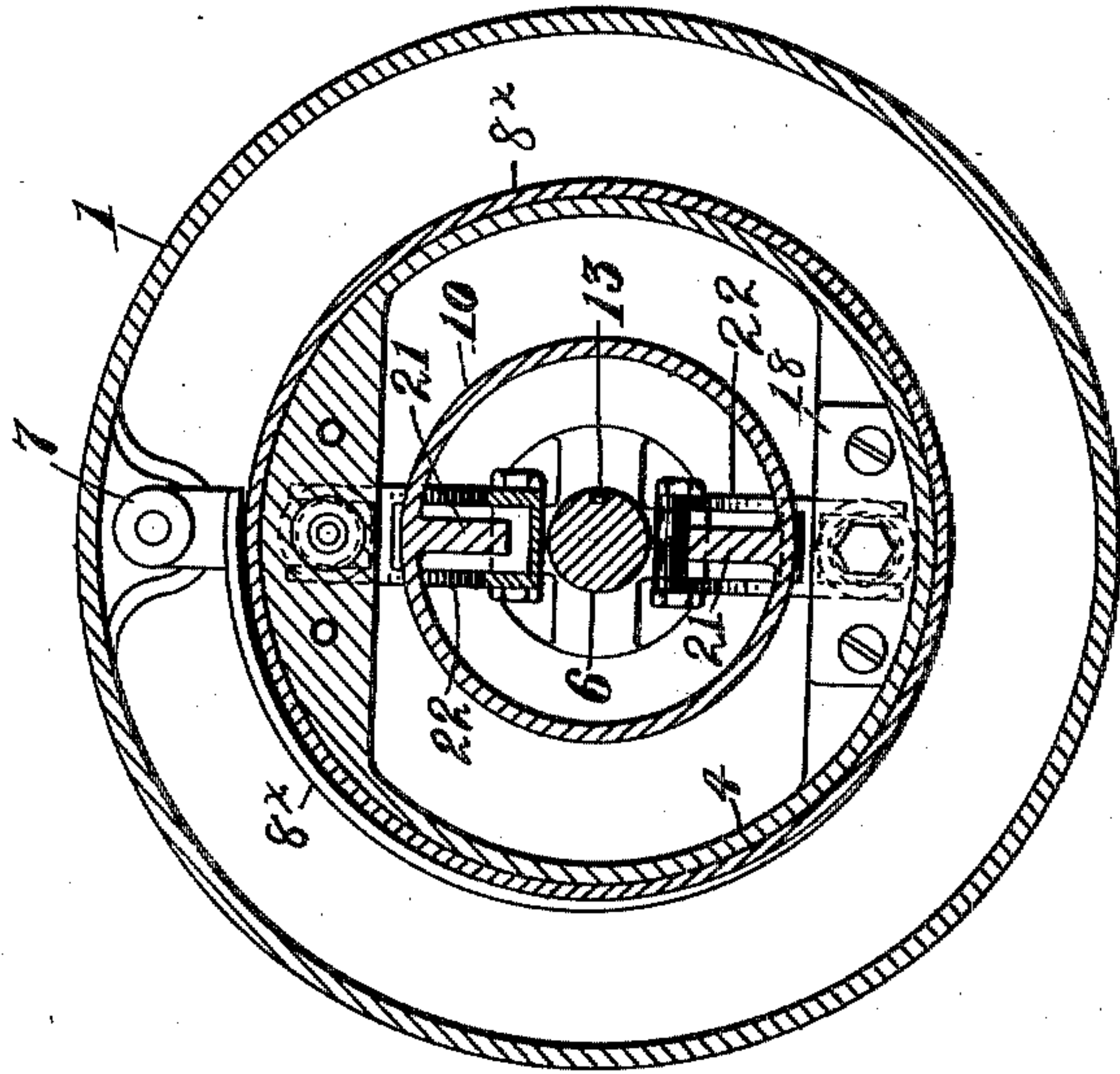
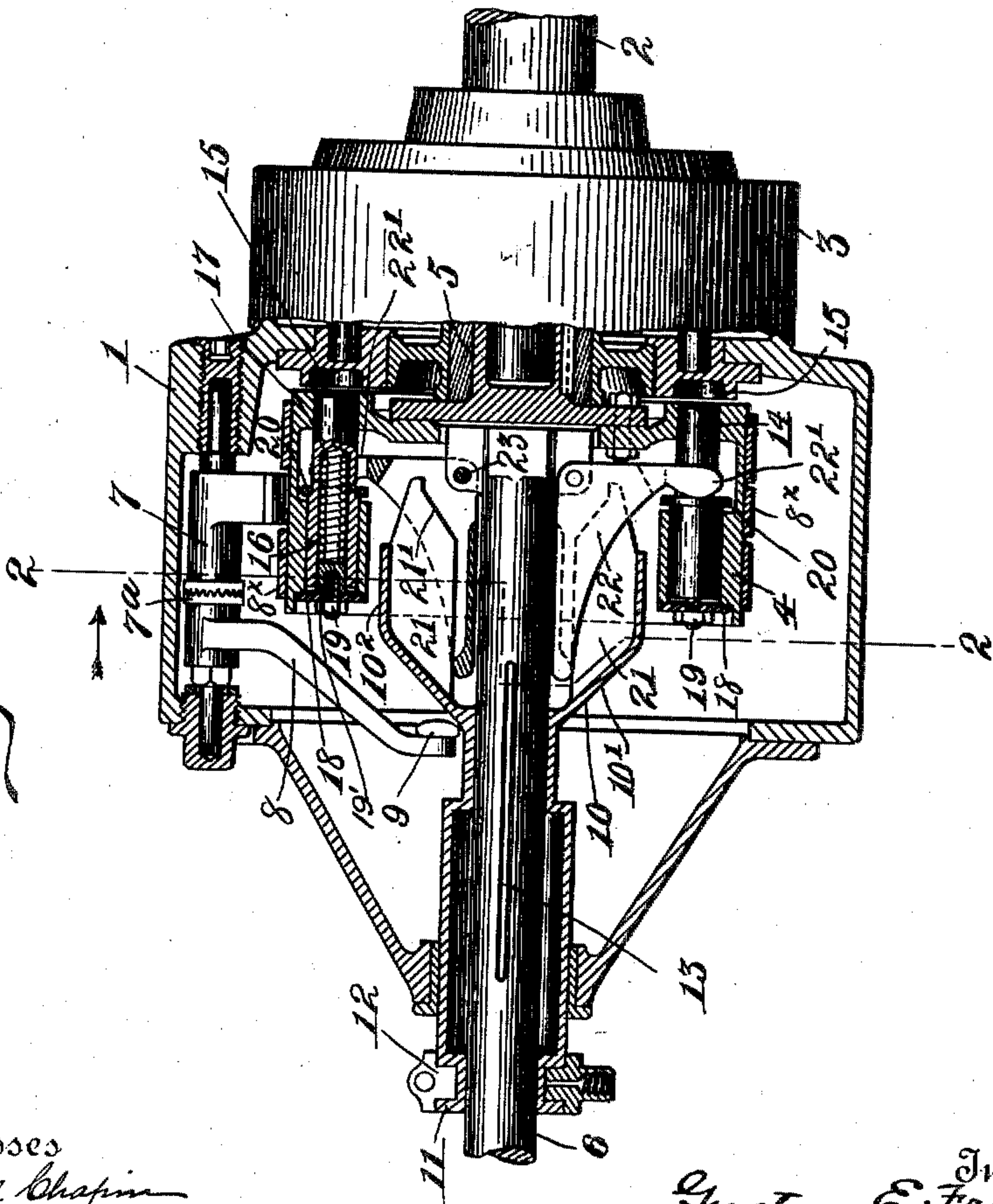


Fig. 1.



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CLUTCH.

No. 816,906.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUSTAVE E. FRANQUIST, 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.

In the use of motor-vehicles and other mechanisms employing a hydrocarbon-engine one of the greatest difficulties is found with the friction-clutch—first, to have the clutch grip with a sufficiently soft and gradual action, and, secondly, to have it bind absolutely and never slip, even under the most severe strains and conditions, when it has been fully thrown into operation. The latter requisite is particularly hard to attain with anything short of a positive clutch. An explosive-engine delivers its rotative movement in jerky impulses, which are very liable to slip the clutch, and this, taken together with the manner in which an automobile is ordinarily used over every sort and condition of road and often subjected to improper handling and suddenly-imposed strains, is sufficient to make even the best of friction-clutches slip at times. If a friction-clutch once commences to slip, even to a slight degree, the defect is bound to increase, since the slipping action causes it to heat and burn, so that it is liable to fail utterly at a critical moment. On all these accounts a friction-clutch which shall have a soft and gradual gripping action, but which shall not slip when fully thrown in, is desirable, and it is the purpose of my invention to provide a construction of friction-clutch which shall have these characteristics and advantages.

A further object of my invention is to devise a form of clutch which shall be simple and easy to construct and having a minimum number of parts.

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.

In the drawings which accompany my application I have illustrated a practical construction of clutch which embodies the principles of my invention, and in which—

Figure 1 is a longitudinal sectional view

partly in side elevation, and Fig. 2 is a section on the line 2 2 of Fig. 1 looking in the direction of the arrows.

Referring now to the figures of the drawings and to the various reference-signs appearing thereon, of which like signs designate the same parts throughout both the views, 1 indicates the driving part of a clutch and is shown in the form of a revoluble hollow casing secured to a shaft 2 and having the usual gear-box 3, which contains the reverse-speed mechanism. Within the casing 1 and coaxial therewith is a drum 4, journaled at 5 within the casing, so as to permit rotative movement of the driving part 1 with relation thereto. The drum operates any suitable mechanism by means of the shaft 6, to which it is secured, and constitutes the driven part in this form of my invention. I have shown a form of friction-clutch between the driving and the driven parts comprising a rock-shaft 7, journaled within the casing 1 and having a cam-arm 8, extending toward the axis thereof. 7^a denotes a rotative adjustment in the rock-arm for varying the relation of the parts. 9 denotes a cam-roller at the extremity of said arm. Around the drum is disposed a band or bands 8^x of spiral or any other form, which are anchored to the casing at any desired points, (not shown,) and a portion of such band or bands is attached to an arm projecting from the rock-shaft 7. By this means when the rock-shaft is turned the strap is tightened in a way which will be understood. These particular features of construction do not form a part of the present invention, having been made the subject of my prior application, Serial No. 254,657, filed April 10, 1905. I provide a sliding cam 10, having a steeply-conical face 10' and a very gradual one, 10², which is longitudinally but non-rotatably movable on the shaft 6 by means of a flanged collar 11 and an annular ring 12, engaging said collar, which may be moved to vary the position of the cam. The keyway 13 constitutes the means for maintaining the cam 10 in its non-rotatable relation with respect to the shaft 6. When the part 12 is shifted, the roller 9 rides up the conical surface of the cam 10 and applies the friction-brake. It is to be understood that this form of friction-clutch is taken merely by way of example, the essential being merely that the driving and the driven part shall have some sort of coaxial friction-faces which

can be thrown into engagement with one another.

Incorporated into the clutch and forming part of the same I have provided positive locking means for positively securing the driving to the driven part, and I have arranged this positive locking means to be thrown into action at the conclusion of the gripping movement of the frictional clutching devices. In this way it is insured that the driving and driven parts have substantially the same rotative speed before the positive clutch can be actuated, and no damage from the latter can occur. In the drawings I have illustrated a practical form of this feature of my invention comprising locking-bolts 14 14, longitudinally and slidably disposed within the drum 4. Opposite the bolts 14 and in the path of the same I have arranged cavities or recesses 15 in the casing 1, into which the bolts may enter. I prefer to arrange the bolts to be spring-pressed outward toward the casing and to have them released when necessary, so that the springs are effective to force the bolts into contact with the casing. For this purpose I form the bolts with longitudinal cavities 16 therein, which contain springs 17.

18 denotes a plate having a screw 19, threaded into a block 19' and forming an adjustable abutment for the spring 17, so as to vary its tension.

20 denotes collars surrounding the bolts 14 and adapted to be engaged by the retaining member or lever, which is simply designed to normally maintain the bolts in their withdrawn position.

It is obvious that the particular form of the bolts and their pressure-springs may be widely varied and still fall within the spirit and scope of my invention.

I will now describe the means by which the bolts are normally held in their withdrawn relation.

Upon the interior surface of the cam 10 I have arranged ribs 21, which bear on the extremities of bell-crank levers 22, pivoted at 23 upon portions of the driven part or drum. The outwardly - extending arms 22' of the bell-crank levers are bifurcated, so as to embrace the bolts 14 and bear upon the collars 20. The ribs 21 of the cam 10 have a portion to initially engage the bell-cranks which is straight and parallel with the shaft, so that motion of the cam has no effect upon the bell-cranks; but each rib has a final inclined surface 21', which permits the bell-cranks to turn. The straight portion of the rib 21 is effective to hold the arms 22' against the collars 20 and prevent the springs 17 from throwing the bolts; but when the inclined portion 21' passes over the tails of the bell-cranks they are released, and the springs 17 become effective.

The operation of my invention will be un-

derstood from the preceding description. Motion of the cam 10 first tightens the friction-clutch, and when this has been fully engaged the further motion of the cam releases the locking-bolts and allows their springs to become effective. It may happen that there is no slipping of the clutch and the bolts merely engage the walls of the casing without falling into the recesses 15; but if slipping occurs the bolts will eventually find the recesses 15 and fall into them under the influence of their springs 17, which will effectually preclude any further slipping movement.

What I claim is—

1. A clutch comprising a driving and a driven part, a sleeve slidably arranged within the latter and having a cam thereon, an arm bearing against said cam for frictionally engaging said parts together, and means for positively locking them together, said means being successively operated by continuous movement of said sleeve and cam.

2. A clutch comprising a driving and a driven part, said parts having coaxial engaging surfaces, a cam for engaging said surfaces and having ribs and separate means operated by said ribs for positively locking said parts together.

3. A clutch comprising a driving part having a spiral band and a driven part having a coaxial engaging face, a sliding cam adapted to bring said faces into engagement, and means operated by the cam at its final movement for locking the parts positively together.

4. A clutch comprising a drum, a driving part including a spiral band surrounding the drum, a cam having connections for tightening said spiral band, and means actuated by the cam in its final movement for positively locking the drum to the driving part.

5. A clutch comprising a drum, a driving part having a spiral band surrounding said drum, a coaxially-sliding wedge or cam, a lever actuated by said cam to tighten said spiral band, a locking-bolt, and a lever actuated by said cam for throwing said locking-bolt into operation at the final movement of the cam.

6. A clutch comprising a driving and a driven part, a coaxial sliding wedge or cam having two separate cam-faces thereon, a lever actuated by one of said cam-faces for frictionally engaging the driving and the driven part, positive locking means, and a second lever engaged by the other of said cam-faces for actuating the positive locking means.

7. A clutch comprising a drum, a rotatable part or casing surrounding said drum and having a band, a lever connected to the tail of said band and extending toward the axis of the drum, a locking-bolt within the drum and arranged to slide longitudinally thereof to engage said outer part or casing, a lever connected with said bolt and a sliding cam

disposed within the drum and having faces thereon arranged to successively engage both of said levers.

5 8. A clutch comprising a drum, a rotatable part or casing surrounding said drum and having a spiral band anchored thereto and surrounding the drum, a lever connected to said band and extending toward the axis of the drum, a locking-bolt, a lever for throwing
10 said locking-bolt, a cam having a steeply-inclined conical face to initially engage said first-named lever, and a slightly-inclined con-

ical face to act upon said lever at the final movement of the cam, and having additional cam-faces to act upon the lever which actu- 15
ates the locking-bolt at the conclusion of movement of the cam.

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

GUSTAVE E. FRANQUIST.

Witnesses:

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