No. 635,194. Patented Oct. 17, 1899.

L. SCHMIDT.

FRICTION CLUTCH.

(Application filed May 12, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

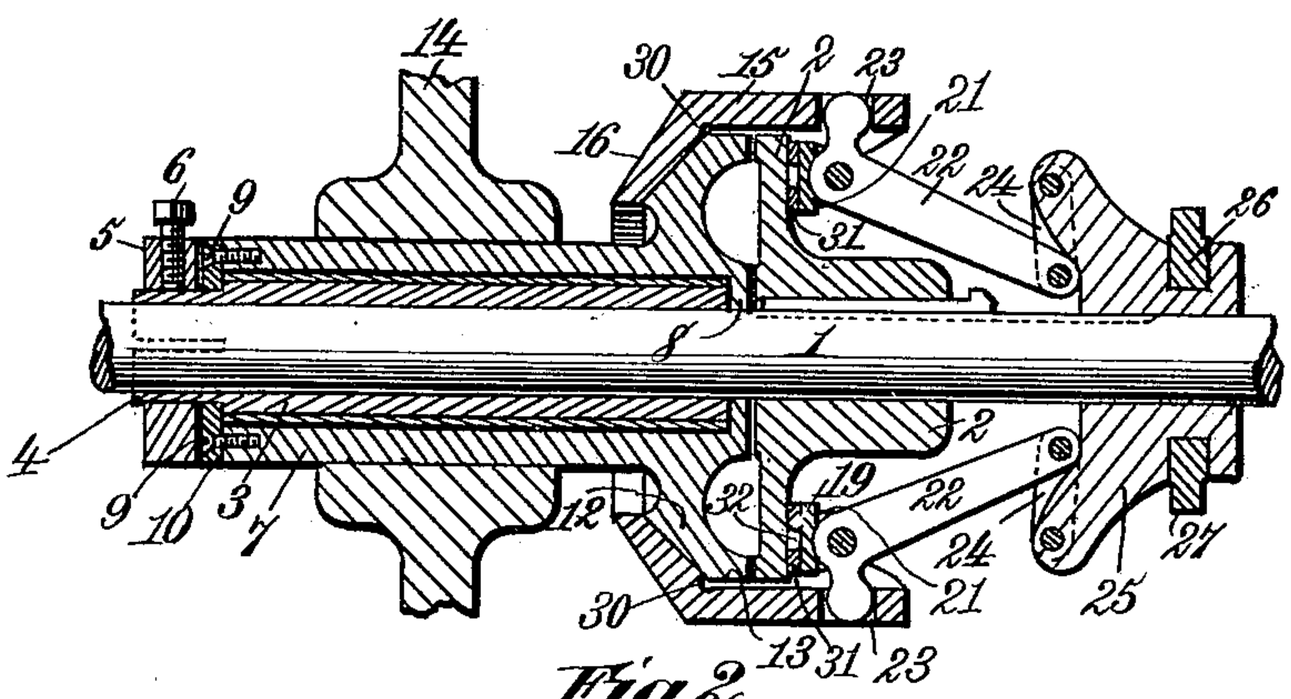


Fig. 2.

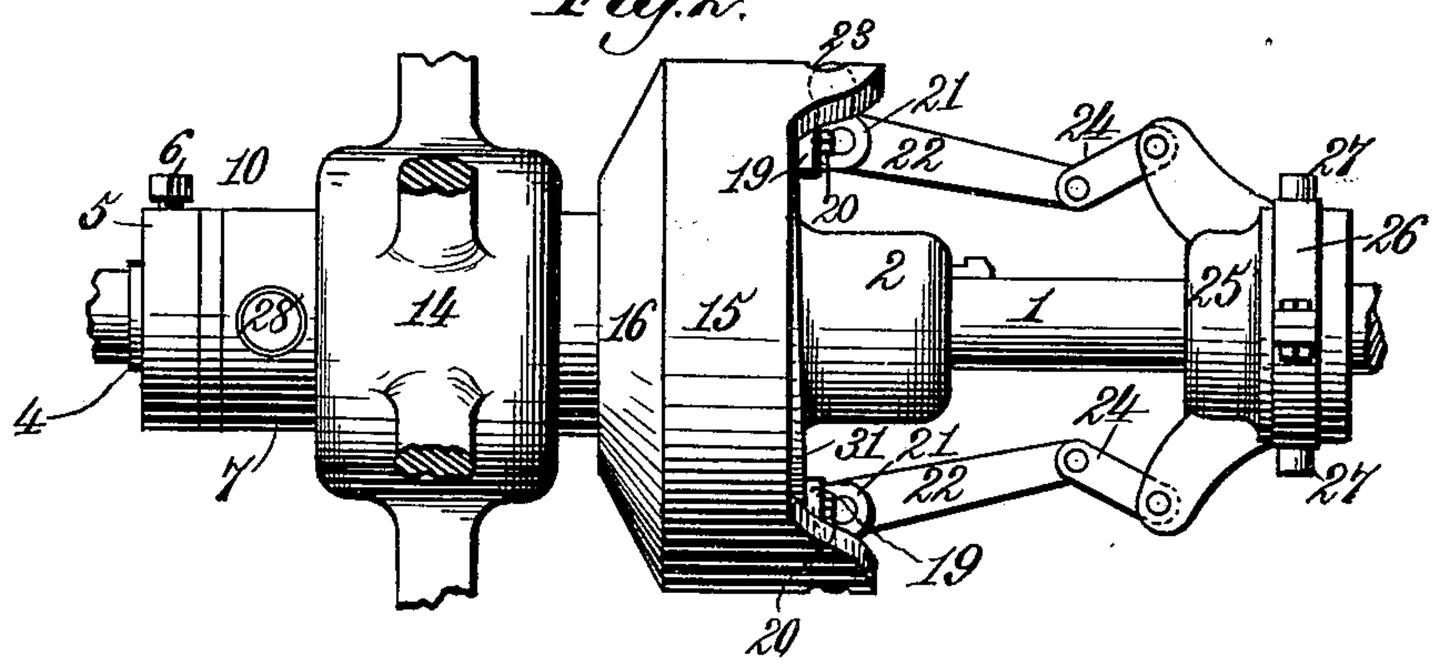
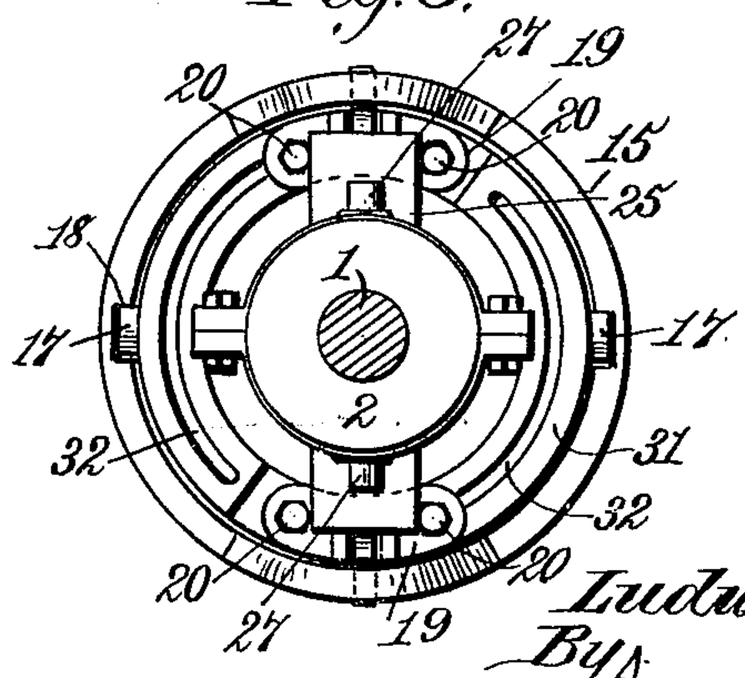


Fig. 3.



Witnesses.
Robt Everett.
W B Kelly

Inventor.
Ludwig Schmidt.
By James L. Norris.
Atty

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Fig. 4

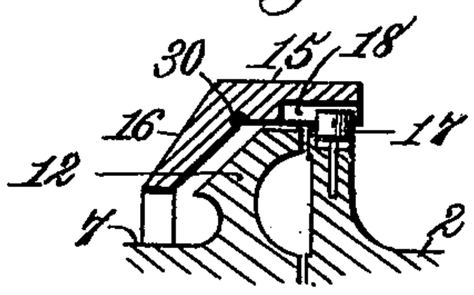


Fig. 6.

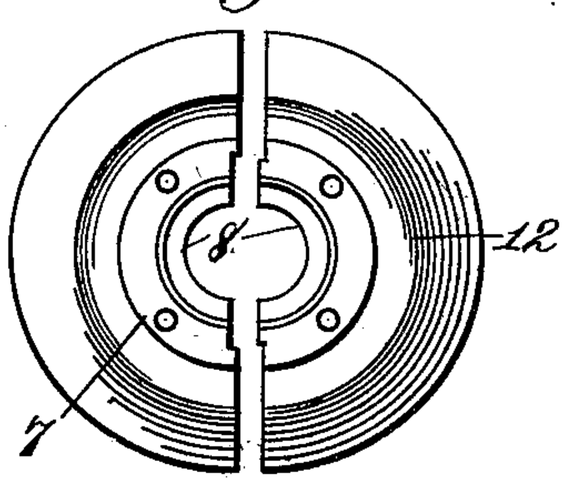


Fig. 5.

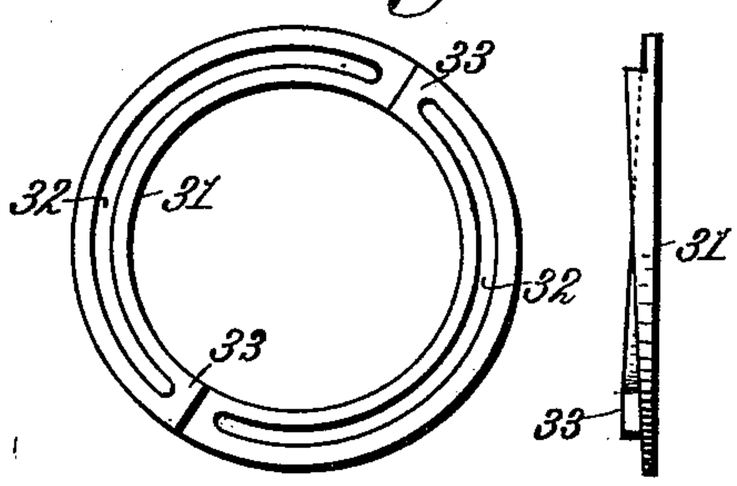
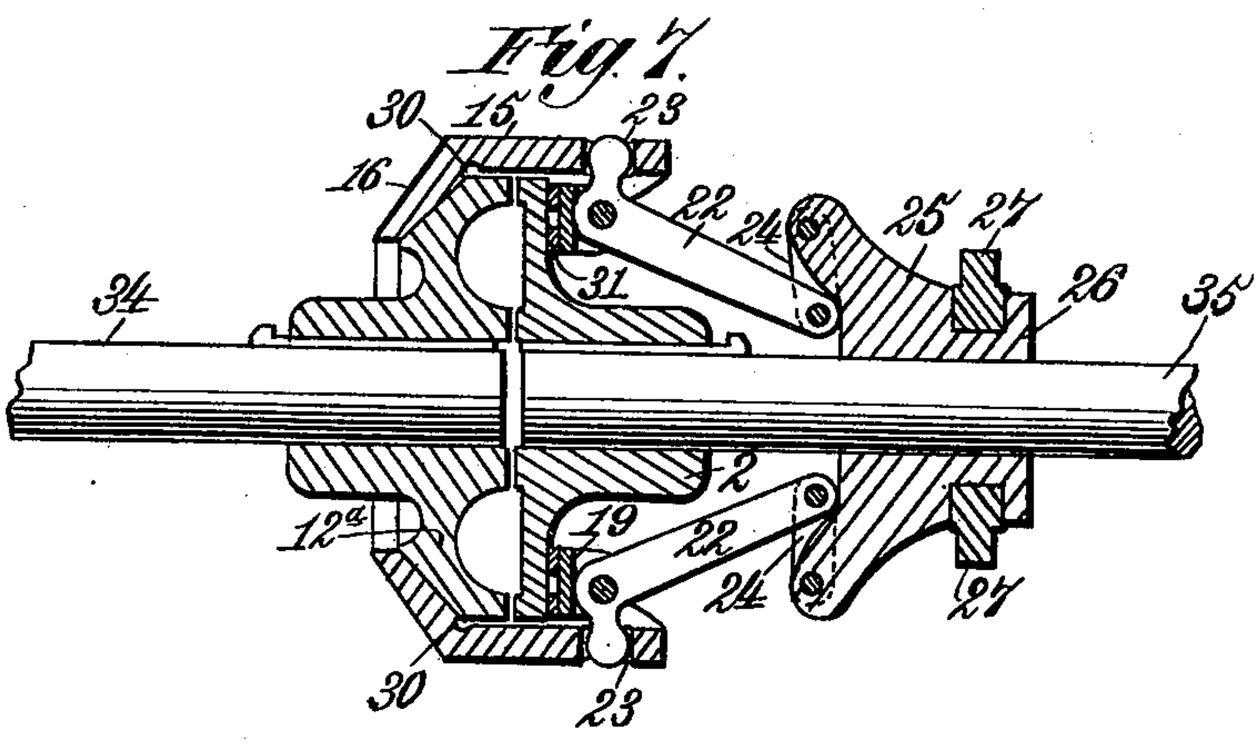


Fig 7.



Witnesses.
Robt Everett.
H B Wolfe

Inventor.
Ludwig Schmidt.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

LUDWIG SCHMIDT, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE ESSMUELLER-HYDE MILL FURNISHING COMPANY, OF SAME PLACE.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 635,194, dated October 17, 1899.

Application filed May 12, 1899. Serial No. 716,576. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG SCHMIDT, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Friction-Clutches, of which the following is a specification.

This invention relates to friction-clutches; and it has for its objects, first, to provide new and improved means for effecting frictional engagement between the clutch members; second, to provide improved means for throwing the movable clutch into and out of operation; third, to provide improved means for adjusting the parts in assembling them together and to compensate for wear, and, lastly, to improve and simplify the construction and render more efficient the operation of this class of clutches generally.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a central longitudinal sectional view of my improved clutch, showing the clutch members in engagement. Fig. 2 is a view in side elevation showing the parts in the position they assume when the clutch members are out of engagement. Fig. 3 is an end view. Fig. 4 is a detail sectional view of a part of the disk, shell, and cone. Fig. 5 illustrates a plan and edge view of the adjusting-washer. Fig. 6 is an end view of the loose sleeve on which the pulley is mounted, and Fig. 7 is a longitudinal central sectional view illustrating the clutch applied to a divided shaft.

Referring to Figs. 1 to 6 of the drawings, the numeral 1 indicates a shaft on which is keyed a disk 2, that revolves with the shaft. Arranged on the shaft opposite the disk is a bushing 3, having a reduced and split end 4, which is held immovably on the shaft by a collar 5 and set-screw 6. The collar 5 is placed over the split end 4 of the bushing and the set-screw is tapped through the collar and bears against said split end, clamping the bushing on the shaft. Loosely arranged on the bushing is a sleeve 7, provided at one end with an inwardly-projecting flange 8, that engages the corresponding end of the bushing, and has secured to its other end by screws 9 a collar 10, that engages the shoulder 11, formed on the sleeve by reducing the end, as described. The sleeve 7 is thus held against endwise movement in either direction. Formed on one end of the sleeve 7 is a cone 12, having a true cylindrical face 13, and fixed on said sleeve is a pulley 14. Disposed about the disk 2 is a cylindrical shell 15, provided with an inwardly-projecting annular flange 16, the inner face of which is frusto-conical in shape to accurately conform to the face of the cone 12. The shell 15 is free to move longitudinally on the disk 2, but is prevented from turning thereon by two antifriction-rollers 17, rotatably mounted on the periphery of the disk and engaging corresponding recesses 18, formed in the interior wall of the shell. Bearing-plates 19 are attached to the face of the disk 2 by screws 20 and are each provided with two perforated ears or lugs 21. The plates 19 are curved in the arc of a circle, for the purpose hereinafter made apparent, and are each attached to the disk by two screws 20, which pass through the opposite ends of said plates. Pivoted between the lugs 21 are bell-crank levers 22, one end of each of which projects into a slot 23, formed in the shell 15. To the opposite ends of said bell-crank levers are pivoted links 24, which latter are also pivotally connected to a collar 25, which is free to slide on the shaft 1. A circumferential groove is formed in the collar, in which is loosely disposed a ring 26, having pins 27 for the attachment of any suitable shifting lever. (Not necessary to illustrate.)

The operation of the clutch as thus described is as follows: Let it be assumed that the parts are in the position shown in Fig. 2, wherein the conical faces of the cone and shell are out of engagement. Then while the shaft and the bushing 3 revolve the sleeve 7, being loosely mounted on the bushing, together with its attached pulley, will remain motionless. The bell-crank levers 22 and the links 24 will then be in the position shown in

Fig. 2, and the centrifugal movement will operate to maintain them in such position, thus holding the clutch members separated against any possibility of their becoming accidentally engaged or thrown into operative frictional contact. When it is desired to rotate the pulley 14, the collar 25 is moved toward the disk 2 by means of the collar 26, operated on by a suitable shifting lever, causing the bell-crank levers 22 to retract the shell and draw the conical faces of the cone and shell into close intimate contact, as shown in Fig. 1, whereupon said cone and its sleeve and pulley will rotate with the shell, disk 2, and the shaft. When the parts are in this position, the pivotal points of the links 24 will be approximately in alinement, or rather their pivotal points of connection with the levers will be thrown very slightly past a line passing through their pivotal points of connection with the collar, whereby the shell will be held immovable and will be locked in engagement with the cone.

An oil-cup 28 is fixed on the sleeve 7, whereby oil may be constantly supplied to the interior of the sleeve and to the bushing. If the shaft is driven by the pulley, however, it is preferable to place the oil-cup on the collar 5 and connect it by a channel or duct with the space between the sleeve and bushing in order that the cup may be filled when the shaft is at rest. An annular groove 30 is formed in the interior of the shell 15 and operates as a reservoir for oil for lubricating the contacting portions of the cone and shell. The oil is introduced between the cone and shell when the latter are thrown out of operative contact.

In order to adjust the parts in assembling them and to compensate for wear, I provide the following means: Arranged between the face of the disk 2 and the bearing-plates 19 is a washer 31, having formed therein two segmental slots 32, through which the screws or bolts 20 pass. The face of the washer adjacent to the bearing-plates is formed with two segmental reversely-inclined cams 33, against which the bearing-plates lie. It will be obvious that by loosening the screws or bolts 21 and turning the washer the cams 33 will throw the bearing-plates to a greater or less extent from the face of the disk, and as the bearings of the bell-crank levers are on one bearing-plate the fulcrums of said levers will be adjusted not only to cause the shell to properly engage the cone, but also to cause the links 24, when the cone and shell are in engagement, to assume the proper position relatively to the collar to lock the clutch in operative position. After the parts have been adjusted as desired the bolts or screws 20 should be tightened up. It will be noted that the reversely-inclined cams act on the bearing-plates simultaneously and to exactly the same extent. Hence the throw of both bell-crank levers will be uniform.

In Fig. 7 of the drawings I have illustrated the clutch applied to a divided shaft. Referring to said drawings, the numeral 34 indicates the driving portion of the shaft and 35 the driven portion, or that portion which receives its motion from the part 34. The disk 2 is keyed on the shaft 35 and, together with the shell 15, bell-crank levers 22, links 24, and collar 25, is constructed and operates in precisely the same manner as that before described. In the present instance, however, the cone 12^a is keyed to the shaft 34 and revolves therewith. Hence when the shell 15 is thrown into frictional contact with the cone 12^a the two portions 34 and 35 of the shaft will be fixed relatively to each and will be caused to rotate together.

Having described my invention, what I claim is—

1. In a friction-clutch, the combination of a shaft a disk attached to the shaft, a loosely-mounted cone, a shell encircling the disk and cone, slidably mounted on the periphery of the disk to rotate therewith, but movable longitudinally over the disk independent thereof, said shell having a frusto-conical flange and a cylindrical surface, a shifting collar secured to the shaft, and devices operated by the collar to shift the encircling shell longitudinally over the disk, while engaged therewith, to impart motion to the cone, substantially as described.

2. In a friction-clutch, the combination of a shaft, a disk attached to the shaft, a loosely-mounted cone, a shell encircling the cone and disk, slidably engaged with peripheral parts of the disk to rotate therewith, but movable longitudinally over the disk independent thereof, said shell having a frusto-conical flange and a cylindrical surface, a shifting collar secured to the shaft, links pivoted to the collar, and bell-crank levers pivotally mounted on the disk, engaged with said shell and pivoted to said links to shift the encircling shell longitudinally over the disk, while engaged therewith, to impart motion to the cone, substantially as described.

3. In a friction-clutch, the combination of a shaft, a disk attached to the shaft and having rollers at its periphery, a loosely-mounted cone, a shell encircling the disk and cone and having a frusto-conical flange and a cylindrical surface constructed with interior recesses to receive the said rollers on the disk, a shifting collar secured to the shaft, and devices operated by the collar to shift the encircling shell over the cone and disk, while the rollers on the latter engage the recesses in the shell, to impart motion to the cone, substantially as described.

4. In a friction-clutch, the combination of a shaft, a disk attached to the shaft and having rollers at its periphery, a loosely-mounted cone, a shell encircling the disk and cone and having a frusto-conical flange and a cylindrical surface constructed with internal recesses to receive said rollers on the disk, a shifting collar secured to the shaft, links piv-

oted to the collar, and bell-crank levers pivotally mounted on said disk, engaged with said encircling shell and pivoted to said links, to shift the shell over the cone and disk, while the rollers on the latter engage the recesses in the shell, to impart motion to the cone, substantially as described.

5. The combination with the shaft, the disk secured thereto, and the loosely-mounted cone, of the shell encircling the disk and cone, constructed to frictionally engage the latter and having longitudinally-sliding engagements with parts on the periphery of the disk, whereby the shell and disk rotate in unison, while the shell can move longitudinally independent of the disk, a shifting collar on the shaft, links pivoted to the collar, and bell-crank levers pivotally mounted on said disk, engaged with said encircling shell and pivoted to said links, substantially as described.

6. The combination with the shaft, the disk secured thereto, and the loosely-mounted cone, of the shell encircling the disk and cone and having longitudinal, interior recesses, rollers mounted on the periphery of the disk and engaging said recesses, whereby the shell and disk rotate in unison while the shell can move longitudinally independent of the disk, a shifting collar on the shaft, links pivoted to the collar, and bell-crank levers pivotally mounted on the disk, directly engaged with said shell and pivoted to said links, substantially as described.

7. In a friction-clutch, the combination with a shaft, of a disk fixed thereon, a rotatable sleeve disposed opposite the disk and provided with a cone on one end the base of which is in juxtaposition to the disk, a shell longitudinally movable on the disk but held against rotation thereon and provided with a frusto-conical-shaped flange arranged to engage the face of the cone, bearing-plates fixed to the face of the disk by bolts or screws, bell-crank levers fulcrumed on said bearing-plates and each engaging at one end the shell, means for rocking said levers to throw the shell into and out of contact with the cone, and an annular washer disposed between the bearing-plates and disk and provided with segmental slots through which the said screws or bolts pass, said washer being provided with two reversely-inclined cams against which the bearing-plates bear, substantially as described, and for the purpose specified.

8. In a friction-clutch, the combination of a shaft, a disk secured thereto, a bushing arranged on the shaft and having a split, elastic outer end reduced to form an annular shoulder, a pulley-carrying sleeve loose on the bushing and having a flanged inner end engaging the inner end of the bushing, a collar secured to the outer end of the sleeve and bearing against said annular shoulder of the bushing, a collar mounted on the split end of the bushing and having a set-screw for compressing said split end against the shaft, a cone forming a part of the inner flanged end of the sleeve, a cylindro-conoidal shell encircling the disk and cone and slidably engaged with peripheral parts of said disk, whereby the disk and shell rotate together while the shell can move longitudinally independent of the disk, and a shifting collar on the shaft, connected with the disk and shell for moving the latter longitudinally independent of the disk, substantially as described.

9. In a friction-clutch, the combination with a disk, a cone disposed opposite the disk, the base of said cone being arranged in juxtaposition to the disk, a shell longitudinally movable on the disk but held against rotation thereon and provided with a frusto-conical-shaped flange arranged to engage the cone, and means for shifting said shell longitudinally on the disk to throw its flange into and out of contact with the cone, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LUDWIG SCHMIDT.

Witnesses:
C. F. WIPPLES,
WM. C. ESSMUELLER.