(No Model.) 2 Sheets—Sheet 1.

F. H. RICHARDS.

FRICTION CLUTCH.

No. 481,194. Patented Aug. 23, 1892.

Fig. 1

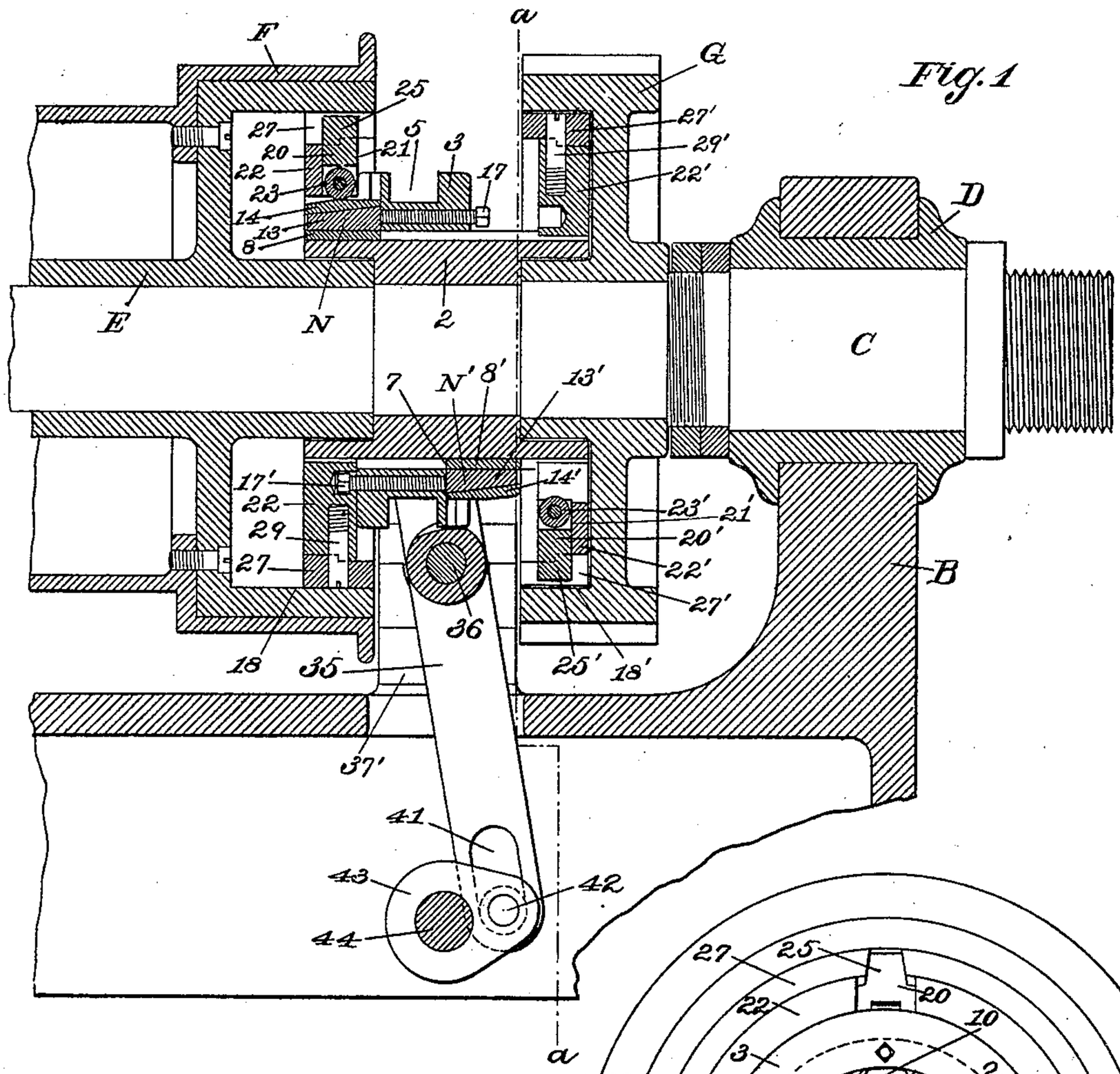
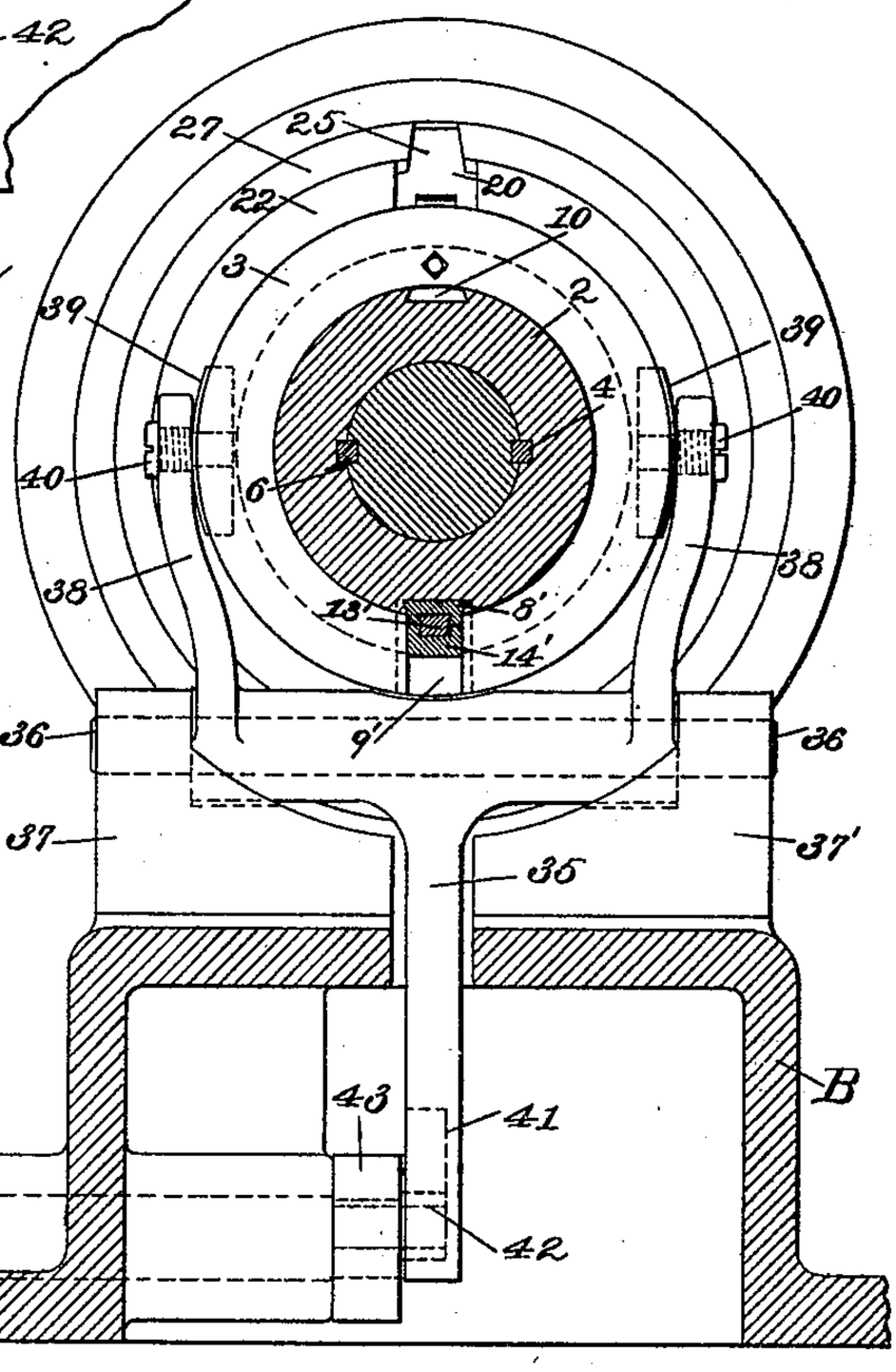


Fig. 2



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(No Model.) 2 Sheets—Sheet 2.

F. H. RICHARDS.

FRICTION CLUTCH.

No. 481,194. Patented Aug. 23, 1892.

Fig. 3

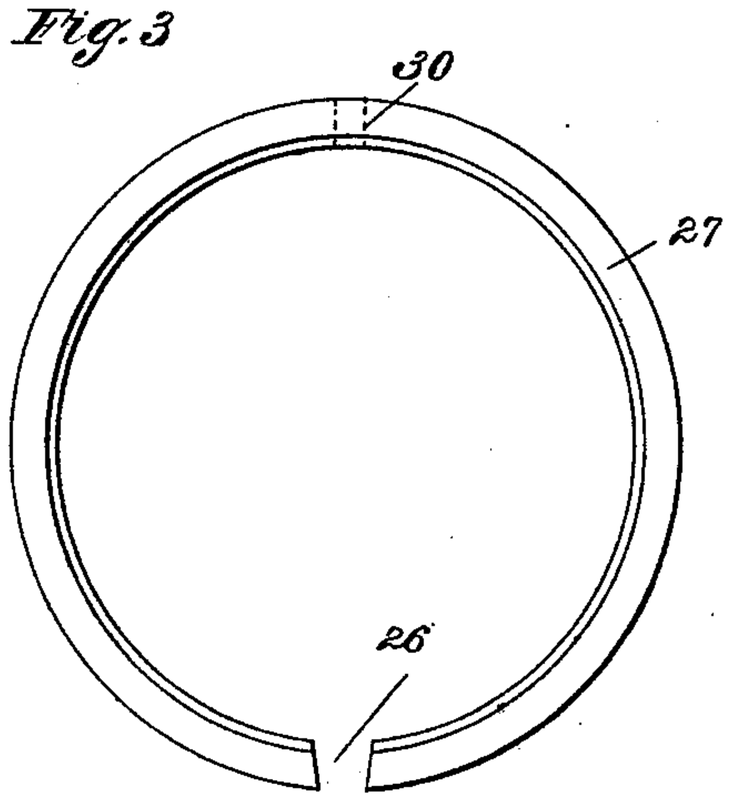


Fig. 4

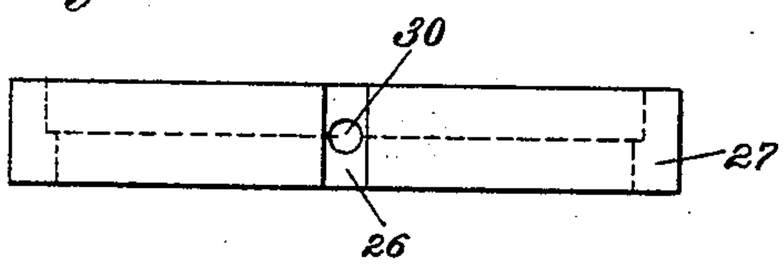


Fig. 5

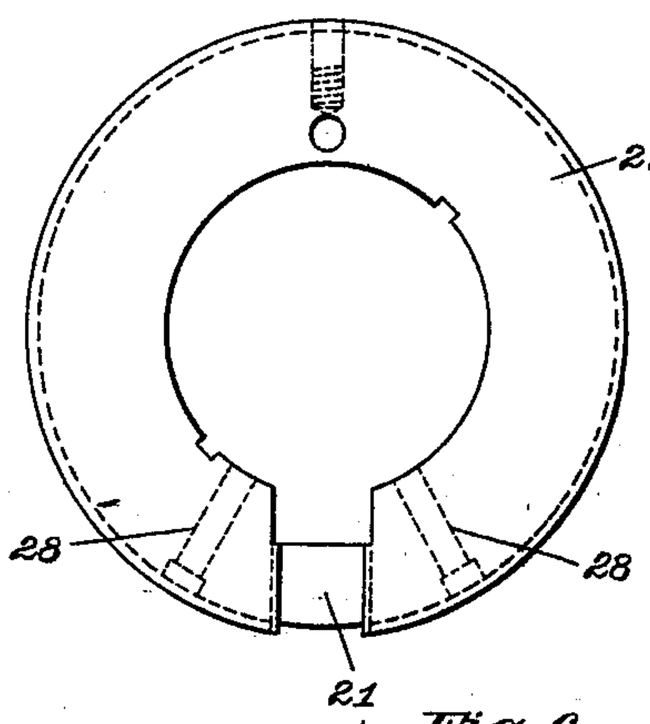


Fig. 6

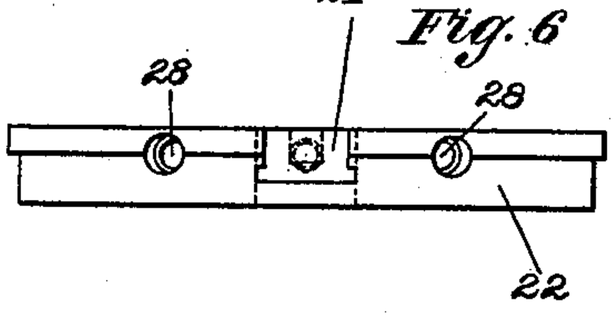


Fig. 7

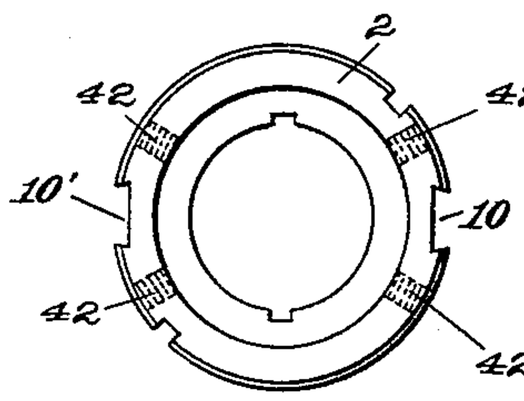


Fig. 8

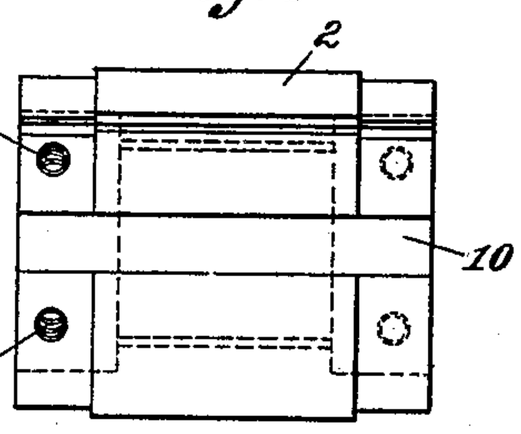


Fig. 11

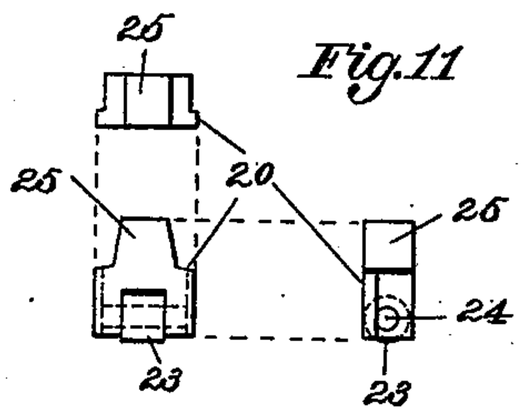


Fig. 12

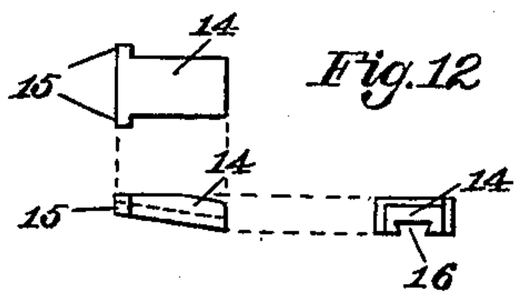


Fig. 13

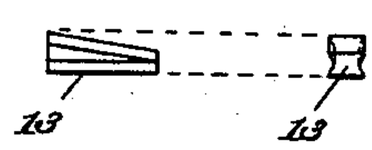


Fig. 14

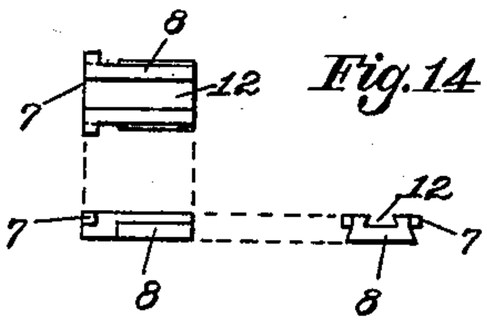


Fig. 9

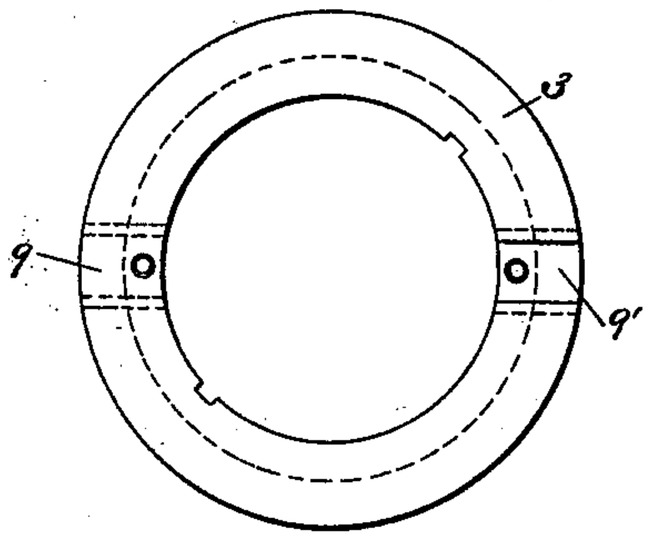
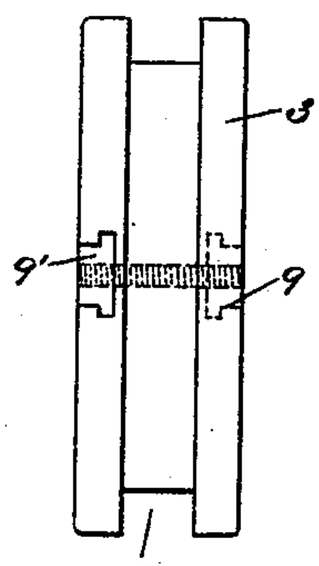


Fig. 10



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FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 481,194, dated August 23, 1892.

Application filed November 23, 1891. Serial No. 412,869. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, 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 Friction-Clutches, of which the following is a specification.

This invention relates to friction-clutches for lathe-heads, the object being to provide an improved friction-clutch mechanism having expansible friction-rings and improved apparatus for actuating the same.

The invention is adapted for use in connection with that class of back-geared lathe-heads shown in Figure 1 of the Letters Patent of the United States No. 308,321, granted to me August 12, 1884, which said lathe-head comprises a lathe-head frame having spindle-bearings, a lathe-spindle, a cone-pulley, the spur-wheel G, loosely mounted on the spindle, a pinion fixed to the cone-pulley, and a back-gear shaft having thereon a large gear meshing with said cone-pulley pinion and a small gear or pinion meshing with said spur-wheel. Those only of said parts which are necessary to an understanding of my present improvements are shown in this application.

In the drawings accompanying and forming a part of this specification, Fig. 1 is a vertical longitudinal section of a portion of a lathe-head furnished with my present improvements. Fig. 2 is a vertical cross-section of the same in line *a a* of Fig. 1, as seen from the right hand of said line. Figs. 3 and 4 are front and edge views, respectively, of the expansible friction-ring. Figs. 5 and 6 are two similar views of the friction-ring carrier, which also carries the ring-expanding wedge. Figs. 7 and 8 are respectively an end view and side view of the clutch-sleeve. Figs. 9 and 10 are an end and a side view, respectively, of the sliding clutch-actuating ring. Fig. 11 shows three views of the wedge for expanding the friction-ring. Fig. 12 shows three views of the clutch-cam upper plate. Fig. 13 shows two views of the clutch-cam-adjusting wedge. Fig. 14 shows three views of the clutch-cam lower plate.

Similar characters designate like parts in all the figures.

In Figs. 1 and 2 is shown a portion of a lathe-head frame designated by B and carrying the usual lathe-spindle C, journaled, as usual, in suitable bearings, as D. A quill E is fitted in the usual manner to turn freely on the spindle and carries fixed thereto, by screws or otherwise, the usual cone-pulley F, whose hub or center consists of said part E. A spur-wheel G, designed to mesh with the usual back gear, (not shown herein,) is fitted to turn freely on the spindle C. Said pulley F or, as herein shown, the "quill" thereof, is constructed with an internal friction-face 18 and the gear G with the similar friction-face 18′, within which the two friction-rings of the double clutch are to be expanded into frictional engagement with said parts respectively. The pulley-clutch is used for driving the spindle rapidly, while the spur-wheel clutch is for reducing that speed by bringing into action the aforesaid back gearing.

The details of each of the clutches being of similar construction, the parts of the gear-clutch are designated by the same characters as the corresponding parts of the pulley-clutch, with the addition of the usual "prime mark."

The pulley-clutch friction-ring 27 and the gear-clutch friction-ring 27′ are carried by the two friction-ring carriers 22 and 22′, respectively, which carriers are fixed upon the opposite ends of a clutch-sleeve 2, that is firmly secured to the spindle C. Said clutch-sleeve is or may be keyed to the spindle by means of the keys 4 6, Fig. 2, and the carriers are shown held in place thereon by means of ordinary keys and by screws reaching through the holes 28, Figs. 5 and 6, into the corresponding threaded holes 42, Figs. 7 and 8. The friction-rings 27 and 27′ are fitted to close upon said carriers respectively, and when thus located turn freely within the said friction-faces 18 18′, respectively, which rings are kept from rotation on said carriers by means of the studs 29 29′, fixed in the carriers and fitting freely, but closely, within the holes 30 of the rings. Opposite to the holes 30 the friction-rings (see Figs. 3 and 4) are divided at 26 upon converging lines, corresponding to the size and angle of the wedges 25 25′, (see Fig. 11,) which are fitted to slide within the channels 21 21′ of said carriers, respectively,

said wedges being held within said channels by the ribs 20, fitting in corresponding grooves, as shown, in the sides of said channels and being furnished with the rollers 23 23′. A clutch-actuating ring 3 is fitted to slide freely on the sleeve 2, and has a groove 5 formed therein to receive the shoes of the clutch-lever, by means of which the said ring is actuated. A T-shaped slot 9 is formed in the ring 3 to receive the similarly-formed end 7 of the lower cam-plate 8, which plate is fitted to slide in a V-shaped and undercut groove 10, formed in the sleeve 2. In the cam-plate 8 there is formed a V-shaped groove 12, into which the cam-adjusting wedge 13 is fitted. The upper cam-plate 14 also has a T-shaped end 15, formed to fit the said groove 9 of the ring 3, and has a V-groove 16 to engage the wedge 13. The above-described parts being grooved and tongued together substantially as described constitute an adjustable wedge-actuating cam, designated in a general way by N, which engages the sliding clutch-ring 3, whereby it may be moved backward and forward between the two clutches. During that movement the cam is kept in place diametrically of the ring 3 by its engagement with the undercut edges of the groove 10, and the parts 8, 13, and 14 of the cam are similarly held together by the interlocking grooves and edges thereof. An adjusting-screw 17, carried by the ring 3, is provided for adjusting the wedge 13 by sliding this between the cam-plates to take up any wear of the parts.

For engaging or disengaging the clutch by hand I have provided a clutch-lever 35, carried by a stud 36, that is journaled in bearings 37 37′, fixed on the head B. The upper end of said lever is bifurcated, the arms 38 38 thereof being provided with shoes 39 39, carried by studs 40 40, fixed in said arms in a well-known manner, which shoes engage the groove 5 of the ring 3. The lower end of the lever 35 has a slot 41 formed therein to receive the crank-pin 42 of the crank-arm 43, which is carried fixed to the inner end of the shaft 44, that is journaled in the head B. Said shaft may be turned to swing the lever forward or backward by means of a suitable handle, as 45, to throw into engagement one or the other of the pair of clutches and thereby drive the lathe with a quick speed or a slow one, as may be required. By throwing the handle 45 toward the right hand in Fig. 1 the ring 3 is moved toward the left hand, thereby forcing the cam under the roll 23 and the wedge 25 outward into the aforesaid opening 26 of the friction-ring 27, thereby expanding said ring into engagement with the driving-pulley. By throwing said handle toward the left hand the opposite cam drives the wedge 25′ outward and expands the friction-ring 27′ into engagement with the gear G to drive the spindle through the usual back gears at a slower speed. When the clutch-ring 3 is in the position shown in Fig. 1, (the driving-pulley not being revolving,) the screw 17 is accessible for adjusting the cam of the pulley-clutch, and when said ring is thrown to the right hand the screw 17 is similarly accessible.

Having thus described my invention, I claim—

1. In a clutch mechanism, the combination, with the friction-ring and its expanding-wedge, of the sliding clutch-ring, an adjustable wedge-actuating cam carried by the clutch-ring, and means for adjusting the cam to regulate the expansion of the friction-ring, substantially as described.

2. In a clutch mechanism, the combination, with the friction-ring carrier and the friction-ring thereon, of the friction-ring-expanding wedge, the sliding clutch-ring, and a cam carried by the clutch-ring and constructed, substantially as described, to be expansible by a wedge therein, and means carried by the clutch-ring for adjusting the cam-wedge, substantially as described.

3. In a clutch mechanism, the combination, with the friction-ring carrier 22, having the groove 21 radially thereof, of the friction-ring on said carrier, means for holding said ring from rotation thereon, the friction-ring-expanding wedge fitted to slide in said groove, the cam actuating said wedge, and means for sliding said cam under and from under the wedge, substantially as described.

4. In a clutch mechanism, the improved cam, comprising the lower cam-plate, the upper cam-plate, and the cam-adjusting wedge intermediate to said plates and connecting the plates together by a sliding engagement therewith, substantially as described.

5. In a clutch mechanism, the combination, with the sliding clutch-ring having the cam-engaging slot, of the cam consisting of the plates engaging in said slot and having the wedge intermediate to said plates and the screw 17, carried in the ring and bearing against the wedge for adjusting the cam by the sliding of the wedge therein, substantially as described.

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