

No. 731,871.

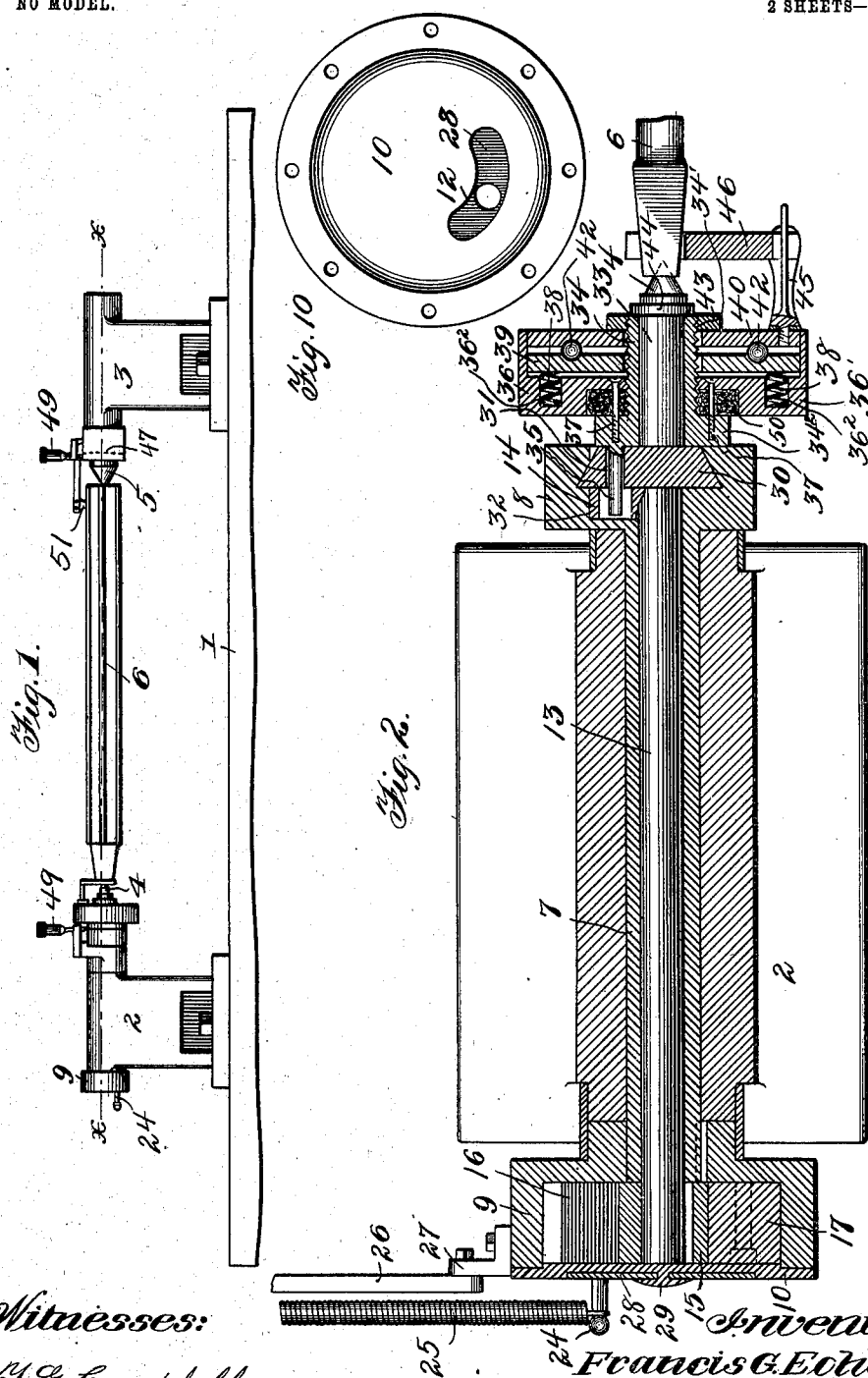
PATENTED JUNE 23, 1903.

F. G. ECHOLS.
FRICTION INDEXING MECHANISM.

APPLICATION FILED DEC. 18, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

J. B. Campbell.

Frances E. Blodgett.

Inventor:

Francis G. Echols.

By his Attorneys

Stratton & Peck

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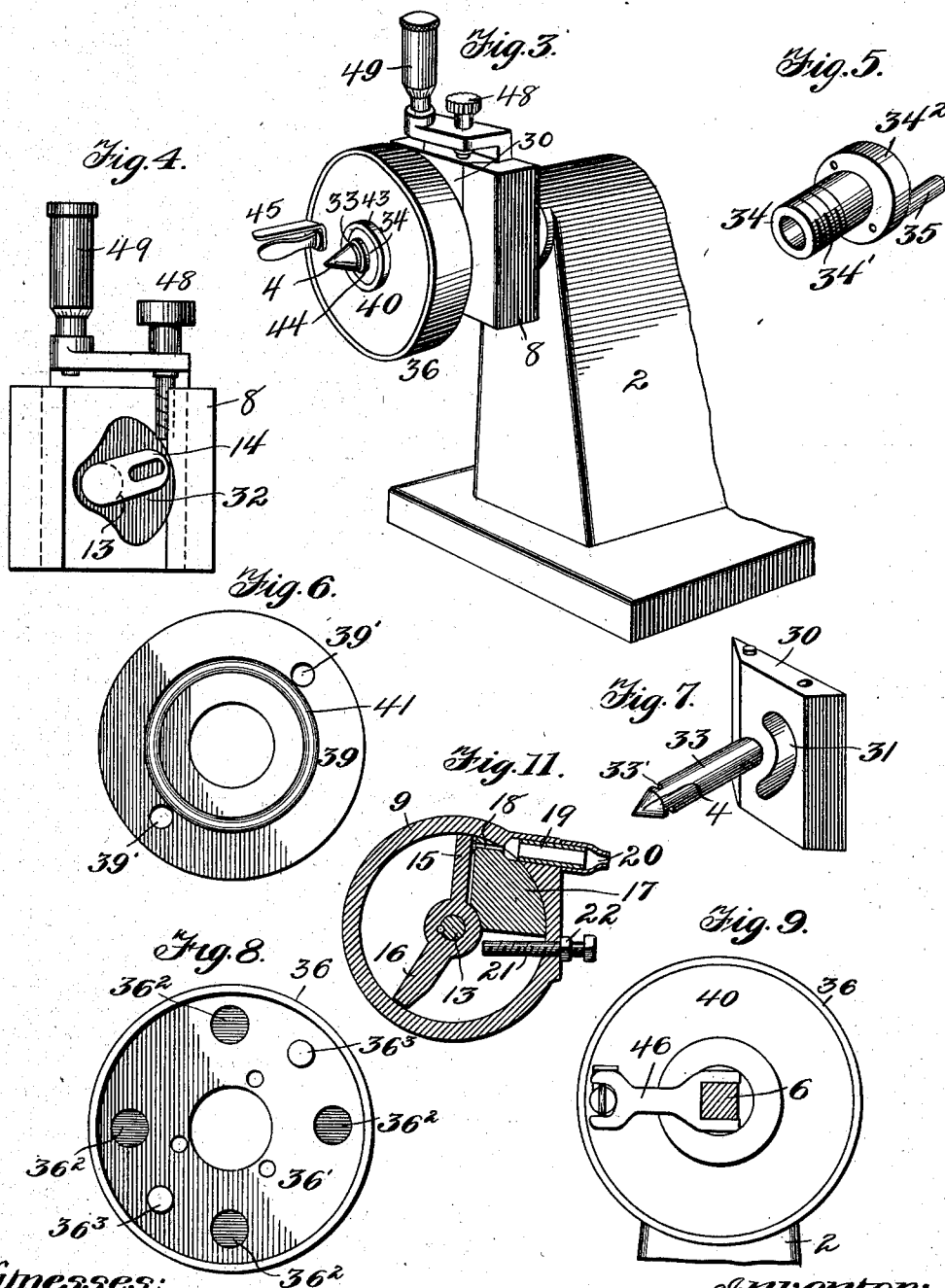
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UNITED STATES PATENT OFFICE.

FRANCIS G. ECHOLS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF NEW JERSEY.

FRICTION INDEXING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 731,871, dated June 23, 1903.

Original application filed August 25, 1902, Serial No. 120,953. Divided and this application filed December 18, 1902. Serial No. 135,793. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS G. ECHOLS, 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 Mechanism, of which the following is a specification.

My invention relates to friction mechanism, and is shown employed for indexing purposes, although in some of its details it is not restricted to such use; and it has for its object the provision of frictional devices of peculiar construction located between an article to be rotated and means for actuating said frictional devices whereby a yielding or slipping connection is provided which will prevent injury in case of resistance to the movement of the article and will also permit the said article to be moved too far and then returned to the exact position required for correct indexing purposes.

A further object of the invention is the provision of friction-disks held in a chambered carrier and of means for actuating said carrier and for connecting one of the disks with the device to be actuated.

In the accompanying drawings, Figure 1 is a side elevation of a table and my improved friction mechanism in place on a head thereof. Fig. 2 is a horizontal section taken on line *xx* of Fig. 1. Fig. 3 is a perspective view of my improvement and of part of the head carrying the same. Fig. 4 is a front elevation of a guideway, showing a crank for actuating the friction devices. Fig. 5 is a perspective view of a sleeve hereinafter described. Fig. 6 is a face view of one of the friction-disks. Fig. 7 is a perspective view of a slide carrying a center on which the sleeve shown in Fig. 5 is mounted. Fig. 8 is a face view of the chambered carrier in which the friction-disks are mounted. Fig. 9 is an end view of said carrier, illustrating a means which may be employed for connecting the outer friction-disk with the article to be actuated. Fig. 10 is a face view of the cover to the piston-chamber, and Fig. 11 is a vertical section through said piston-chamber.

Like numerals designate similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates a table which so far as the invention is concerned may be either reciprocatory or stationary and carries a head-stock 2 and a tail-stock 3, each provided with centers 4 and 5, respectively, as illustrated in Fig. 1, said centers acting as supports for work 6, shown as a reamer-blank in said figure.

Mounted in a bearing of the head-stock 2 is a tubular shaft 7, having at one end a head 8 and at its opposite extremity a piston-chamber 9, the latter being provided with a cover 10, having a curved slot 12 for a purpose hereinafter described. Within this shaft 7 is a shaft 13, carrying at one end a slotted crank 14 and at its other end a piston 15, having a wing 16 projecting from its hub, as illustrated in Fig. 11. Located in the piston-chamber is an abutment 17, having a port 18 leading to a nipple 19, the latter communicating with a pipe 20, leading to a source of fluid-pressure. (Not shown.) Threaded into the wall of the piston-chamber is a screw 21, on which is jam-nut 22, said screw serving as an adjustable stop for limiting the stroke of the piston, and hence controlling the movement of the shaft to which it is attached, as will be hereinafter explained.

Projecting from the wing 16 and passing through the curved slot 12 in the cover 10 of the piston-chamber is a pin or stud 24, to which is connected one end of a spring 25, whose other extremity is attached to an arm 26, adjustably secured to a bracket 27 on the exterior of said piston-chamber. This pin or stud passes through a rocking plate 28, secured to the cover by a rivet 29 or otherwise, said plate fitting in a recess of the cover and serving to prevent leakage of fluid through the slot 23.

Fitted in a guideway of head 8 is a slide 30, having a curved slot 31. This head is also recessed or cut away, as at 32, to afford room for the sweep of the crank 14, as shown in Fig. 4. Projecting from said slide 30 is a center 33, notched at 33' for a purpose here-

inafter mentioned, and loosely mounted on this center is a sleeve 34, exteriorly threaded at 34' and having a flange 34², carrying a wrist-pin 35, the latter passing through the slot 31 of the slide and entering the slot of crank 14. (See Fig. 2.) Threaded upon the sleeve 34 is a cup-like carrier 36, which is additionally secured to the flange 34² of the sleeve by screws 37, the base 36' of this carrier being provided with clutch-pins 36³ and with a series of recesses 36² for the reception of springs 38, as illustrated in Figs. 2 and 8. Located within the flange or cup of the carrier are friction-disks 39 and 40, preferably provided with raceways 41, in which are placed balls or rollers 42, although these balls and raceways may be omitted, if desired, each of these disks loosely surrounding the sleeve 34, and the disk 39, having holes 39' for the reception of the pins 36³, projecting from the base of the carrier. A nut 43, threaded upon the sleeve, serves to force the disk 40 against the disk 39 with the necessary degree of pressure, and a washer 44, sprung into the notches 33' of the center 33, prevents endwise movement of the sleeve 34 upon said center. Carried by disk 40 is a fork 45 for the reception of the arm of a lathe-dog 46, (shown employed to connect said disk with the work or other article 6 to be indexed.) In the tail-stock the center is carried by a slide 47, and for adjusting the slides 30 and 47 to vary the positions of the centers screws 48 and vernier-stops 49 may be employed, as shown in Figs. 1, 3, and 4. Dust-excluding packing 50 is seated in a recess in the base of the carrier 36 and bears against the flange of the crank-sleeve 34, as shown in Fig. 2, and a resilient or other stop 51 may be provided to insure correct indexing.

In the operation of my invention the friction-disk 40 is connected in any desired manner with the device to be indexed. Fluid, such as compressed air, is then introduced to the piston-chamber 9 by means of the pipe 20, and the pressure of said fluid forces the piston 15 around in the chamber until the wing 16 comes into contact with the adjustable stop 21, which, as above stated, regulates the extent of its movement. As has been before set forth, the hub of the piston is keyed to the shaft 13, and as such piston is rocked or oscillated the shaft will of course turn with it, thereby causing the crank to actuate the wrist-pin 35 projecting from the flanged head 34² of the sleeve 34. As this sleeve is rocked by the means described the cup-shaped carrier 36 moves with it and the disk 40, which is connected with the device to be actuated, also moves bodily with the cup and its companion disk 39, and thereby imparts movement to the device with which it is connected. As the piston and its shaft are rocked or oscillated the spring connected to the stud 24 projecting from the wing 16 of said piston is distended, and after the supply of motive fluid

has been cut off from the pipe 20 this spring will return the parts to normal position, and should the device have been turned too far the spring in thus returning the parts will cause the article to be brought against the stop or resistance element 51, which may be employed for determining its proper position. When this is done, the disk 40 will of course be held stationary by the stop, and the carrier and disk 39 will have a slipping movement thereon or on the interposed balls. These balls prevent excessive friction between the disks 39 and 40, and yet permit a sufficient pressure or frictional engagement of said balls and disks to enable the carrier and said disks to rotate the device with which one of them is connected, the disk 40 being held stationary by the stop 51 in contact with said device, and the other disk 39 having a slipping movement when the piston-shaft is returned to normal position and the piston 15 is forced against the abutment 17 by the spring above mentioned.

No claim is herein made to the combination of the friction-disks and their carrier shown and described with the other parts of the particular machine illustrated, for such combination is set forth and claimed in my application filed August 25, 1902, Serial No. 120,953, of which the present case is a division; nor is claim made to the peculiarities of the motor mechanism, elements of which are shown herein, said motor mechanism constituting the subject-matter of my application filed December 18, 1902, Serial No. 135,794.

Changes may be made in the form and construction of the carrier and friction-disks without departure from the invention, and the invention is not limited to its employment with any specific machine, for, as is obvious, it may be used in other relations different from that shown and described.

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

1. The combination with a machine element comprising a chambered carrier and a pair of friction-disks mounted in said carrier, one of said disks being held against rotation and the other being oscillatory, of a device carried by one of the disks and adapted to connect it with means to be actuated.

2. The combination, with an oscillatory carrier, of a pair of friction elements supported on the carrier, and means connecting one of said elements with the device to be actuated.

3. The combination, with a rotatable carrier, of friction-disks mounted on the carrier, each of said disks having a ball-raceway; balls located in said ball-raceways; and means for connecting one of the friction-disks with the device to be actuated.

4. The combination, with an oscillatory carrier, of friction-disks, one mounted for axial movement, and the other for rotary movement, with relation to said carrier; means

for forcing one of said disks toward the other; and means for connecting one of the disks with an element to be actuated.

5 5. The combination, with a flanged carrier, of springs located on the base of the carrier; a movable friction-disk receiving the pressure of the springs; means for preventing said disk from rotating; a second friction-disk capable of rotary movement; and means for
10 rotating said carrier.

6. A machine element comprising a flanged carrier, springs seated in the base of the carrier; and a pair of friction-disks located within the flange of the carrier, one of said disks
15 bearing against said springs, and being fixed against independent rotation, and the other of said disks being capable of rotary movement.

7. A machine element comprising a flanged
20 carrier; friction-disks located in said carrier one of said disks being fixed against independent rotary movement, and the other being capable of such movement; springs for forcing one of said disks toward the other

disk; and a driving-clamp carried by one of
25 said disks.

8. The combination, with a flanged carrier, of a pair of friction-disks located within the flange of said carrier, each of said disks having a ball-raceway; balls located in said race-
30 ways; and yielding means for forcing one of said disks toward the other.

9. A machine element comprising a flanged carrier having recesses in its base, springs seated in said recesses; a perforated friction-
35 disk bearing against the springs and movable axially of the carrier; pins on the base of the carrier, and entering the perforations of said friction-disk; a second friction-disk in contact with the first disk, and free to rotate
40 in the carrier; and means for rotating said carrier.

In testimony whereof I affix my signature in presence of two witnesses.

FRANCIS G. ECHOLS.

Witnesses:

WILBUR W. LARKUM,
LEWIS A. THURBER.