F. P. HUYCK.

CLUTCH.

APPLICATION FILED MAY 7, 1908.

941,349.

Patented Nov. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

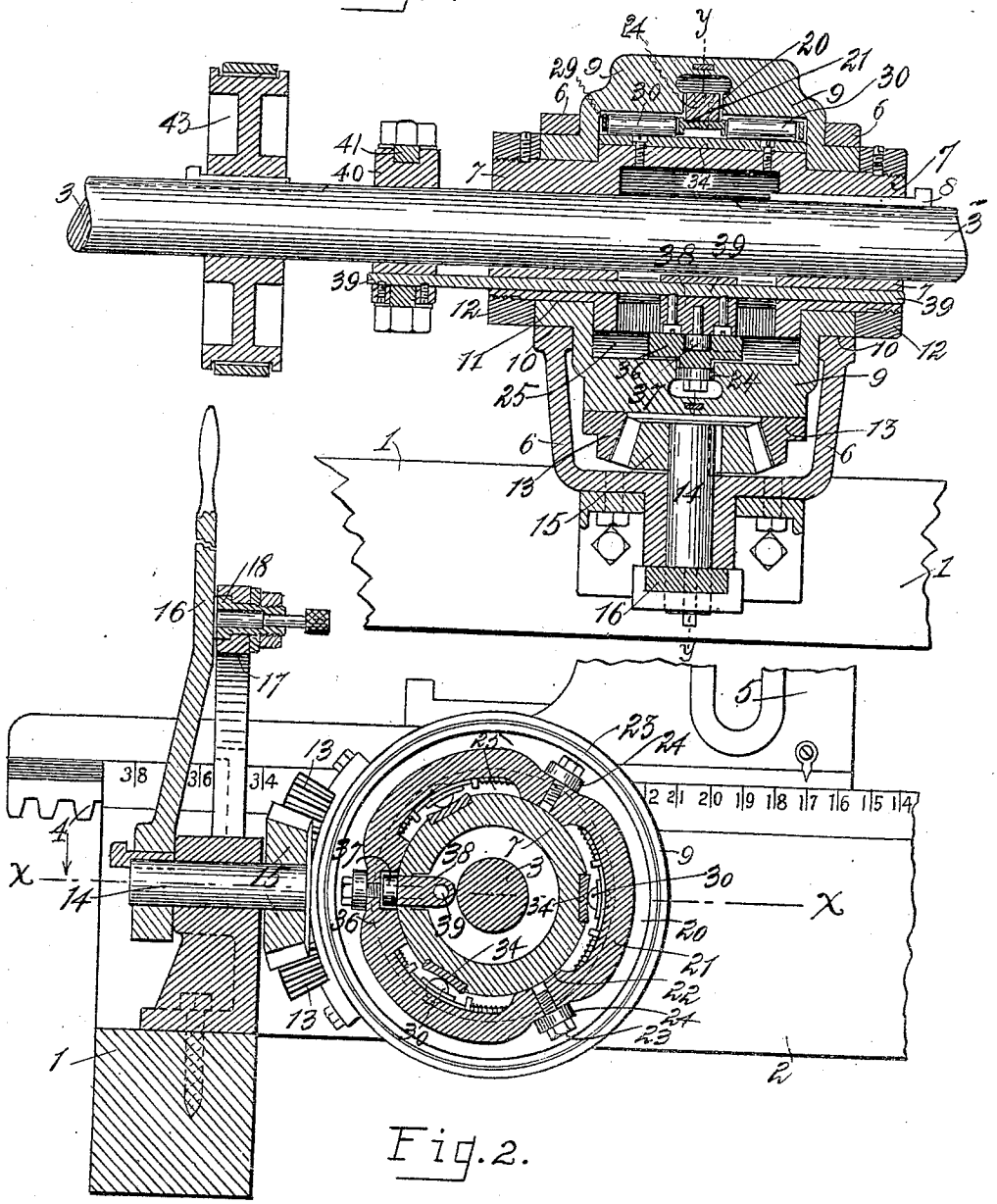


Fig. 2.

Witnesses:

D. C. Walter

Ada E. Cameron.

Inventor.

Francis P. Huyck

by Munn & Hall Attys

F. P. HUYCK.

CLUTCH.

APPLICATION FILED MAY 7, 1908.

941,349.

Patented Nov. 23, 1909.

2 SHEETS—SHEET 2.

Fig. 3.

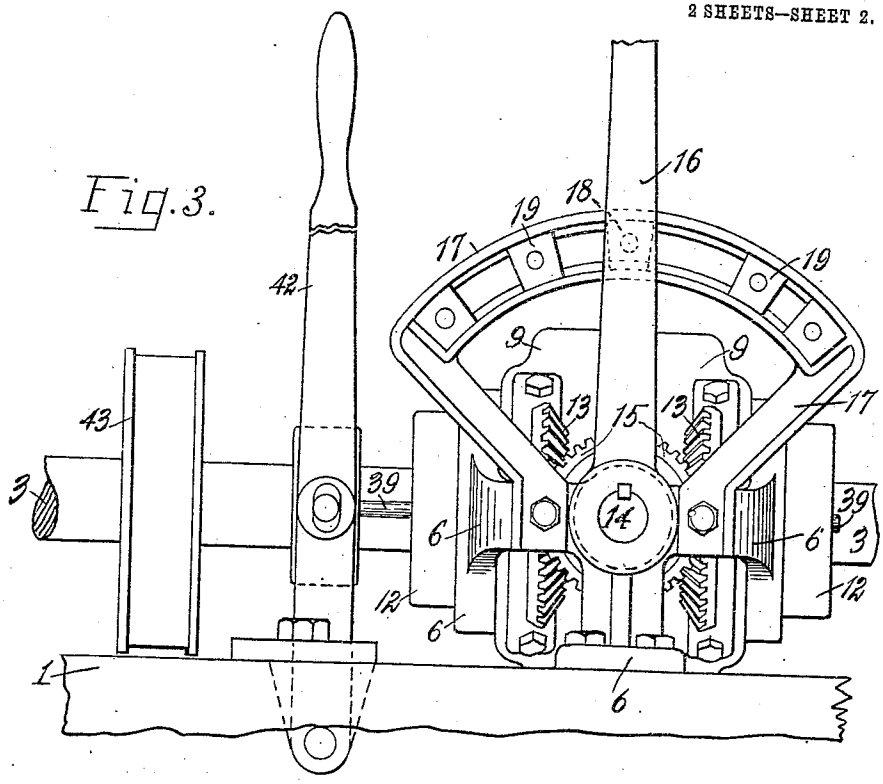


Fig. 6.

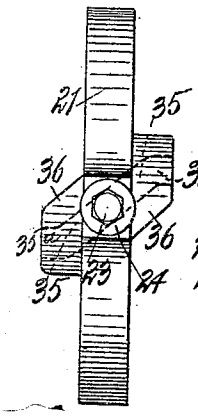


Fig. 4.

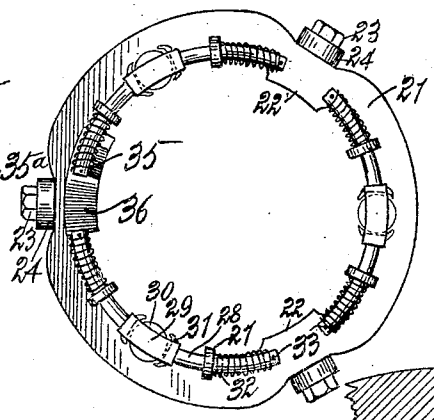
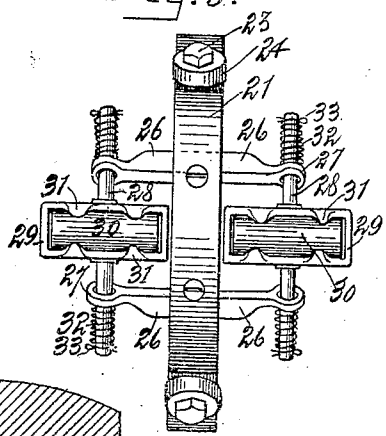


Fig. 5.



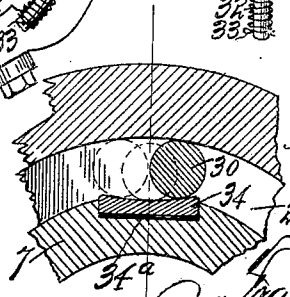


Fig. 7.

Witnesses:

D. C. Walter

Ada E. Cameron.

Inventor.

Francis P. Huyck,

by Munn & Hall, Atty.

UNITED STATES PATENT OFFICE.

FRANCIS P. HUYCK, OF TOLEDO, OHIO.

CLUTCH.

941,349. Specification of Letters Patent. **Patented Nov. 23, 1909.**

Application filed May 7, 1908. Serial No. 431,308.

To all whom it may concern:

Be it known that I, FRANCIS P. HUYCK, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Clutches; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in clutches which are particularly well adapted for use in connection with saw-mill carriage set-works, or that part of a saw-mill carriage which is designed to move laterally the log which is carried by the carriage, so that the transverse movement of the log relatively to the saws shall be uniform and of exactly the required distance. My clutch is designed to effect the operation of the "set-works" or analogous devices in either direction quickly, easily, and accurately.

I attain these objects by means of the devices, construction, and arrangement of parts hereinafter described and shown, and illustrated in the accompanying drawings, in which,—for convenience of illustration,—I have shown the same in connection with a saw-mill set-works and in which,—

Figure 1 is a central horizontal sectional plan-view of my device, taken on line *x*—*x* Fig. 2; Fig. 2, a vertical transverse sectional elevation taken on line *y*—*y* Fig. 1; Fig. 3, a side-elevation of my device; Fig. 4, a side-elevation of the roller supporting frame or ring hereinafter referred to, detached; Fig. 5, an edge-elevation of the same seen from the right in Fig. 4; Fig. 6, an edge-view of the same seen from the left in Fig. 4, the roller-housings and springs, and spring-guides hereinafter referred to being omitted, and Fig. 7, an end-view, on an enlarged scale, of one of the clutch-rollers hereinafter referred to, together with its bearing surfaces.

Like numerals of reference indicate like parts throughout the drawings.

In the drawings, 1 is the frame of a saw-mill carriage, and 2 the head-block of the carriage. Longitudinally of the carriage is journaled a shaft 3 which carries pinions,—not shown in the drawings,—which engage racks 4 secured to knees 5 against which the log to be sawed rests and the movement of which determines the position of the log transversely on the carriage and its relation to the saw or saws. Upon the top of the frame is a stout bracket 6 which serves as one of the supports of the shaft 3. 7 is a sleeve or hub keyed, as at 8, to the shaft 3. 9—9 are cup-shaped parts having their open mouths turned toward and adjacent to each other and together forming a two-part sleeve or shell which embraces the hub 7. The two-part shell is journaled in the bracket, as at 10, and the sleeve 7 is journaled within the shell, as at 11. Threaded end-extensions of the hub 7 have thereon rings 12 which take up and prevent end-movement of the hub and shell upon their bearings. The two-part shell or sleeve 9 is revoluble upon its bearings independently of the hub and the two-parts of the shell of sleeve 9 are revoluble upon their bearings and independently of each other. 13—13 are opposed corresponding segments of gear-wheels rigidly secured to or formed integral with the two parts of the shell or sleeve 9. A horizontal stub-shaft 14 journaled in the bracket 6 carries at its inner end a beveled pinion 15 which at its opposite sides meshes with the gear-segments 13, secured, respectively, as above stated, to the opposed halves of the shell 9. The outer end of the shaft 14 carries an upright hand-lever 16. The bracket carries a quadrant 17 in which slides a block 18, shown in dotted lines in Fig. 3, secured to the lever 16. 19—19 are stops adjustable upon the quadrant in the path of the sliding block 18 and which limit the movement of the lever 16 in either direction.

It will be seen that the throw of the lever 16 will, through the pinion 15, impart opposite rotary movements to the gear-segments 13 and to the shell-parts 9—9 to which the segments are secured and that if during the partial rotation of one of the shell-parts it is operatively engaged with the hub, a corresponding rotation will be communicated to the hub and to the shaft 3 to which the hub is secured. It will also be apparent that if the two shell-sections be alternately engaged with the hub 7, as the lever is swung

first in one direction and then in the other, the hub and its shaft will be driven in one direction only,—say forwardly,—and that if the shell-parts are caused to operatively and alternately engage the hub when they rotate in the other direction, the shaft 3 will now be caused to rotate backwardly. To accomplish the engagement of the two parts of the shell or sleeve 9 with the hub 7 so that the hub may be driven in either direction, as above indicated, I provide the mechanism now to be described.

The opposed faces of the two parts of the shell 9 are recessed to form a circumferential annular channel, as at 20, (see Fig. 1). In this channel is disposed an irregular shaped frame or ring 21. The inner margin of the ring has inwardly projecting reduced portions 22 arranged at equi-distant intervals which portions have curved bearing surfaces which contact with and ride upon the outer surface of the hub 7 which furnishes a bearing upon which the ring 21 is designed to rotate through a small arc of its circumference. Projecting radially from the ring 21 at equi-distant intervals are pins 23 upon which are journaled rollers 24 which are adapted to contact with the sides of the channel 20. These rollers prevent undue side movement of the ring and reduce the side-friction of the ring to a minimum. Between the inner surface of the two-part shell 9 and the outer surface of the hub 7 is an annular space 25. Projecting laterally into the space 25 from both sides of the ring 21 at equi-distant intervals and alternating with the rollers 24 are pairs of arms 26 (see Fig. 5) having at their extremities eyes 27 through which pass rods 28, curved in an arc of the circle of the annular space 25. As shown, these rods are in pairs arranged end-to-end. Between the adjacent ends of each pair of curved rods 28 is mounted and secured a frame or housing 29, rectangular in general form and in each of which is secured loosely a roll 30, by means of overlapping lips 31 which slightly embrace the roll. A coiled spring 32 surrounds each projecting end of each of the curved rods 28, the spring pressing at one end against the eye 27 and at its other end engaging a pin 33 passing through the rod. The sets of curved rods and springs hold the housings 29 and the rolls 30 normally in the central position indicated in Figs. 2, 4, and 5.

The outer surface of the hub 7 has, at intervals corresponding with the intervals between the pairs of rolls 30, channels or grooves parallel with the axis of the hub in which channels are disposed plates 34 which are, preferably, slightly concaved transversely on their outer surface (see Fig. 7). The plates 34 may, if preferred, be flat transversely and may be disposed upon the concave surface of the outer shell or sleeve but the construction illustrated in the drawings is preferred. The radial adjustment of the plates 34 is obtained by means of wedge-like shims 34ª driven beneath the plate for adjustment or to take up wear. The ring 21 with its roll-housings and rolls is disposed in the annular space between the two-part shell 9 and the hub 7 in such fashion that the rolls 30 are disposed exactly opposite the center or deepest part of the concaved plates 34. The rolls 30 when resting opposite the deepest part of the concavity will not touch the inner surface of the shell but if the rolls be moved to either side of the concavities the paths of the rolls are here narrower than the diameter of the rolls, (see Fig. 7.) and any movement of the outer or inner sleeve in that direction wedges the rolls between the adjacent surfaces and causes the two members to turn together. It will be observed that the springs 32 tend to hold the rolls in central inoperative position and out of engagement with the inner surface of the shell. I design using the rolls 30 for, at will, locking together the inner and outer concentric members when one or the other of these members is rotated in either direction or when desired to so dispose the rollers that the outer and inner members may rotate freely and independently of each other.

To move the rolls 30 into either of the positions indicated in Fig. 7 the ring 21 is given a slight turn on its axis so that the rolls are carried with the ring either to the right or to the left causing the rolls to engage the proper edge of the concaved plate and to thus lock the inner and outer members in rotative relation in either direction as may be desired. When the inner and outer members are to be independent of each other then the rolls are moved so that they coincide with the deepest parts of the concave surfaces of the plates 34. The movement of the ring upon its axis and the corresponding transverse movements of the several series of rollers is effected by means of a diagonally disposed cam-race 35,—shown in dotted lines in Fig. 6,—formed across the inner circumference of the ring and projecting lugs 36. In this cam-race is a cam-roller 37 mounted upon a block 38 which is rigidly clamped upon a rod 39 which slides in a longitudinal aperture in the hub. The outer projecting end of the rod 39 is secured to a collar 40 longitudinally movable upon but rotatively engaged with the shaft 3. In the collar 40 is a circumferential groove in which is a loose ring 41 engaged with an upright lever 42 fulcrumed at its lower end upon the carriage. The throw of the lever 42 to the right or to the left moves the rod 39 in a right line and, through the cam and diagonal cam-race 35, causes the ring 21 to turn upon its axis in the desired direction

carrying with it the series of rolls into the contact needful for locking the adjacent concentric members in coöperative relation. At each end of the cam-race 35 the race is deflected, as at 35ª, to a right angle to the plane of the ring 21, and when the cam-roller 37 is forced into either end of the cam-race, it is held against the wedge-like action of the diagonal surfaces of the cam-race until released by the throw of lever 42. When the lever 42 is placed in upright position as indicated in Fig. 3, the cam-roller will stand at the middle of the cam-race and the rolls 30 will now be held over the deepest part of the concavities of the plates 34, and the hub 7 and the shell 9 will be free to revolve independently of each other.

The operation of my device thus far described is as follows: Assuming that there is a log upon the carriage and that the operator desires to force the knee 5 forward and that the lever 42 stands in upright position so that the rolls 30 stand in neutral position, as indicated in Fig. 2, now the lever 42 is swung so that the ring 21 is given a part turn clockwise (see Fig. 2) thus carrying the rolls into contact with the elevated margin of the plate 34, as in Fig. 7. Now the lever 16 is swung first in one direction and then in the other. As the lever is swung to and fro the pinion 15 on the shaft 14 causes the two toothed segments with their attached shell-parts to oscillate upon their bearings in opposite directions. As one shell-part advances, its series of rolls 30 is wedged between the inner surface of the shell-part and the plate 31, carrying the hub the shaft and the shell-part together. At the same time the other shell-part retreats without interference from its series of rolls which, overcoming the resistance of its springs, yields slightly permitting the shell-part to rotate but without displacing the rolls sufficiently to prevent their coming into instant operation when the movement of this shell-part is reversed.

It will be seen that when the lever 16 swings in one direction one part of the clutch is engaged and carried forwardly, and with it the shaft 3, and that when the lever is swung in the opposite direction the other part of the clutch is engaged and the shaft 3 is again carried forwardly. Now assume that the shaft 3 is to be rotated in the opposite direction the lever 42 is thrown over in the opposite direction causing the ring 21 to swing on its axis bringing the rolls into contact with the opposite sides of the concaved plates. Now the swing to and fro of the lever 16 will, as above described, cause the shaft to revolve in the opposite direction, causing the knee, through the gearing above described, to retreat.

In saw-mill practice it is common to provide the shaft 3 with a stout coiled spring which is wound up with the advance of the knees and which, when the knees are released, causes the knees automatically to retreat to their starting position. In such cases the shaft is provided with a brake-wheel 43 by means of which the operator prevents the accidental backward movement of the shaft. When the rolls 30 in my device are thrown into the neutral position indicated in Fig. 2, the coiled spring here referred to (not shown in the drawings) may be permitted to act in the usual way and to withdraw the knees without manual assistance from the operator.

While I have shown my clutch as double-acting,—that is to say, as acting positively at each throw of the operating lever in either direction,—it will be obvious that by the omission of one of the shell-parts and its driving gear an operative device would still remain, and well might be operated as a single-acting reversible clutch. In practice, however, I prefer the construction above described as being more rapid in operation.

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

1. In a device of the described character, a shaft, two concentric members upon the shaft, one of the members being secured to and revoluble with the shaft, the other member being revoluble independently of the shaft, a series of rolls interposed between the opposed faces of said two concentric members, a frame for governing the position of said rolls, said opposed faces having convergent portions which limit the travel of the rolls in both directions, shifting means and means carried by the frame coöperating with said shifting means whereby said rolls are moved to either end of said convergent portions, said last-named means and said shifting means constituting a locking means for positively maintaining said frame in shifted position.

2. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, an outer sleeve revoluble independently of the shaft, a driving mechanism for the outer sleeve, a series of rolls interposed between the two sleeves, a frame for governing the position of said rolls, tracks for said rolls upon one sleeve, which tracks at both extremities approach the opposed surface of the other member sufficiently to prevent the passage of the rolls therebetween, shifting means, and means carried by the frame whereby said rolls are moved to either end of said convergent portions, said last-named means and said shifting means constituting a locking means for positively maintaining said frame in shifted position.

3. In a device of the described character,

a shaft, a sleeve secured to and revoluble with the shaft, another sleeve concentric with said first mentioned sleeve and revoluble thereon independently of the shaft, said outer sleeve being diametrically divided into two parts, a segmental beveled gear for each of said two parts, a beveled pinion engaged with said two gears and arranged to actuate the gears simultaneously in opposite directions, a lever for the pinion, two parallel series of rolls interposed between the inner and outer sleeves,—there being one series of rolls for each outer sleeve-part,—a frame capable of oscillation for determining the position of said rolls, a track for each of said rollers eccentric to the axis of the shaft, shifting means and means carried by the frame coöperating with said shifting means to oscillate said frame into locked position at the end of its shifting movement.

4. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, another sleeve concentric with said first mentioned sleeve and revoluble thereon independently of the shaft, said outer sleeve being diametrically divided into two parts, a segmental beveled gear for each of said two parts, a beveled pinion engaged with said two gears and arranged to simultaneously actuate the gears in opposite directions, a lever for the pinion, two parallel series of rolls interposed between the inner and outer sleeves,—there being one series of rolls for each outer sleeve-part,—a track for each of said rolls eccentric to the axis of the shaft, and means for shifting said series to either extremity of the tracks and maintaining the same in shifted and locked position.

5. In a device of the described character, a ringlike revolubly mounted frame or housing having a cam-race disposed diagonally to the plane of such frame, a cam-roller in the race, a lever, a rod connecting the roller and lever,—the arrangement being such that the swing of the lever imparts to the frame an axial movement,—a series of rolls carried by said frame, a shaft, a sleeve on the shaft, another sleeve concentric with the shaft, there being between said two sleeves an annular space in which the rolls are disposed, the adjacent surfaces of said two sleeves having convergent portions which limit the movement of the rolls in both directions, said cam-race being of a form to coact with said cam-roller in maintaining the rollers in shifted position.

6. In a device of the described character, a ringlike revolubly mounted frame or housing having a cam-race disposed diagonally to the plane of such frame, a cam-roller in the race, a lever, a rod connecting the roller and lever,—the arrangement being such that the swing of the lever imparts to the frame a rotary movement,—a series of rolls carried by said frame, and springs which hold said rolls normally in inoperative position, said frame adapted to be held by said roller and cam race in locked and shifted position at either end of its rotary movement.

7. In a device of the described character, a shaft, a sleeve on the shaft revoluble independently of the shaft, there being an annular space within the sleeve, a driving mechanism for the sleeve, a ringlike frame within the annular space, a series of rolls carried by the frame, tracks for the rolls eccentric to the axis of the shaft at both extremities, springs carried by said frame which hold the rolls normally in inoperative relation to the surfaces of the annular space, and shifting means for the frame whereby the same is held in locked position at either end of its shifting movement.

8. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, an outer sleeve concentric with the shaft,—there being an annular space between the two sleeves,—a ringlike frame in said annular space, pairs of arms carried by the ring, rods slidably supported upon said arms and curved to conform to said annular space, housings supported by said curved rods, springs engaged with the arms and rods, and rolls in the housings adapted to engage the opposed surfaces of the inner and outer sleeves, said opposed surfaces having convergent portions which limit the movement of the rolls in both directions, and shifting means for said ringlike frame whereby the same is held at its limit of movement in either direction in shifted and locked position.

9. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, another sleeve concentric with said first mentioned sleeve and revoluble thereon independently of the shaft,—there being an annular space between said two sleeves,—a ringlike frame mounted in said annular space, rollers upon the ring adapted to engage the sides of the annular space and to limit the lateral movement of the ring, a series of rolls carried by the ring within the annular space, the path of said rolls being convergent at each end.

10. In a device of the described character, a ringlike revolubly mounted frame or housing having a cam-race disposed diagonally to the plane of such frame, a cam-roller in the race, a lever, a rod connecting the roller and lever,—the arrangement being such that the swing of the lever imparts to the frame an axial movement,—a series of rolls carried by said frame, springs which hold said rolls normally in inoperative position, and a series of rollers journaled radially upon said ring and adapted to engage the walls of said annular space and to limit lateral movement of the frame.

11. In a device of the described character, a shaft, two concentric members upon the shaft, one of the members being secured to and revoluble with the shaft, the other member being revoluble independently of the shaft, a series of rolls interposed between the opposed faces of said two concentric members, the path of each of said rollers being convergent at each end, springs which hold the rolls normally midway between the ends of their paths, and means for moving said series of rolls in harmony toward either end of their paths, said means being constructed to maintain the rolls at either end of their paths.

12. In a device of the described character, a supporting frame, a bracket upon the frame, a sleeve journaled in the bracket, an inner sleeve journaled within the sleeve, a shaft within and secured to and revoluble with the inner sleeve, the inner and outer sleeves being revoluble independently of each other, a gear for transmitting motion to the outer sleeve, a lever connected with said gear, normally disengaged reversible means for connecting the outer and inner sleeves in operative engagement, said last-named means comprising means for locking the same at either end of its reversing movement.

13. In a device of the described character, a supporting frame, a bracket upon the frame, a sleeve journaled in the bracket, an inner sleeve journaled within the sleeve, a shaft within and secured to and revoluble with the inner sleeve, the inner and outer sleeves being revoluble independently of each other, a gear for rotating the outer sleeve, a lever connected with said gear, a series of rolls interposed between said two sleeves, the paths of said rolls being convergent at both extremities, springs which hold said rolls normally midway of the length of the paths, and means for shifting said series of rolls at will toward either end of their paths, said shifting means comprising a locking means for the said series of rolls at either end of their shifting movement.

14. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, an outer sleeve concentric with the shaft, there being an annular space between the two sleeves, a ringlike frame in said annular space, said ring having a cam-race disposed diagonally to the plane of the ring, said race terminating at each end in a portion disposed parallel to the axis of the ring, a cam-roller in the race, a rod connected with the cam-roller, a lever arranged to reciprocate the rod, the arrangement being such that the movement of the lever in either direction gives to the ring a corresponding part axial turn, and rolls carried by said ring and disposed between the opposing surfaces of the inner and outer sleeve, the curved paths of the rolls being convergent at both ends.

15. In a device of the described character, a shaft, a sleeve secured to and revoluble with the shaft, another sleeve concentric with said first mentioned sleeve and revoluble thereon independently of the shaft, said outer sleeve being diametrically divided into two parts, a segmental beveled gear for each of said two parts, a beveled pinion engaged with said two gears and arranged to simultaneously actuate the gears in opposite directions, a ring interposed between said two sleeves, two parallel series of rollers carried by the ring and interposed between the inner and outer sleeves,—there being one series of rolls for each outer sleeve-part,—the curved paths of the respective rolls being convergent at both ends, a cam adapted to give said ring a part axial turn and to carry the rolls toward either end of their path, a lever for actuating said cam, a lever for actuating said pinion, said cam being constructed to maintain said ring at the end of its rotary movement in either direction.

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

FRANCIS P. HUYCK.

Witnesses:
CLEM V. WAGNER,
ADA E. CAMERON.