

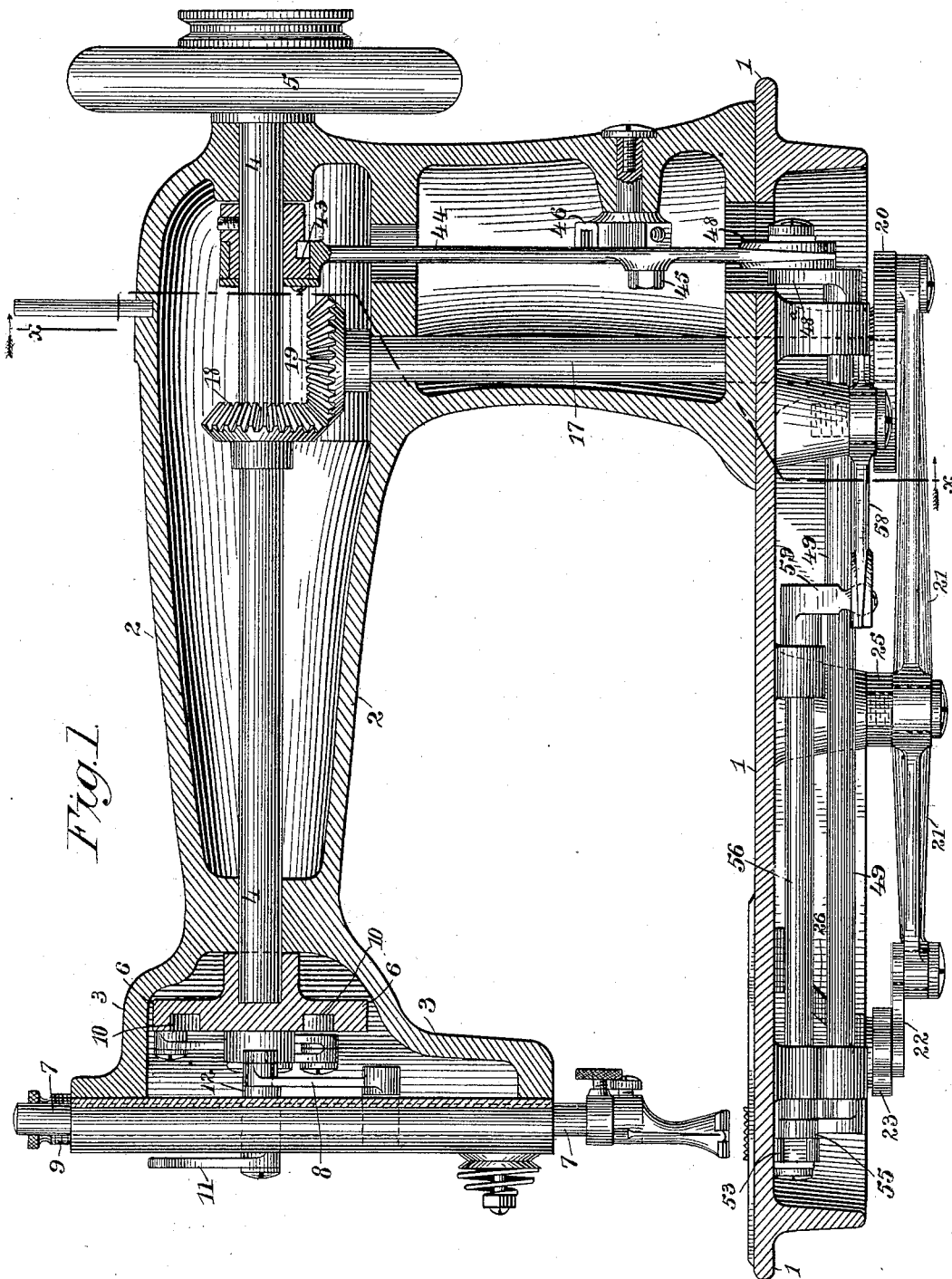
(No Model.)

4 Sheets—Sheet 1.

F. T. LEILICH.
ROTARY SHUTTLE SEWING MACHINE.

No. 423,061.

Patented Mar. 11, 1890.



Witnesses
E. J. Tanner
Arthur J. Tanner

Inventor
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(No Model.)

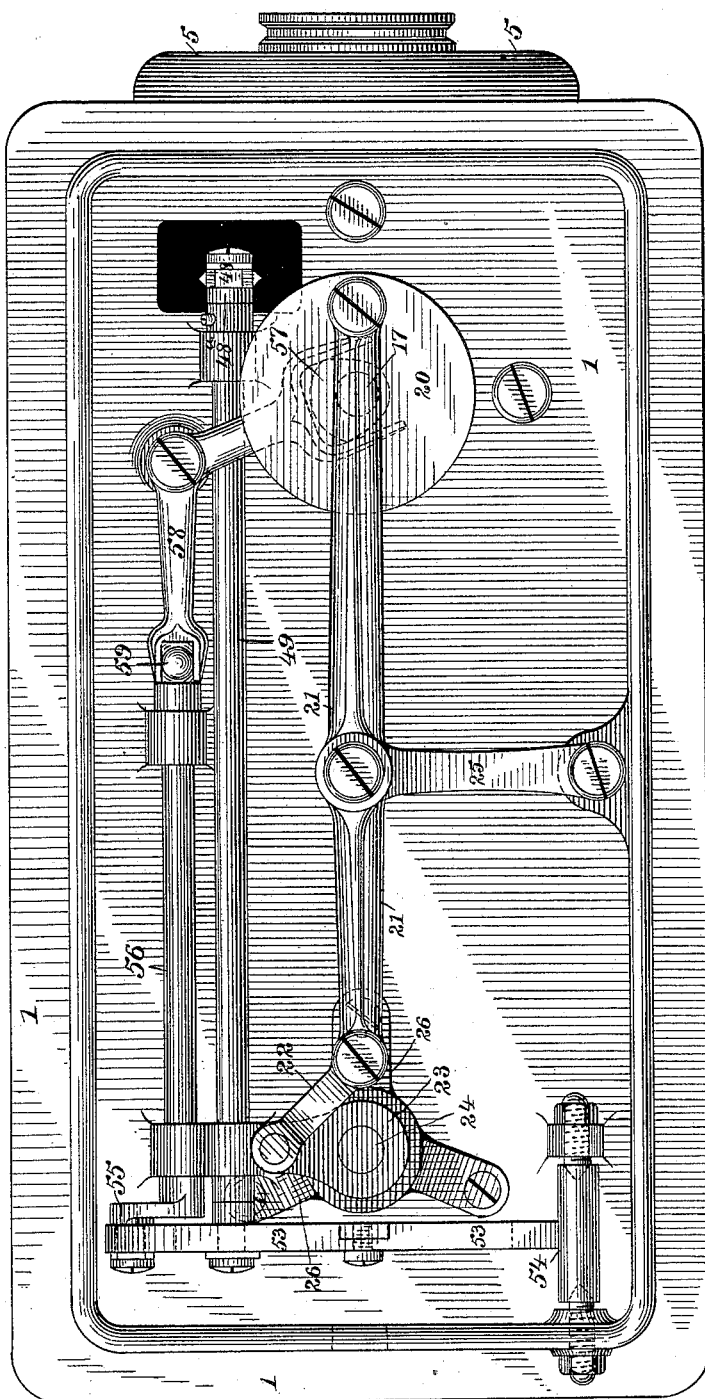
4 Sheets—Sheet 2.

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Fig 2.



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Fig. 3.

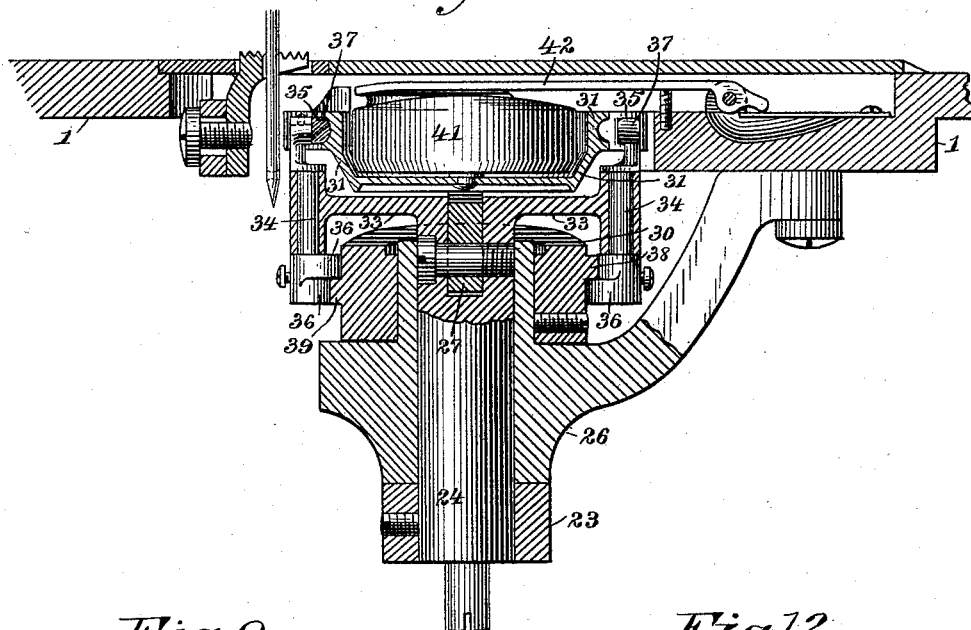


Fig. 9.

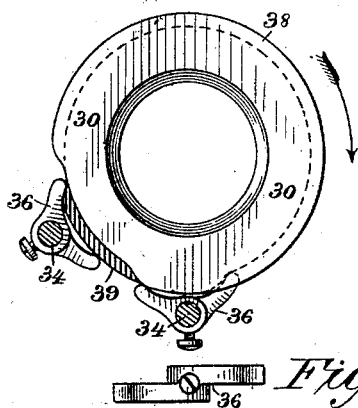


Fig. 12.

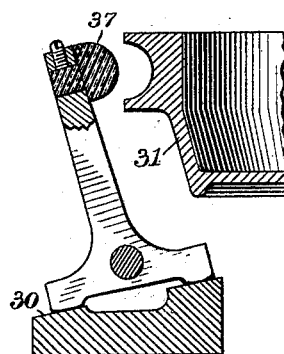
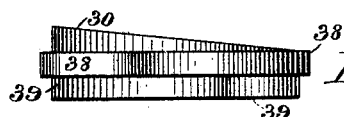


Fig. 10.



Fig. 11.



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4 Sheets—Sheet 4.

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Fig. 4.

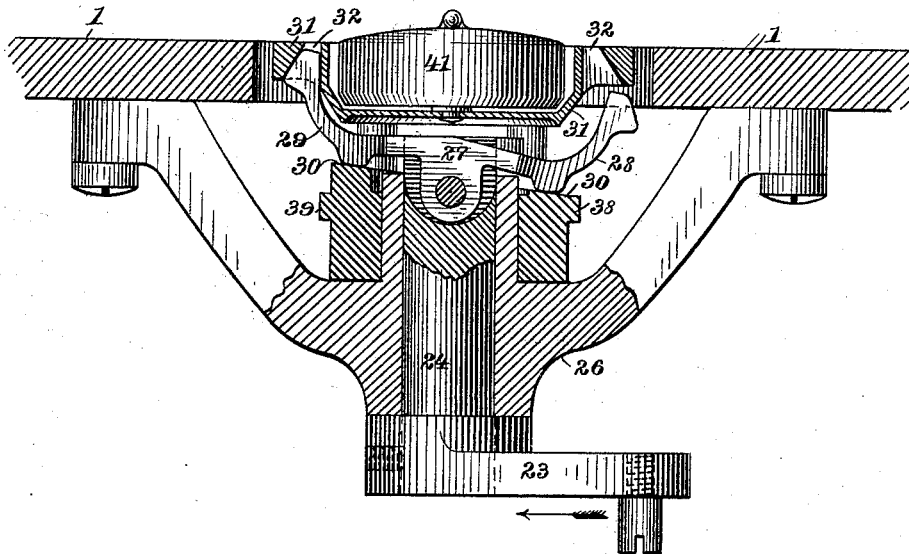


Fig. 5.

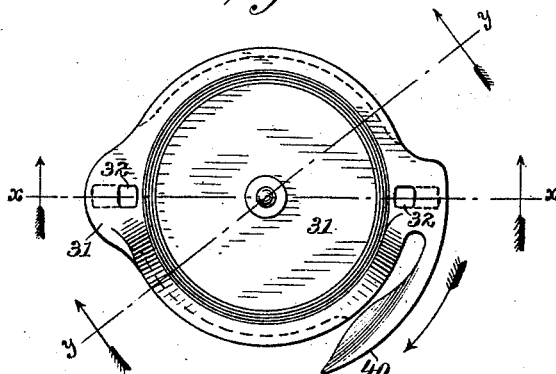


Fig. 6.

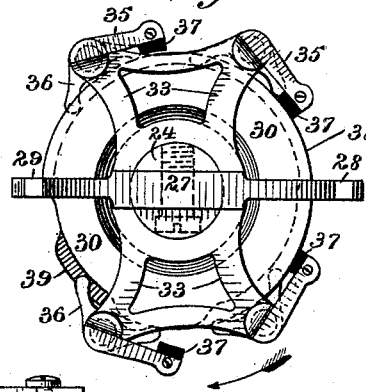


Fig. 7.

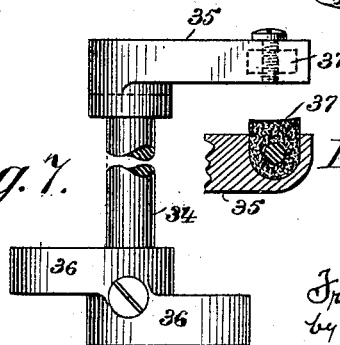
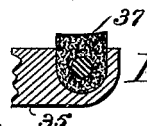


Fig. 8.



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UNITED STATES PATENT OFFICE.

FRANCIS T. LEILICH, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

ROTARY-SHUTTLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 423,061, dated March 11, 1890.

Application filed May 5, 1888. Serial No. 272,880. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS T. LEILICH, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain
5 new and useful Improvements in Sewing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others
10 skilled in the art to which it appertains to make and use the same.

This invention relates to certain novel and useful improvements in sewing-machines, but has particular reference to the mechanism
15 whereby the proper actuation of the shuttle is accomplished.

This invention is predicated upon the principle of a horizontally-placed rotary shuttle, the same carrying a centrally-placed bobbin.
20 The objects of my invention are to provide an actuating mechanism for the shuttle which shall be capable of running at very high rates of speed and in which all friction shall be reduced to a minimum; in which undue wear
25 upon the running parts shall be obviated; which shall be economical in the use of lubricating material; in which the necessary lubricant shall be so disposed that it cannot come in contact with the thread or the work;
30 in which the frictional contact of the shuttle with a race, race-cap, or other bearing shall be entirely dispensed with; which, while employing a short needle, shall produce a tight and uniform tension with any kind of thread
35 and upon all kinds of material; which shall require a minimum length of thread passing through the needle-eye during the formation of the stitch, and which shall dispense with any draft of thread through said eye while it
40 is in the goods.

With these ends in view my invention consists in the details of construction and combination of co-operating elements, which shall hereinafter be fully set forth, and then recited in the claims.
45

In order that such as are skilled in the art to which my invention appertains may fully understand how to make and use my improvement, I will describe the same in detail, ref-

erence being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a central longitudinal section through a machine for which my actuating mechanism is well adapted; Fig. 2, a bottom
55 plan view; Fig. 3, a central vertical section through the shuttle-actuating devices on line *y y* of Fig. 5; Fig. 4, a central vertical section at an angle to Fig. 3 and on line *x x* on Fig. 5; Fig. 5, a plan view of the shuttle; Fig. 6, 60 a plan view of the driving and carrying devices with their actuating-cams; Fig. 7, an enlarged detail elevation of one of the carrying-levers; Fig. 8, a detail section through one of the non-metallic contact-points; Fig. 9, 65 a detail plan of the cam for actuating the carrying-levers; Fig. 10, a detail of one of the riders; Fig. 11, a detail side elevation of the cam; Fig. 12, a modified form of grasping and carrying lever.
70

Like reference-numbers denote the same parts in all the figures.

1 is the bed; 2, the arm; 3, the head cast upon the end of the arm; 4, the main shaft; 5, the hand-wheel.
75

17 is a vertical shaft, and 18 19 are beveled gears through which it receives motion from the main shaft. 20 is a disk secured on the lower end of said vertical shaft, and 21 is a pitman pivoted to said disk. (See Fig. 2.) At its other end said pitman is connected by a link 22 to a crank 23 on the lower end of the vertical shuttle-shaft 24. Near its center the pitman is swivelly connected to a link 25, whose other end is pivotally secured to a bearing on
80 the bed near the edge of the latter.

26 is a bracket secured to the bottom of the bed-plate. In this is journaled the shuttle-shaft, and carried thereby is the pivotally-hung shuttle-driver 27, having driving-arms
85 28 and 29 at the ends thereof. (See Fig. 4.)

30 is a face-cam arranged around the shaft and adapted to impart to the driver its properly-timed movement into and out of engagement with the shuttle 31, which has pockets
90 32 therein for the reception of the points of the driver-arms. (See Fig. 5.)

33 is a head, which is shown in Fig. 6. It

is secured to or made part of shaft 24 and revolves therewith. In the end of each arm of the head just referred to is journaled a short shaft 34, which has at its upper end a lever 35 and at its lower end a double-faced rider 36, said faces being in different horizontal planes. (See Figs. 7, 9, 10, and 11.) The levers 35 above referred to have each a face or bearing-surface 37 of non-metallic substance, as rawhide, rubber, or vulcanized fiber.

The riders are operated, as will hereinafter appear, by their engagement with two cam-surfaces 38 39, which are formed on the periphery of the stationary sleeve or collar, whose upper surface operates the shuttle-driver. The shuttle 31 has a loop-taking beak 40, which is like to the beak shown in the application heretofore referred to. It has also a centrally-placed bobbin 41.

42 is a latch, which extends outward over the top of the shuttle.

The operation of my machine is as follows: The vertical shaft is geared to the main shaft and has a crank-disk on its lower end. The pitman is connected to the crank-disk at one end and is fulcrumed near its center to a link whose other end is pivoted to the bed of the machine. The other end of the pitman is connected to a link through which it operates the crank of the vertical shuttle-shaft. By this method I obtain a variable rotation of the shuttle-shaft different in degree from that employed in my previous constructions, and I also dispense with considerable friction by abolishing the sliding contact of the pitman.

The shuttle-shaft has its bearing in the bracket attached to the bed, and said bracket holds also the shuttle-operating mechanism. The shuttle-shaft has a head or web upon its upper end, in which are the bearings of the small vertical shafts 34. The arms which are secured upon the upper ends of these shafts, and which are shod, as aforesaid, with a non-metallic shoe or point, grasp and uphold the shuttle and revolve with the shuttle-shaft. At the lower ends these shafts carry riders 36, which engage and slide upon the cams 38 39, and these riders are so controlled by said cams that they effect the grasp and release of the shuttle at predetermined times. The contours of the operating-cams are reversed one to the other, and are so placed that as one of the rider-arms is approaching the center the opposite rider is receding, thus giving to the shaft upon which they are secured a positive oscillatory movement.

The non-metallic contact of the grasping-arms with the shuttle secures quietness of operation and obviates destructive wear upon the shuttle. The arms merely hold the shuttle in a horizontal position and concentric with the shaft. They do not in any manner drive or impel the shuttle. The latter function is performed by the driver, which performs no carrying function.

In the drawings I have shown the driving

device which was used in the machine which formed the subject-matter of my pending application, Serial No. 265,308; but I can equally as well, if desired, utilize the carrying-pins in a certain other pending application filed by me, Serial No. 269,922, or other similar device operated by a cam.

Both the shuttle carrying and driving devices are controlled by the contours of their respective cams in such time and in such manner that the loop of upper thread in passing around the shuttle-body is not in any way obstructed. The grasping-arms release their hold *seriatim* to give said loop free passage. They also are so spaced in conjunction with their timing that no more than one of the holding or carrying arms is out of engagement at one time. The arms in engagement are at all times competent to carry the shuttle steadily and true.

The shuttle has the central bobbin, the beak so shaped as not to draw through the needle-eye while said eye is in the goods, and the bridge which controls the under thread, all of which are shown in the application heretofore referred to. It possesses additional features, viz: The point or beak is in different and larger circumferential plane than the periphery of the shuttle-body by which it is carried, and it has also two nearly or quite semicircular grooves, in which the ends of the carrying-arms enter and grasp, and also the apertures or pockets heretofore referred to, into and out of which the ends of the drivers are projected. One of said apertures is directly behind the beak, and they are preferably at an angle of one hundred and eighty degrees one to the other. The outwardly-extended latch prevents the bobbin-case from turning with the bobbin.

Any suitable form of under tension may be used, and a removable cloth-plate admits of free access to the shuttle and bobbin.

In this my invention I do not wish to be confined to the precise details of construction herein shown and described, since many minor changes not involving invention and referable only to mechanical skill may be made without departing from the spirit and aim thereof.

I claim—

1. In a machine of the character described, the combination, with the shuttle, of a series of intermittently-actuated arms or levers arranged in the same horizontal plane with the shuttle-rim, the rotating head whereon said carrying-levers are mounted, means, as a cam, whereby said levers are operated, and an independent cam-oscillated shuttle-driver mounted upon the rotating head and adapted to impart the proper rotary motion to the shuttle, substantially as set forth.

2. In a machine of the character described, the combination, with the shuttle, of the stationary cams surrounding the shuttle-shaft, the shuttle-carrying levers, the two-armed riders upon said carrying-levers, cams for the

actuation of said levers, and the positively cam-actuated driver, substantially as set forth.

3. The combination, with the main shaft and the needle-bar driven thereby, of the vertical shaft, the pitman operated by said shaft, said pitman fulcrumed at its center to a swinging link, the vertical shuttle-shaft operated by the pitman, the shuttle, and the carrying-levers, and the independent cam-actuated driver carried by said shuttle-shaft, substantially as set forth.

4. In a machine of the character described, the combination, with the shuttle-shaft and shuttle and the oscillating cam-actuated driver, of the short vertical shafts journaled around said shuttle-shaft, the grasping-levers secured upon said shafts at the upper ends of the latter, the double-armed riders secured at the lower ends of said short shafts, and the cam whereby said riders are operated, substantially as set forth.

5. In a sewing-machine, the combination, with the shuttle, of the shuttle-shaft located in axial alignment therewith, the oscillating driver carried by said shuttle-shaft, a series of short shafts arranged around and carried by said shuttle-shaft, a series of carrying-levers secured upon said short shafts, a series of double-armed riders secured upon the lower ends of said short shafts, said rider-arms being in different vertical planes, and a double-surfaced cam whose two surfaces are adapted to engage the riders and to thereby impart the proper axial movement to the shafts, substantially as specified.

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

FRANCIS T. LEILICH.

Witnesses:

W. J. TANNER,
A. J. TANNER.