

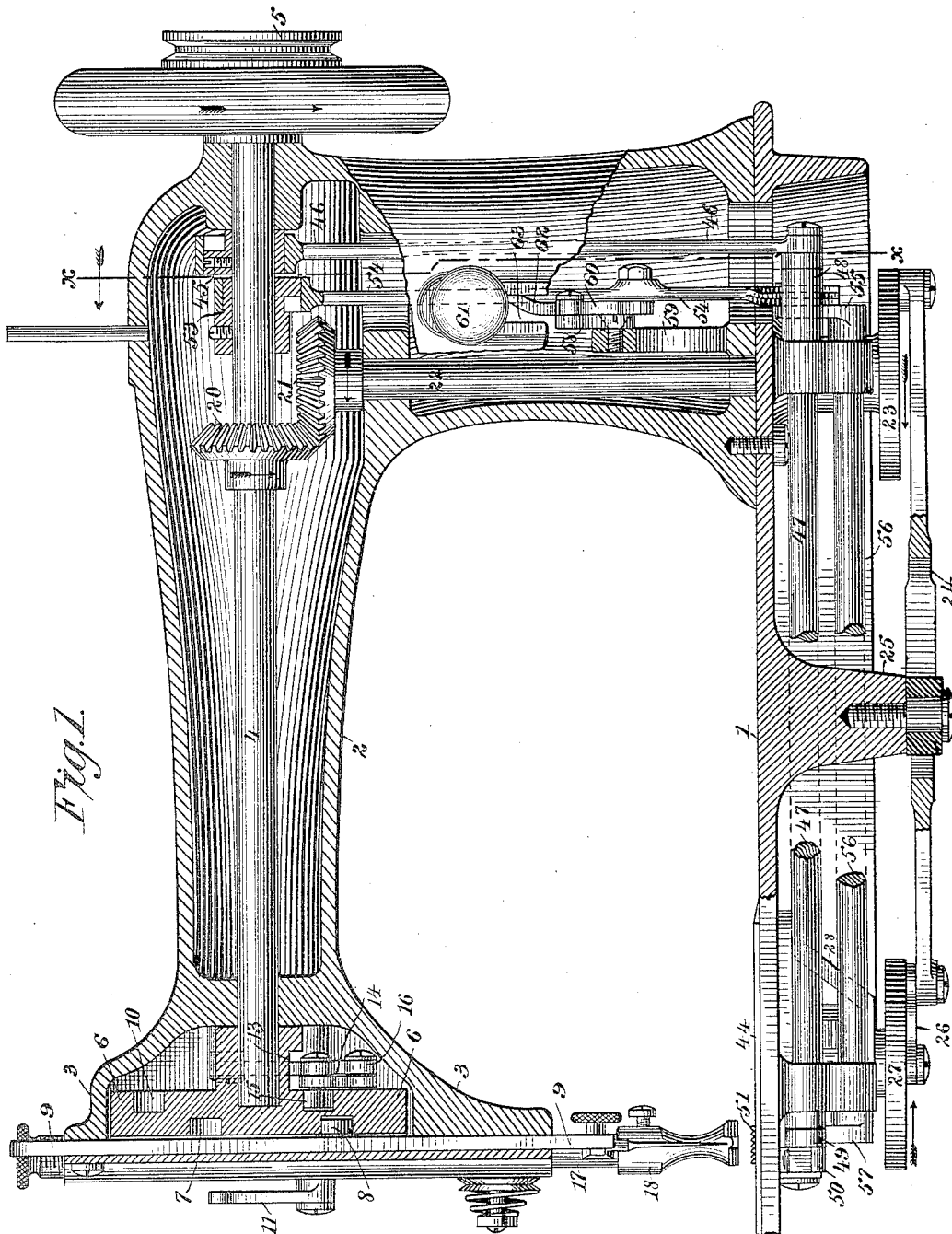
(No Model.)

3 Sheets—Sheet 1.

F. T. LEILICH.  
ROTARY SHUTTLE SEWING MACHINE.

No. 418,895.

Patented Jan. 7, 1890.



Witnesses  
Wm. J. Tanner  
H. J. Shelton

Inventor  
Francis T. Leilich  
by P. H. Hubbard attorney

(No Model.)

3 Sheets—Sheet 2.

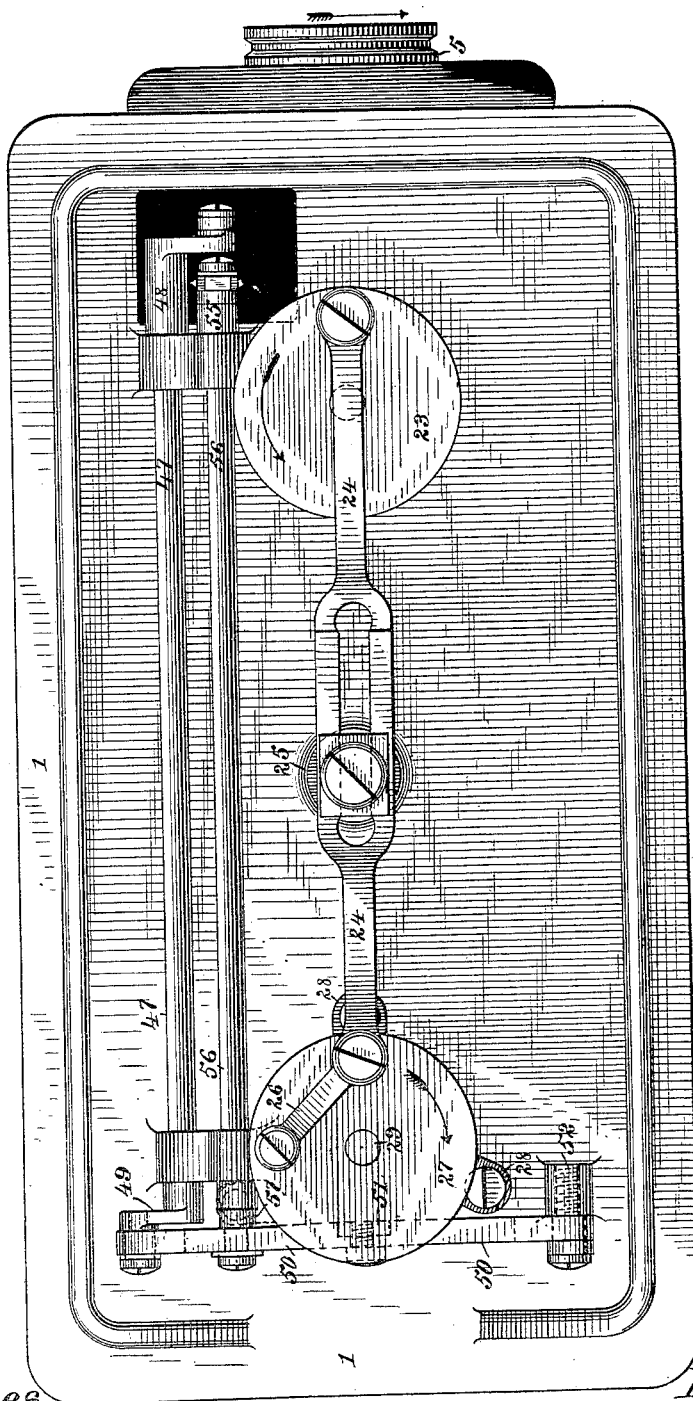
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Fig. 2.



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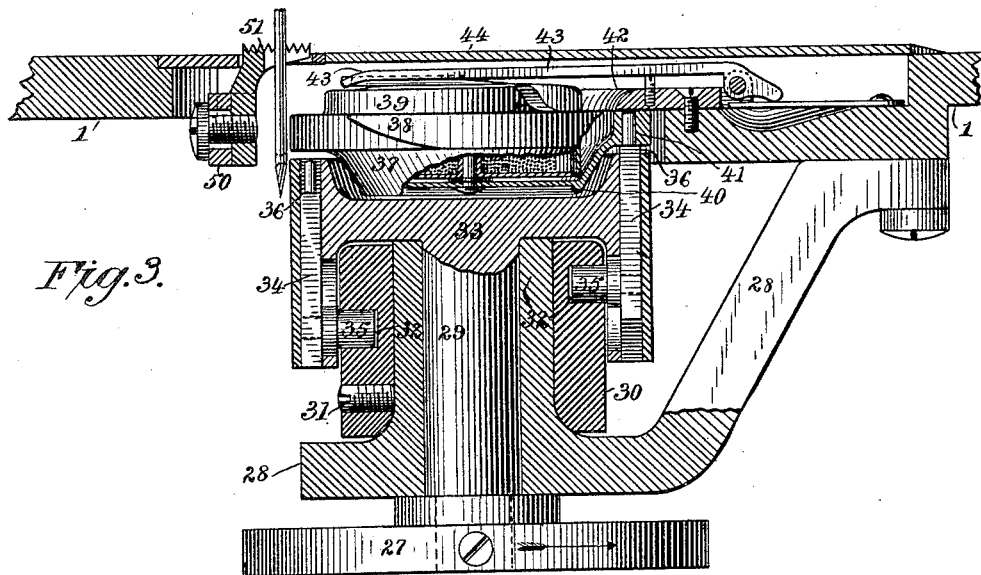


Fig. 3.

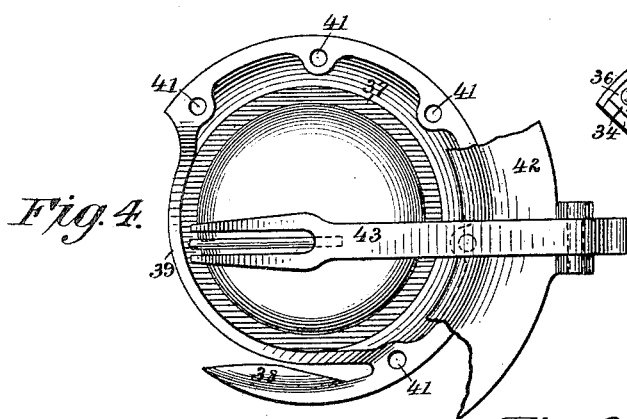


Fig. 4.

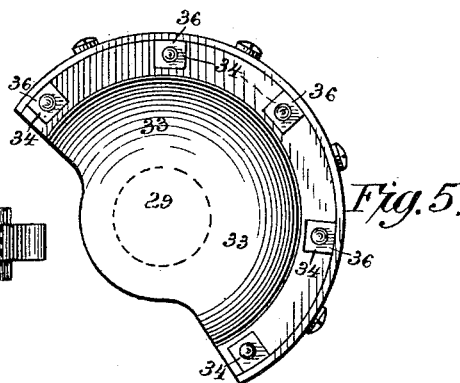


Fig. 5.

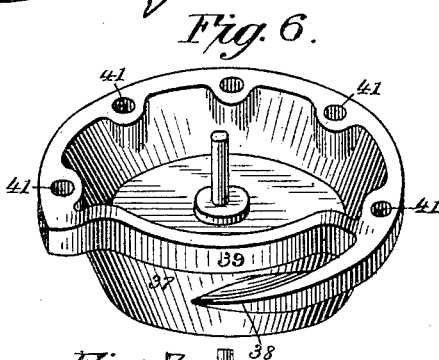


Fig. 6.

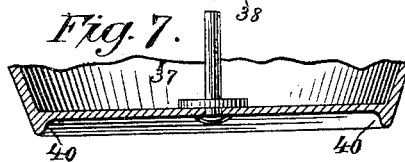


Fig. 7.

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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. 418,895, dated January 7, 1890.

Application filed April 7, 1888. Serial No. 269,922. (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 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 skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in sewing-machines, but more particularly to that portion of the machine which comprises the loop-taker or shuttle and the means whereby the proper rotation is imparted thereto.

In some measure the construction herein shown and described is an improvement upon that set forth in a certain pending application filed by me February 25, 1888, Serial No. 265,308, and, like the subject-matter of said application, my present invention is founded upon the system which comprises a horizontally-placed rotary shuttle, a centrally-placed bobbin and bobbin-case, and means for driving said shuttle, which shall also uphold the same in its travel, whereby the necessity of a shuttle-race is obviated and much friction done away with, and the necessity for lubrication proportionately diminished.

The object of my invention is to provide means for the taking of the loop and interlocking the under thread therewith and for driving the shuttle, which shall be simple in construction, positive in every motion, and capable of running at high rates of speed without undue wear or excessive noise, which shall permit of the employment of a very short needle for sewing thick as well as thin material, and which, as to the shuttle, shall require no lubrication upon that part with which the thread comes in contact.

With these ends in view my invention consists in the construction and combination of elements which will hereinafter be fully set forth, and then recited in the claims.

In order that those skilled in the art to which my invention appertains may more fully understand its construction, I will de-

scribe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section through a machine constructed in accordance with my invention; Fig. 2, a bottom plan view; Fig. 3, an enlarged central vertical section through the means for driving and carrying the shuttle; Fig. 4, a plan view of the shuttle, showing the bobbin-case therein and held as against rotation by the bifurcated latch; Fig. 5, a detail plan view of the shuttle-driving pin-carrier; Fig. 6, a perspective of the shuttle; Fig. 7, a transverse vertical section through the shuttle.

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

In the sewing-machine of which my invention is best adapted to form a part, 1 is the bed, 2 the overhanging arm, and 3 the arm-head, in which suitable needle-driving devices and take-up mechanism are arranged.

4 is the main shaft, journaled in the longitudinal portion of the arm.

22 is a vertical shaft arranged at right angles to the main shaft and deriving motion therefrom by means of beveled gears 20 21. Upon the lower end of this vertical shaft is secured a disk 23, having pivoted thereto one end of a pitman 24, the other end whereof is pivoted to a link 26, which said link is pivoted to a disk 27. Near its center the pitman is slotted and is secured through said slot to a hub or boss 25 on the bed-plate, so that it may have upon said boss both an axial and a sliding movement.

28 is a bracket screwed or otherwise secured beneath the bed-plate. A vertical shaft 29, which is rigid upon and revolves with the disk 27, is journaled in said bracket, as is clearly shown at Fig. 3.

30 is a sleeve arranged around the hub or central portion of the bracket and is secured firmly thereto, as by a screw 31. Said sleeve has cut in the periphery thereof a cam-groove 32, whose purpose will be presently explained.

33 is the shuttle-driving-pin carrier, which is shown in plan view at Fig. 5. It is mounted upon and revolves with the vertical shaft 29. Loosely arranged in grooves about the periphery of the said carrier are the shuttle-

driving pins 34, adapted to have a vertical reciprocation in the said grooves. The movement is given to said pins by means of the engagement of rollers 35, located near their lower ends, with the cam-groove 32 in the sleeve 30. The pins 34 are shouldered at their upper ends, as seen at 36.

37 is the shuttle, having beak 38 and a loop-controlling bridge 39 and a centrally-placed bobbin-case, upon the top of which is a small finger 75, adapted to be engaged by the latch 43. (See Fig. 4.) The loop-controlling bridge is shown in side elevation at Fig. 3, in plan at Fig. 4, and in perspective at Fig. 6. It rises above the plane of the top of the shuttle by a gentle curve at each end thereof, and its object is to alternately slacken and tighten the under thread.

40 is a rib extending around the lower surface of the shuttle. (See Fig. 7.) Its purpose is to reduce the friction of the thread as the latter is drawn under the shuttle during the formation of the stitch.

41 are holes extending vertically through the shuttle-rim and properly spaced, so that the round ends of the driving-pins 34 may engage therewith.

42 is an annular cap or ring secured to the bed-plate above the outer flange of the shuttle. It serves to prevent the shuttle from rising out of engagement with the pins when run at high speed. As will be readily seen, the shuttle is carried around by and upon the pins. It has no race. The latch 43 serves to secure the bobbin-case against rotation with the shuttle by engagement with the finger on said case. A cloth-plate 44 rests upon the bed above the shuttle, and the latter may be removed when necessary by the removal of the cloth-plate and of the annular shuttle-cap 42.

In the operation of the machine a variably-speeded motion is imparted from the main shaft of the machine to the shuttle-shaft through the gears, vertical shaft, the disk upon the latter, the pitman, and its connection to the disk on the said shuttle-shaft.

In the devices herein described I have dispensed entirely with the shuttle-race, and instead thereof I carry and drive the shuttle upon and by means of the shouldered reciprocating pins, which are caused to enter and recede from the apertures in the shuttle-rim by means of the engagement of the roller-studs upon said pins with the cam-groove in the sleeve or cylinder which surrounds the shuttle-shaft. These pins are held, as hereinbefore explained, in grooves or pockets in the carrier, which revolves with the shuttle-shaft, and they are caused to reciprocate positively in said pockets in such time that as the shuttle revolves through the loop they are withdrawn one by one out of engagement with the shuttle and in advance of the thread, so that a free and unimpeded passage is afforded to the latter. The shuttle is engaged at all times by at least four of these pins, and

is kept from rising out of engagement with them by a cap or partial ring, as 42, which covers the shuttle-rim and excludes dirt. The pressure of the shuttle against this ring or cap is never very great, and very slight lubrication of the top of the shuttle-rim will suffice. As the thread does not wipe over the upper surface of the shuttle-rim, it is not exposed to the lubricant. This shuttle, while embodying elements which, taken individually, are not at all new, yet contains them in such a new and useful combination that novel and beneficial results are obtained from their use. It is constructed with apertures around its rim to receive the pins upon and by means of which it is upheld and driven. It has the centrally-placed bobbin-case and bobbin, the bulging bridge whereby the under thread is first slackened and then tightened, the beak which is designed to draw no thread through the needle-eye while the latter is passing through the goods, and the rib or flange at the back of the shuttle, which diminishes the friction of the loop of thread in its passage over the latter. The needle-bar and needle having descended and risen a sufficient distance to throw out a loop toward the shuttle, the point of the latter takes it on and expands it until such time as the needle-eye has risen to the under surface of the goods. As the greatest cross-section of the beak is now in the loop, and as the cross-section diminishes thereafter to the shuttle-body, the needle-eye will rise through the goods without any more thread being drawn down through it during its passage and until the advancing shuttle-body requires more thread, by which time the needle-eye will have risen above the throat-plate and the goods. This feature relieves the thread from a great amount of strain and renders it feasible to use a much smaller needle than could otherwise be employed. As the shuttle continues its rotation the thread is drawn under and across its lower side, the rib or flange preventing contact with the entire surface. This diminishes friction, and as the loop is cast off it is drawn up in the goods by means of the take-up. As it is being drawn up the bridge of the shuttle first slackens the under thread as the loop enters the goods and then tightens it in conjunction with the take-up and feed motion.

I claim—

1. The combination, with the main shaft and the vertical shaft geared thereto, of the crank-disks beneath the bed-plate and the sliding pitman connecting said disks, the vertical shuttle-shaft, the shuttle-pin carrier secured upon the top thereof, the cam arranged around said shaft, the series of shouldered pins arranged in grooves in said carrier and engaging with said cam, and the shuttle provided with a series of holes in its rim, said holes registering with the pins in the carrier and adapted to be entered and left by said pins, substantially as specified.

2. The combination, with the shuttle hav-

ing a beak and a raised thread-controlling bridge, as 39, said shuttle having in its rim a series of holes vertically disposed, of the rotating shuttle-pin carrier, the loose shuttle-  
5 pins shouldered at their upper ends and each provided with a stud or roll near its lower end, a stationary grooved cam engaging said studs upon the shuttle-pins, and means, as described, for the rotation of the carrier, substantially as set forth.  
10

3. A rotary shuttle having the following elements: a centrally-placed bobbin-case, a series of holes in the shuttle-rim, whereby said shuttle may be carried and driven, a  
15 bridge for the control of the under thread, said bridge extending from behind the beak past the point thereof and to the heel end of said shuttle, and the beak greatest in cross-section at about its central portion, and tapering thence toward its heel and point, whereby  
20 after the needle has risen to the under side

of the fabric the beak does not further elongate or spread the loop until the needle-eye has risen clear of the work, substantially as set forth.

4. The shuttle, substantially as described, having the holes in its periphery, the centrally-placed bobbin, the bulging bridge for the control of the under thread, the beak greatest in cross-section at its center, and an  
25 outwardly-projecting circumferentially-arranged rib upon the bottom of the shuttle, whereby contact of the loop with the under surface of said shuttle is obviated and friction is diminished, as specified.  
30

In testimony whereof I affix my signature in presence of two witnesses.  
35

FRANCIS T. LEILICH.

Witnesses:

S. H. HUBBARD,  
WM. J. TANNER.