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GEORGE REHFUSS,
No. 121,896.

2 Sheets--Sheet 1.
Improvement in Sewing Machines.
Patented Dec. 12, 1871.

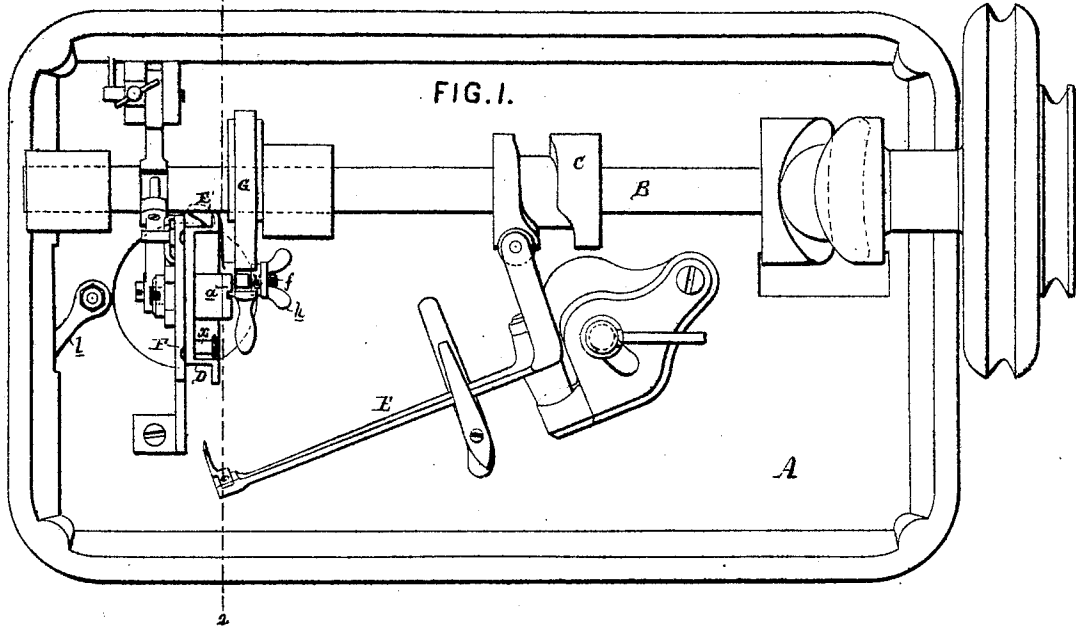


FIG. 2.

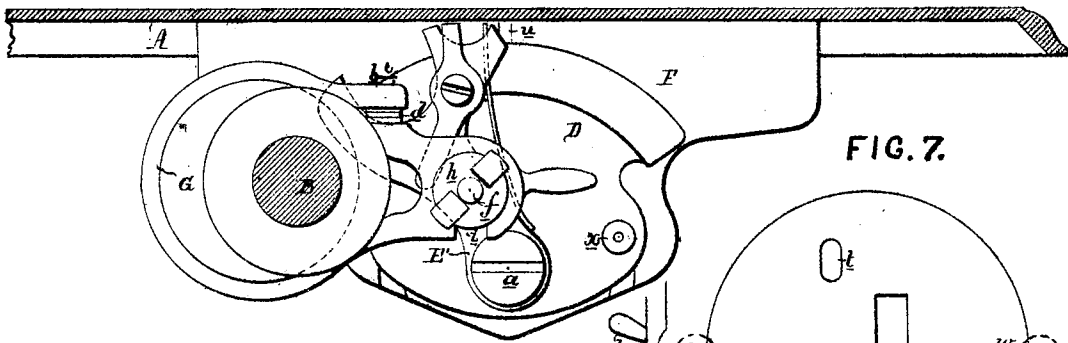


FIG. 3.

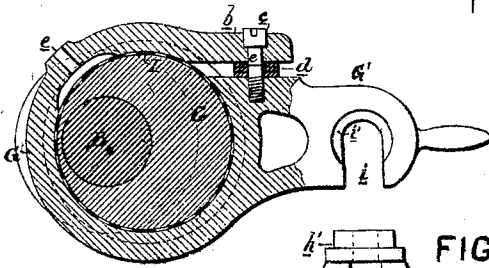


FIG. 4.

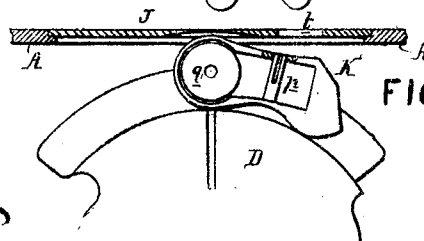


FIG. 5.

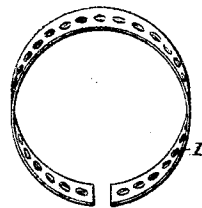
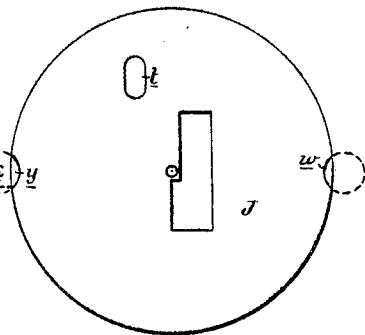


FIG. 7.



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GEORGE REHFUSS.

Improvement in Sewing Machines.

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FIG. 8.

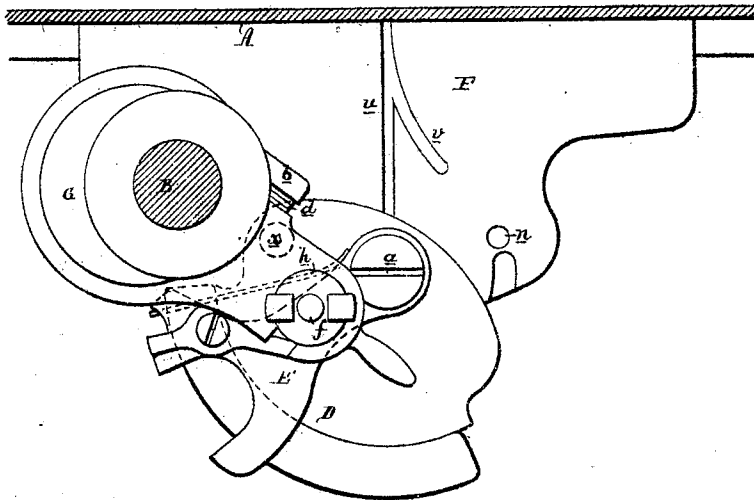


FIG. 9.

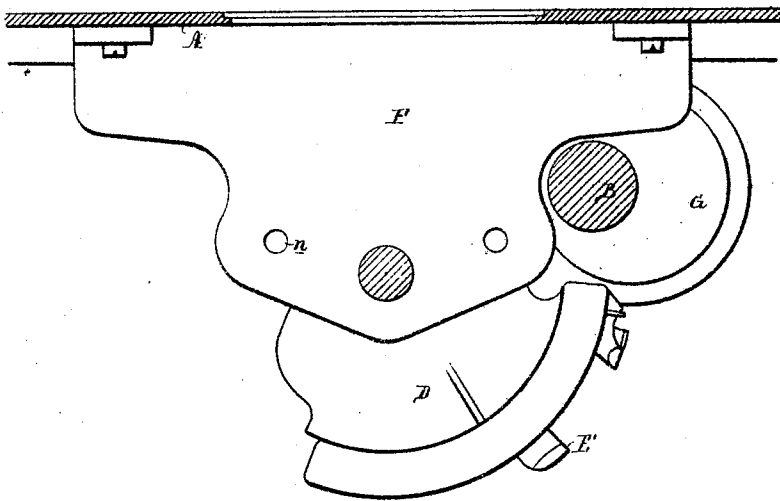
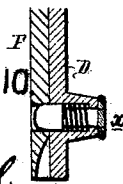


FIG. 10.



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UNITED STATES PATENT OFFICE.

GEORGE REHFUSS, OF PHILADELPHIA, PA., ASSIGNOR TO AMERICAN BUTTON HOLE, OVERSEAMING, AND SEWING-MACHINE COMPANY, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 121,896, dated December 12, 1871.

To all whom it may concern:

Be it known that I, GEORGE REHFUSS, of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Sewing-Machines, of which the following is a specification:

My invention relates to improvements in the sewing-machine for which Letters Patent No. 51,086 were granted to my assignees November 21, 1865, (antedated November 11, 1865,) and Letters Patent No. 114,197, granted April 25, 1871; and my improvements, which are too fully explained hereafter to need preliminary description, have for their object the ready conversion of the machine from a condition adapted to the making of a lock-stitch to a condition for making a button-hole stitch. My improvements are also directed to the attainment of other useful purposes, which are minutely described hereafter.

Figure 1, Sheet 1, is an inverted plan view of a sewing-machine with my improvements; Fig. 2, a vertical section on the line 1 2, Fig. 1; Figs. 3, 4, and 5, views of the eccentric for operating the shuttle-driver, and of appliances connected with the said eccentric; Fig. 6, a sectional view of the cloth-plate with the shuttle and shuttle-race beneath; Fig. 7, a plan view of the cloth-plate, with the device for retaining and releasing the same; Fig. 8, the same as Fig. 3, showing the eccentric and shuttle-driver and shuttle-race in positions differing from those in the said figure; Fig. 9, a rear view of Fig. 7; and Fig. 10, a sectional view illustrating the mode of locking the shuttle-race.

A is the base plate of the machine, in suitable bearings, beneath which turns the driving-shaft B, carrying a scroll-cam, C, for operating the looping-arm E, as described in the Letters Patent granted to my assignees November 21, 1865, the mode of moving the said arm out of gear with the scroll-cam and retaining it when not required for aiding in the making of the button-hole stitch being fully described in the said patent. D is the movable shuttle-race, and E' the shuttle-driver, described in the patent granted to my assignees on the 25th day of April, 1871, both being hung to a pin, *a*, projecting from the vertical face-plate F secured to the under side of the base-plate A. On the driving-shaft B is a flanged eccentric, G, embraced by an eccentric-rod, G', the peculiar character of which will be

best observed on reference to Fig. 3, the portion of the rod which embraces the eccentric having its outer end *b* disconnected from the other portion of the rod, excepting through the medium of a set-screw, *c*, on tightening which the rod may be made to embrace the eccentric with more or less force. The screw, on the contrary, may be so loosened that the portion *b* of the eccentric-rod will, by its own elasticity, or aided by a spring, *d*, move outward sufficiently to enable the eccentric-rod to be passed laterally over the flanges of the eccentric. A ring, I, of thin steel, perforated throughout, is interposed between the eccentric-rod and eccentric. I have found that this ring tends to maintain the bearing surface of the eccentric in such a thoroughly-lubricated condition as to diminish the friction. This is brought about by the oil introduced into the hole *e* finding its way into and being retained within the perforations of the ring, which consequently distribute the oil evenly throughout the frictional surface. A pin, *f*, projects from the face of the shuttle-driver E, and to this pin is adapted the rounded end of the slot *i* in the outer ends of the eccentric-rod, the latter being confined to the pin by a thumb-nut, *h*, in a manner which forms one of the features of my invention. It will be observed that the nut has a circular projection, *h'*, and that this projection is adapted to a segmental recess, *i'*, concentric with the rounded end of the slot *i* in the eccentric. When the end of the eccentric-rod is adjusted to the pin *f* and the thumb-nut screwed to its place the rod is connected to the said pin as effectually as though the latter passed through a plain hole in the eccentric-rod instead of through a slot, *i*, the segmental recess retaining the nut, and consequently preventing the removal of the eccentric-rod from the pin *f* until the projection *h'* of the nut is withdrawn from the segmental recess *i'*.

When the sewing-machine is required to make a loop-stitch, and the looping-arm has to be moved to a position where it is under the control of the scroll-cam C, there is no further use for the shuttle-race, the eccentric and its rod, or the shuttle device. In my said patent of November 21, 1865, it became necessary to move the eccentric G and its rod laterally on the driving-shaft before this change could be made, and the movement of these parts demanded tedious manipulation, which I obviate by my present ar-

rangement. When the shuttle-driver has to be disposed of I simply loosen the nut *h* and then raise the outer end of the eccentric-rod free from the pin, and turn the shuttle-driver down to the position shown in Fig. 8, and again connect the end of the rod to the pin *f*. As the looping-arm performs its duty the shuttle-driver will continue to vibrate, without, however, interfering with the looper, and without performing any duty except that of maintaining its frictional surfaces in a proper lubricated state, and being thereby in a good condition for effective service whenever it is required. It will be seen that by this arrangement I avoid the necessity of loosening and adjusting the eccentric on the shaft B, a duty which is more the province of a machinist than that of a sewing-machine operator.

When the machine has to be used for making the button-hole stitch, it becomes necessary to move away the race D, as described in the aforesaid patent of April 25, 1871; it is consequently moved from the position shown in Fig. 2 to that seen in Fig. 8. It is important that the race should be self-locking in either of the two positions to which it has to be adjusted. The race-plate D is provided with a spring-pin, *x*, Fig. 10, rounded at the end, the spring having a tendency to force the pin against the face-plate F. When the race-plate is moved from the position shown in Fig. 8 to that seen in Fig. 2, the point of the pin *x* (shown by dotted lines in Fig. 8) will, as the race-plate approaches its destination, come in contact with an inclined plane on the face-plate F, and will be consequently pushed back ready to be forced by its spring into a hole, *u*, in the said face-plate, when the race-plate has reached its proper position for being used as a race for the shuttle, in which position it is consequently locked by the pin. In like manner, when the race-plate has to be moved from the position shown in Fig. 2 to that seen in Fig. 8, the same pin will come in contact with another inclined plane on the face-plate and drop into another hole, and will consequently be locked until the pin is again withdrawn. By combining this self-locking device with the race-plate, the operator is relieved from much tedious manipulation and adjustment.

Another important feature of my invention is the facility with which the tension of the shuttle-threads can be regulated without removing the work-plate or withdrawing the shuttle from its race. This feature will be best understood by referring to Figs. 6 and 7, where J represents the circular work-plate covering an opening in the base-plate A and fitting in a recess made in the edge of the said opening. K is the shuttle, and *p* the pin, round which the thread from the spool *q* is wound to impart more or less tension. In the work-plate is a hole, *t*, so situated that the shuttle can be adjusted to present its pin immediately below the said hole, through which a suitable instrument can be introduced to turn the pin, and thereby adjust the tension as circumstances may suggest.

Another feature of my invention is the facili-

ty with which the work-plate may be withdrawn when the shuttle has to be removed. It will be observed in Fig. 7 that the work-plate has a small recess, *w*, for introduction beneath a lip on the base-plate, the lip consisting in the present instance of a portion of a circular piece, shown by dotted lines as projecting a short distance over the opening in the base-plate for receiving the work-plate. The work-plate has another small recess, *y*, opposite to the recess *w*, and a portion of the disk *k* fits over and into this recess when the work-plate is confined to its place. The disk can be turned in the base-plate by means of a handle, *l*, and part of the disk is cut away, so that when the portion thus cut away is opposite the recess *y* the work-plate is at liberty to be withdrawn. Some instrument, however, would be necessary to effect this withdrawal but for the provision which I will describe. The work-plate, where the recess *w* occurs, is bent very slightly upward, so that after the recessed portion *w* has been introduced beneath the lip it requires a slight effort to depress the opposite edge of the plate before it can be overlapped by the disk. When, therefore, the disk is turned to release the plate it has a tendency to jump from its place corresponding with the effort previously exercised to depress it, and no instrument is necessary to effect the withdrawal of the plate—in other words, the plate has, when depressed, an inherent elasticity, which induces its self-removal when released.

It will be observed in Fig. 8 that the face-plate F has the usual vertical groove *u* for receiving the upper needle, and that with this groove communicates a curved groove, *v*, for receiving the looping-needle, which is permitted by the latter groove to move in the proper range in respect to the upper to insure the formation of the loop-stitch.

I claim—

1. The combination of the eccentric G and eccentric-rod and a vibrating shuttle-driver, arranged substantially as described, so that the said eccentric-rod can be connected to the driver when the latter is moved to either of the two positions illustrated and described.
2. The portion *b* of the eccentric-rod, the spring *d*, and set-screw *c*, by which the said portion *b* is connected to the rod.
3. The perforated ring I interposed between the eccentric and eccentric-rod, as set forth.
4. The thumb-nut *h* adapted to the pin *f*, and having a projection, *k'*, adapted to a segmental recess, *l'*, which is concentric with the rounded end of the slot *i* of the eccentric.
5. The movable race-plate D having a spring-pin, *x*, or its equivalent, by which the said race-plate is made self-locking in either of the two positions to which it has to be adjusted.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. REHFUSS.

Witnesses:

WM. A. STEEL,
HARRY SMITH.