

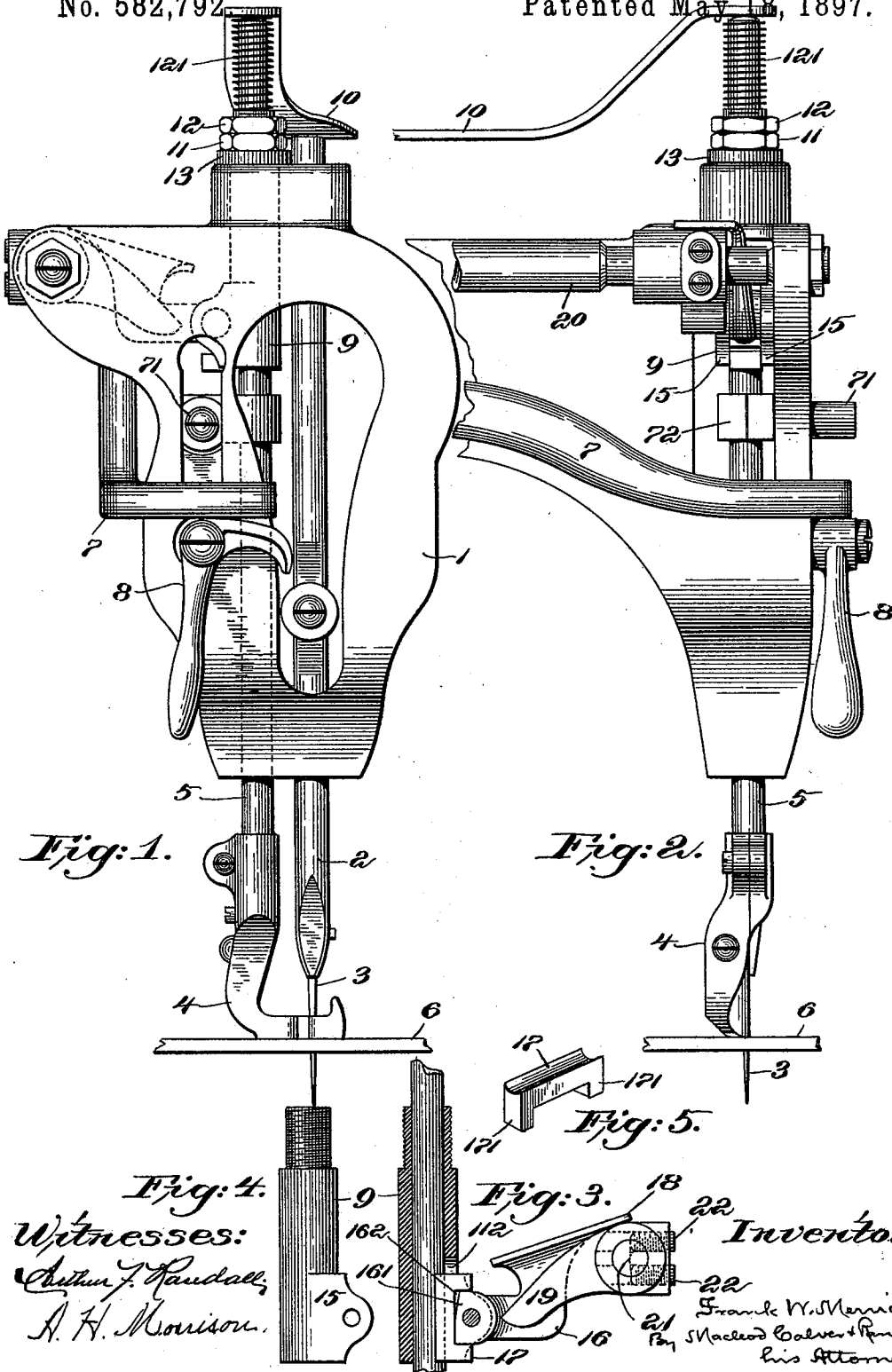
(No Model.)

2 Sheets—Sheet 1.

F. W. MERRICK.
AUTOMATIC PRESSER FOOT LIFTING DEVICE FOR WAX THREAD SEWING
MACHINES.

No. 582,792

Patented May 18, 1897.



Witnesses:

Arthur J. Randall,
A. H. Morrison.

Inventor:

Frank W. Merrick
By Macleod Colver & Randall
his Attorneys

(No Model.)

2 Sheets—Sheet 2.

F. W. MERRICK.

AUTOMATIC PRESSER FOOT LIFTING DEVICE FOR WAX THREAD SEWING
MACHINES.

No. 582,792.

Patented May 18, 1897.

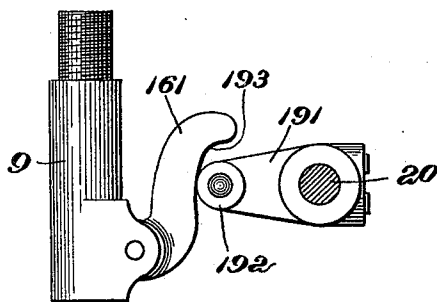


Fig. 6.

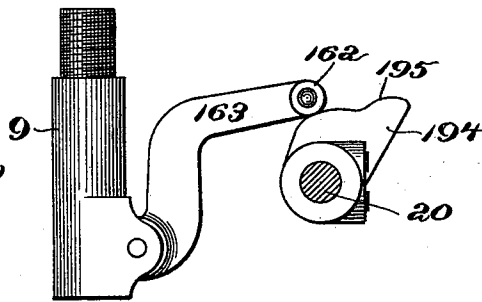


Fig. 7.

Witnesses:

Arthur L. Randall,
Alice H. Morrison.

Inventor:

Frank W. Merrick
By Melvin Calver & Randall
his Attorneys

UNITED STATES PATENT OFFICE.

FRANK W. MERRICK, OF BOSTON, MASSACHUSETTS.

AUTOMATIC PRESSER-FOOT-LIFTING DEVICE FOR WAX-THREAD SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 582,792, dated May 18, 1897.

Application filed September 3, 1895. Serial No. 561,199. (No model.)

To all whom it may concern:

Be it known that I, FRANK W. MERRICK, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Automatic Presser-Foot-Lifting Devices for Wax-Thread Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Heretofore in some instances machines of the class to which my invention relates have been equipped with devices for raising automatically the presser-foot. In some of such machines a friction-clamp engaging the presser-bar has formed a portion of the lifting devices, the said clamp being given at intervals an upward movement and raising the presser-bar with it. In such machines the presser-bar has been fitted to fixed bearings above and below the friction-clamp. A disadvantage of this construction and arrangement is the fact that when the clamp is closed upon the presser-bar the latter has communicated thereto a lateral strain or deflection which forces its upper end with great pressure against one side of the bearing therefor and correspondingly forces the lower end of the presser-bar against the opposite side of the lower bearing. When now the lifting action takes place, there is on the sides mentioned binding and greatly-increased friction of the presser-bar in its bearings, thereby throwing greater strain upon the lifting devices and causing the latter to slip. Another disadvantage of all prior devices with which I am acquainted is the suddenness of the action of the parts as the clamp is operated to close it upon the presser-bar and to lift the latter. In all such cases the lifting of the presser-bar begins instantly upon the closing of the clamp thereon, and both are effected with great quickness. The suddenness of the "blow" is so great as to tend to cause the clamp to slip, so that even where such devices prove fairly reliable when the machines on which they are employed are run at low rates of speed they become unreliable when the speed is increased.

In the working of the presser-foot-lifting mechanism great quickness of action is necessitated by the exceedingly slight portion

of time that is allowed for the action of the presser-foot-lifting devices in the cycle of operations of the machine. The entire lifting and depressing action must be consummated—that is to say, must be begun and ended (the presser-foot being raised from the work and then dropped upon the latter again)—during the time of the feed, which latter usually occupies about one-sixth of a revolution of the main shaft of the machine. Hence a period corresponding with one-sixth of a revolution of the said main shaft practically is the extreme limit that can be taken for one complete action of the presser-foot. In prior mechanisms the closing of the clamp upon the presser-bar has been effected at the same rate of speed as that with which the actual lifting has had to be effected; hence the violence of the blow and the frequency of slippage.

The object of my present invention is to obviate the foregoing disadvantages and to provide an improved construction and combination of parts which shall be free from all tendency to the slip above mentioned.

In the accompanying drawings I have shown my invention in the best form which I have yet devised and will proceed to describe the same with reference to the said drawings. After being thus described the invention will be more particularly pointed out and distinctly defined in the claims at the close of this specification.

Figure 1 of the drawings is a view in elevation representing the head of a sewing-machine with my invention applied thereto, sufficient of the working parts being shown to make clear the nature and relation of the invention. Fig. 2 is a view at right angles to Fig. 1, showing the parts that are represented in the latter. Figs. 3, 4, and 5 are details of the clamping device. Figs. 6 and 7 are views showing modifications.

At 1 is represented the head of a sewing-machine, at 2 the awl-bar, at 3 the awl carried by the said awl-bar, at 4 the presser-foot, at 5 the presser-bar, and at 6 is intended to be indicated a portion of work underneath the presser-foot.

At 7 is indicated the forward end of the usual lever intended to be operated by foot for lifting the presser-foot and presser-bar,

when desired, the said lever engaging with a stud or screw 71, projecting from the block 72, fixed upon the presser-bar.

At 8 is the usual hand-operated cam-lever 5 pivoted upon the head of the machine and arranged to act upon the said lifting-lever 7 to enable the presser-foot to be raised by hand, when desired.

The said parts are or may be as heretofore 10 or of any usual or preferred construction, and in practice the awl-bar is operated in any well-known or suitable manner.

At 9 is a sleeve which surrounds the upper 15 end of the presser-bar 5, the said sleeve being fitted to a bearing provided therefor in the upper part of the head 1 and being free to slide up and down in such bearing. The upper extremity of the presser-bar extends above the upper end of the said sleeve and is 20 borne upon by the free end of a blade-spring 10, which latter is secured to the arm of the machine. The said spring 10 acts to hold the presser-foot 4 normally pressed upon the upper surface of the work 6. The upper end of 25 the sleeve 9 is screw-threaded, and said end has applied thereto the adjusting-nut 11, above which is the lock-nut 12. A washer 13, of sound-deadening material, is placed upon the said upper end below the adjusting-nut 30 11, the said washer lying upon the top of the head 1. By means of the adjusting-nut 11 the limit of the descent of the sleeve 9 is determined, and by turning the said nut upon the sleeve the said limit may be adjusted up 35 or down, as will be obvious. A spiral spring 121 surrounds the upper end of the presser-bar. The said spring is compressed between the blade-spring 10 and the upper end of the sleeve 9 and acts to bear the latter into its 40 lowest position. In the lower end of the sleeve 9 is a slot or opening 112, at opposite sides of which are lugs 15 15. Between these lugs is placed a shoe or clamping-block 17, the latter having a surface which preferably 45 is concaved to fit the rounded exterior surface of the presser-bar. This shoe or block 17 is formed with projections 171 171, extending, respectively, above and below the inner end of the lever 16 to hold the shoe or block 50 in place. The said lever is pivoted upon a pin 161, passing through lugs 15, and the outer end of the lever 16 has a laterally-turned flat portion or flange 18. The said portion or 55 flange 18 is of some considerable length and overlies a rocker 19, the latter being in the form of an arm having the surface thereof which acts against the under side of the said portion 18 described on a diminishing or parabolic curve which is tangential to the cylindrical portion or hub of the arm. 60

The rocker 19 is applied and secured to one end of a rock-shaft 20, which latter in practice will be actuated by any suitable means usually employed for actuating rock-shafts 65 in like connection and position. For example, an eccentric on the main shaft of the machine may be employed for rocking the said

rock-shaft. One side of the rock-shaft 20 is "spotted" or slabbed off, so as to produce a flat surface 21, and through the hub or cylindrical portion of the rocker 19 are passed adjusting-screws 22 22. The said screws 22 22 70 contact with the flat surface 21 at opposite sides of the center or axis of the shaft 20—that is to say, at opposite sides of a radial line passing through the said axis or center. 75 The said screws 22 22 serve not only as a means of clamping the rocker to the rock-shaft 20, so as to cause the rocker to partake of the movements of the rock-shaft, but also 80 as a means of enabling an angular adjustment of the rocker upon the rock-shaft to be effected. As will be obvious, in effecting this adjustment it is necessary only to turn one screw out and the other in, more or less, as 85 may be required for giving the desired position of the rocker.

The face 161 at the inner end of the lever 16 is the face which, as the outer end of the said lever 16 is raised by the action of the 90 rocker 19, engages with the shoe or clamping-block 17 to force the latter against the presser-bar. The said inner end of the lever 16 is cut away to afford a clearance-space 162, which, when the outer end of the lever is permitted 95 to descend, will relieve the pressure upon the clamping-block and thereby allow the latter to release the presser-bar.

Adjustment of the rocker upon its rock-shaft by means of the screws 22 22 enables 100 me to vary, as may be desired, the height to which the presser-foot is lifted from the work. Vertical adjustment of the sleeve 9 by means of the adjusting-nut 11 enables me to determine the amount of clearance or play which 105 shall occur at the inner end of the lever 16. I first adjust the sleeve 9, by means of the nut 11, so as that, the rocker being in the position which is represented in Fig. 1 and the portion 18 of the lever 16 resting on the concentric 110 portion of the root or base of the diminishing or parabolic curve of the rocker, the working face at the inner end of the lever 16 shall just relax its pressure upon the clamping block or shoe 17 and thereby relieve the pressure of 115 the latter against the surface of the presser-bar. This is the position which is to be given to the parts when they are first assembled. This adjustment of the sleeve 9 has an effect, as will be obvious, in modifying the extent of 120 the vertical movement of the presser-bar which is derived from the action of the rocker 19 upon the lever 16.

It will be obvious that in proportion as the axis on which the lever 16 turns is raised or 125 lowered the amount of clearance or play at the inner end of the lever 16 will be increased or diminished, and the extent of the actual lift of the presser-bar and presser-foot will be varied exactly in proportion to the extent 130 of that portion of the movement of the rocker which is consumed in taking up the clearance or play. Accordingly after the sleeve 9 has been adjusted, as above stated, the rocker is

adjusted as aforesaid in order to procure the right amount of play or clearance at the inner end of the lever 16. The adjustability of the sleeve enables me to take up play at said inner end resulting from wear of the parts.

The devices heretofore in use have been constructed and adjusted to operate with great suddenness of action, the lift beginning at a high rate of speed simultaneously with the closing of the clamp. When this is the case, it is practically impossible to prevent slip, particularly when running the machine at high speed.

A leading characteristic of my invention is the easy and deliberate closing of the clamp upon the presser-bar, the operating devices being so constructed as that the clamp is made to engage with the presser-bar with an easy movement and to become fully engaged therewith before the lifting begins. This is secured in the embodiment of my invention which is represented in Figs. 1 and 2 by forming the curve of the rocker 19 as a gradual one which at first is tangential to the concentric hub portion of the said rocker and then gradually diminishes in curvature. This provides for gradually closing the clamp upon the presser-bar and then effecting the lift without blow or tendency to slip.

I have shown in Fig. 6 a modification of my invention in which I employ a rocker-arm 191, carrying a roller 192, which latter acts in conjunction with the curved surface 193 of the clamp-lever 161. The said surface 193 is so shaped throughout the greater portion of its length that in the normal or depressed position of the presser-bar, &c., it departs but little from concentricity with the rock-shaft on which the rocker 191 is mounted. Hence the action of the roller 192 upon the lever 161 closes the clamp upon the presser-bar slowly and easily and before the lift begins. The curvature of the portion of the arm 161 upon which the roller 192 bears after the closing of the clamp is more pronounced, so as to insure proper lifting action.

Fig. 7 shows another modification, in which the rocker 194 is formed with a curved surface 195, acting upon a pin or roller 162, carried by the clamping-lever 163. The curvature of the first part of the surface 195 is such as to operate, as above described, to close the clamp gradually upon the presser-bar, the remaining portion—namely, that which acts to occasion the lifting—having a more abrupt grade.

The sleeve 9 constitutes a movable bearing for the presser-bar. The presser-bar is clamped with the said bearing by the action of the rocker upon the clamping-lever which has been described herein, and when the lifting action takes place the sleeve and presser-bar rise together, being subsequently depressed by the action of the springs. As will be obvious, the binding and friction which here-

tofore have been exerted upon the presser-bar and have operated to prevent its movement and to occasion slipping of the clamp thereon are transferred to the exterior of the sleeve and no longer have effect upon the presser-bar. The sleeve is positively actuated by the devices which have been described herein, and hence is not affected by the former causes of defective action.

I claim as my invention—

1. The combination with the head of a sewing-machine having a bearing, the presser-foot, and the presser-bar, of a movable bearing for the presser-bar, the said movable bearing itself fitting the said bearing of the head, a clamping-lever mounted on said movable bearing, and actuating means for the said lever which by its initial movement actuates said lever to clamp the presser-bar to the movable bearing and by a further movement moves the movable bearing lengthwise within the bearing in the head, substantially as described.

2. The combination with the head of a sewing-machine having a bearing, the presser-foot, and the presser-bar, of the movable bearing surrounding said presser-bar, the said movable bearing itself fitting the said bearing of the head, means to adjust vertically the position normally occupied by the movable bearing, a clamping-lever mounted on said movable bearing, and means to actuate the said lever which by its initial movement actuates said lever to clamp the presser-bar to the movable bearing and by a further movement moves both the latter and the movable bearing lengthwise within the bearing in the head, substantially as described.

3. The combination with the head of a sewing-machine having a bearing, a presser-foot, and the presser-bar, of the movable bearing surrounding said presser-bar and screw-threaded exteriorly, the said movable bearing itself fitting the said bearing of the head, the adjusting-nut on said movable bearing, a clamping-lever mounted on said movable bearing, and means to actuate the said lever which by its initial movement actuates said lever to clamp the presser-bar to the movable bearing and by a further movement moves both the presser-bar and the movable bearing lengthwise within the bearing in the head, substantially as described.

4. The combination with the presser-foot, the presser-bar, and the clamping-lever, of means to move said clamping-lever with a varying speed, and effect the clamping at a relatively slow speed and the lifting at an increased speed, substantially as described.

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

FRANK W. MERRICK.

Witnesses:

CHAS. F. RANDALL,
HENRY CALVER.