

(Model.)

2 Sheets—Sheet 1.

W. H. HANNA.
SEWING MACHINE.

No. 491,554.

Patented Feb. 14, 1893.

Fig. I

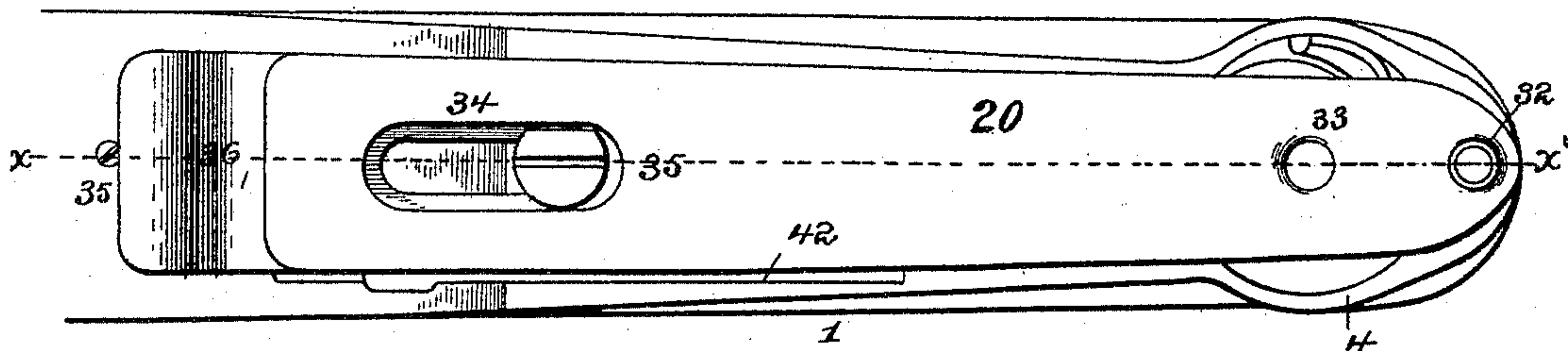


Fig. II

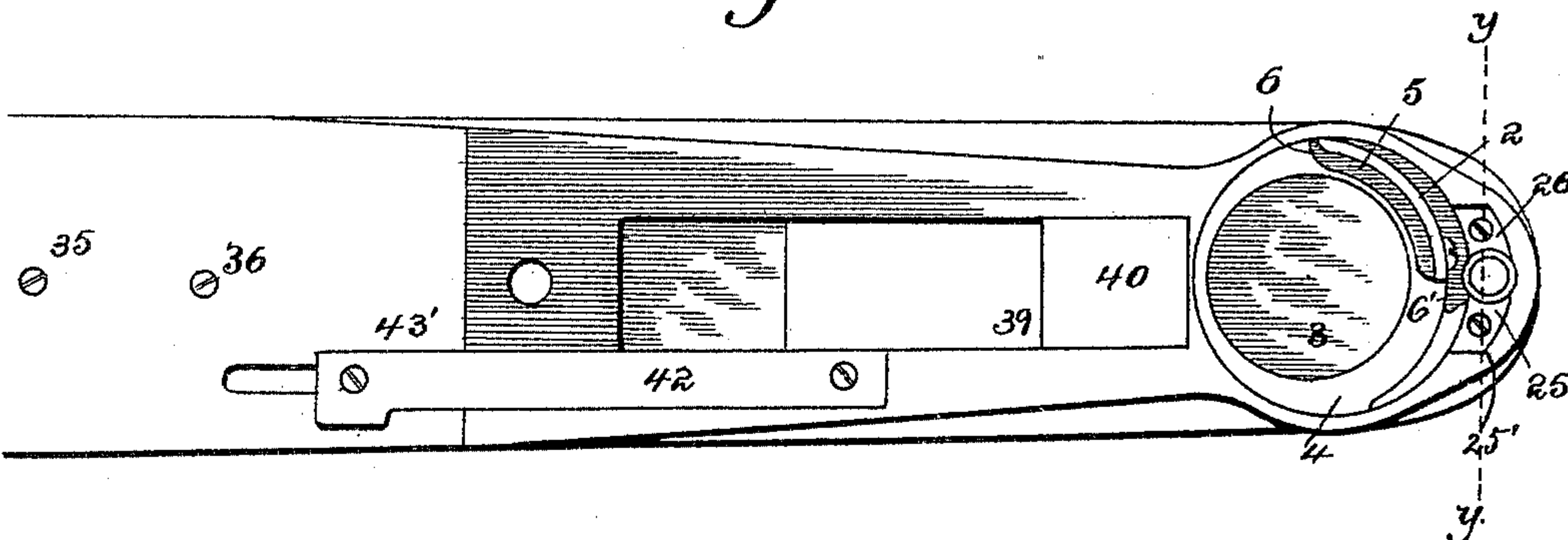


Fig. IV

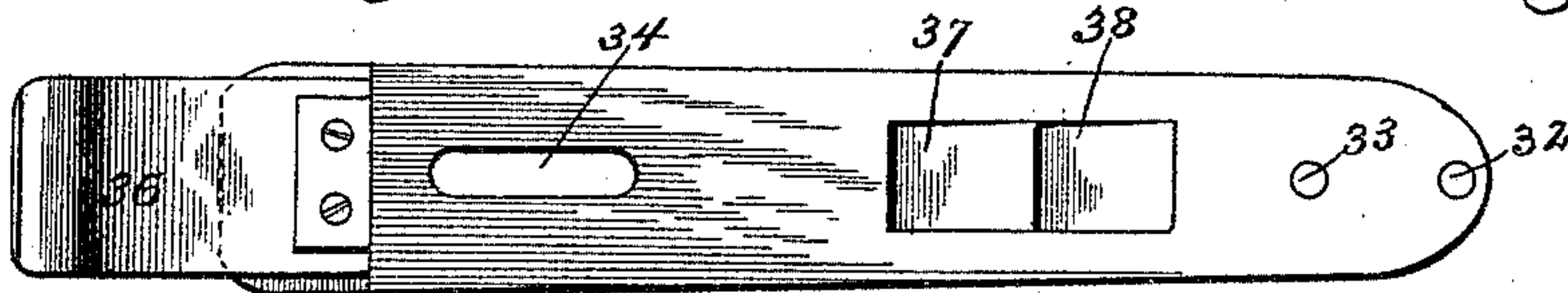
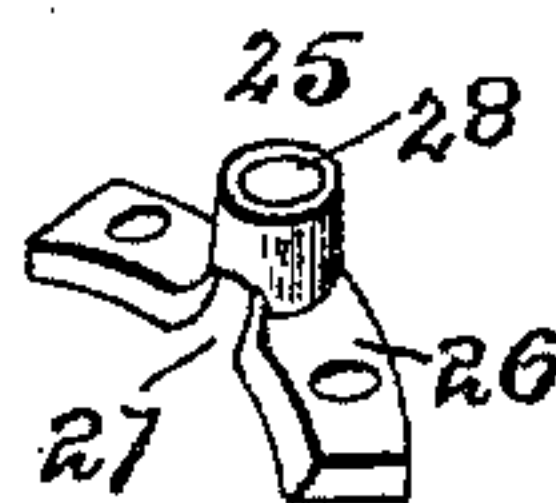


Fig. V



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(Model.)

2 Sheets—Sheet 2.

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Fig. III.

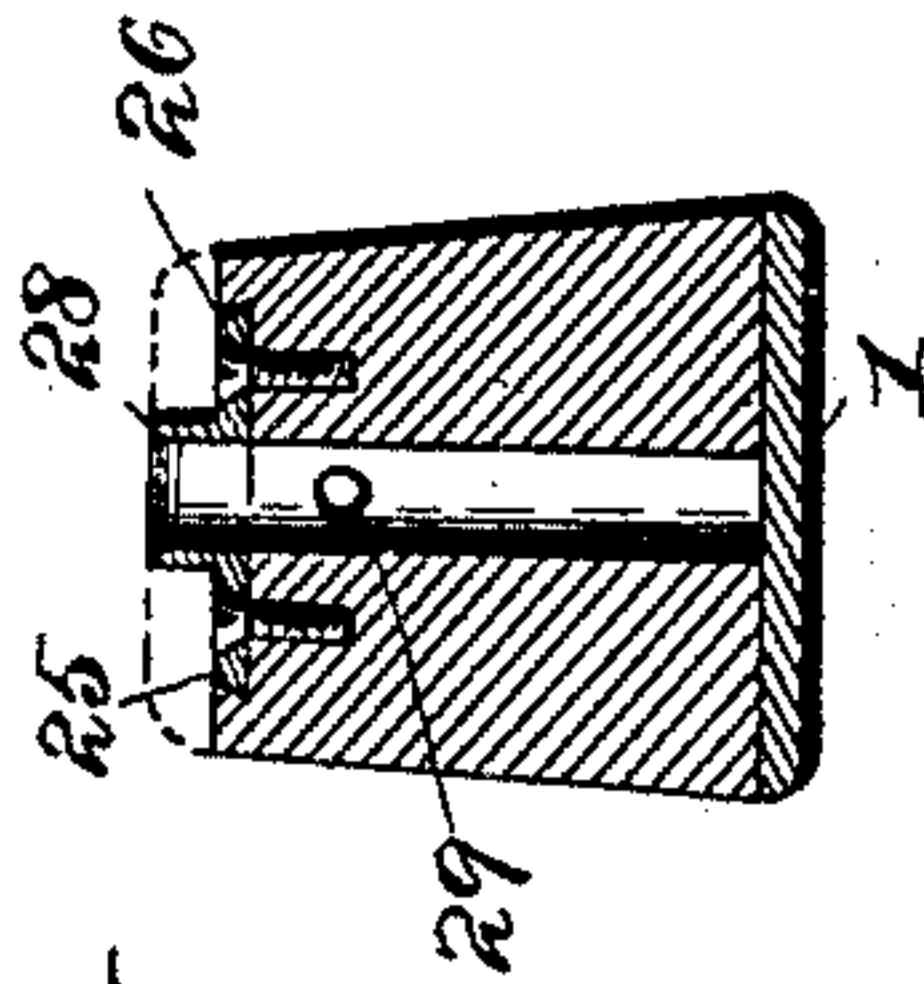
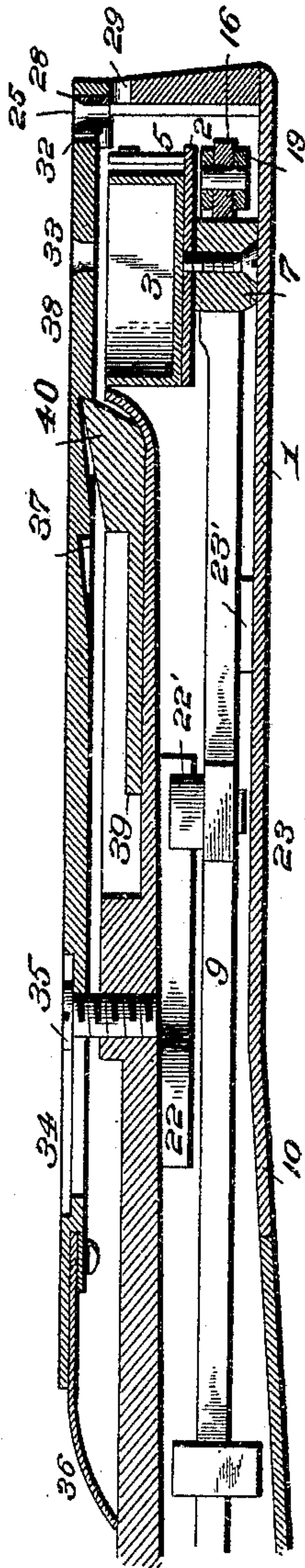


Fig. IV.

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UNITED STATES PATENT OFFICE.

WILLIAM HAMILTON HANNA, OF PETERSBURG, ILLINOIS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 491,554, dated February 14, 1893.

Original application filed July 31, 1891, Serial No. 401,308. Divided and this application filed October 31, 1891. Serial No. 410,489. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM HAMILTON HANNA, a citizen of the United States, residing at Petersburg, in the county of Menard and State of Illinois, 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.

The invention embraced in the present application is a division of an earlier application filed by me on the 31st day of July 1891, Serial No. 401,308; and the nature of said invention is to simplify and render effective the throat-plate of a sewing machine of the class technically known as "universal feed-arm" machines; to make the tubular throat for the needle and its thread more durable and efficient, adapt the said throat for ready removal and renewal, and enable the throat to be applied to old sewing machines.

With these ends in view, the invention consists in the peculiar construction and adaptation of parts, and the combination of devices, which will be hereinafter fully described and claimed.

In the accompanying drawings, Figure I is a top plan view, on an enlarged scale, of an "arm" of the sewing machine of the well known type of "Singer" machine. Fig. II is a plan view with the vibrating throat plate removed to show the shuttle, its carrier, and the reciprocating rod to move the vibrating plate. Fig. III is a longitudinal sectional view on the line $x-x$ of Fig. I. Fig. IV is a detached detail view of the improved throat plate, and Fig. V is a like view of the tubular throat. Fig. VI is a vertical transverse sectional view through the longitudinal arm of the machine to show the flared base of the tubular throat seated in said arm.

Like numerals of reference denote corresponding parts in all the figures of the drawings.

1 designates the longitudinal arm of a sewing machine, 2 the oscillating shuttle carrier, and 3 the shuttle movable with the carrier. This arm 1 is provided near its outer end with a circular shuttle race 4, and in this race

is fitted the shuttle and its carrier, the same being driven by a rod 9 operating within a chamber or recess 10 in the lower side of the arm 1. This driving rod is operated in the manner and by the means shown and described in my earlier application hereinbefore referred to.

I will now proceed to a detailed description of my improvements, which relate to the tubular throat, 25, the vibrating throat plate, and the means for actuating the same. This tubular throat is provided with an enlarged base 26, as shown in the drawings, which base and throat are inserted or fitted in the arm 1 in the manner presently described. On the inner side of the throat and base is formed an opening or passage 27 which opens laterally through the base and the lower part of the throat, and the throat and its base are arranged flush with the shuttle race, to form a continuation of the boundary wall of said race. By thus arranging the throat and base thereof relatively to the shuttle race, the lateral opening 27 of said base is made to communicate with the shuttle race, and thus the needle and needle thread as they pass through the tubular throat are brought into such position relative to the point of the shuttle that the shuttle point can take or engage the loop of the needle-thread.

In the manufacture of my improved tubular throat I temper the whole throat and base to the proper degree of hardness, and the upper end of said throat is flared or enlarged at 28. I have found by practical experience that an untempered throat is injured by the deflection of the needle, particularly in sewing leather and heavy materials, which deflection of the needle causes it to strike the edge and wall of the throat, forming corrugations or sharp projections that operate to chafe, cut and weaken the needle-thread and frequently draws out the shuttle thread which forms loops on the under side of the work. But by tempering the throat and throat-plate and flaring or enlarging the needle orifice thereof, I am enabled to obviate this formation of rough sharp projections when the needle is deflected and impinges against the throat, which is a great advantage.

The tubular throat and its base are made of

a single piece of metal in this wise:—To make my improved tubular throat I take a round (solid) wire of proper length and diameter and for the throat I drill, longitudinally, a hole the proper size and to one side sufficient to only leave enough metal to form a side and when the thick sides are cut away a round tube is formed; this is only done for a distance equal to the thickness of the throat plate, which should be not more than one-eighth inch:—this one-eighth of an inch is the depth of the tubular throat. Now I taper slightly, the balance or base. The thin side of the base, below the tube, is now cut away to the throat which forms a slot or opening 27 in the base which admits of the needle-thread being projected into the shuttle race. I do not, however, desire to strictly confine myself to this precise method of making the tubular throat and base thereof; as the same may be made by other methods, although I prefer to manufacture the throat and base in a single piece and temper the throat. To fit or insert the base into the arm 1, a tapering recess or hole 25' is cut therein on the side next adjacent to the shuttle race, which hole is made as far from the race as will admit of the flattened side of the base coming flush with the face or surface of the race and permits the inner side of the tubular throat to hang or lie over the face of the shuttle race. A transverse opening or hole 29 is now drilled or formed in the end of the main arm 1, at a point midway of the point reached by the bottom of the base which admits of a space below the bottom of the base for the insertion of a wedge and room above the point to loosen the base and to force the throat and base out of position and enables the ready and easy removal of the throat and base from the arm 1 when it becomes necessary or desirable to renew or repair the throat.

It is evident that the improved throat and base can be applied to old machines by forming the socket in the arm 1 and adjusting the base and throat therein in the manner herein described.

The feeding mechanism comprising the vibrating throat plate 20 and the means for actuating and adjusting the same is more particularly designed as an improvement on a prior invention patented to me on January 27, 1891, No. 445,468. In the improved device I aim to simplify the construction by dispensing with the hinge in the earlier device and to facilitate a two-fold adjustment of the throat-plate which is hereby made to form a long end or short end between the pivot of the plate and the tubular throat. The improved plate is made of a single piece of metal and near one end it is formed with spaced needle-orifices 32, 33, and with a longitudinal countersunk slot 34 at an intermediate point of its length. The plate can be moved to bring either of its needle-orifices 32, 33 to receive the throat, which adjustment of the throat plate is permitted by the longitudinal

slot 34 and the screw 35 which has its head fitted in the slot and its shank screwed into a threaded aperture or socket in the solid part of the arm 1. This screw 35 is cut away to form a flat surface on one side, and it does not bind or force the throat plate so firmly upon the arm 1 as to prevent said throat plate from having the necessary vertical vibration for the purpose of lifting the free end of the same above the throat as is required in the proper operation of the feeding mechanism, and to admit of its being lifted clear of the tubular throat and permit its removal, laterally, from its position over the shuttle and race. The movement of the throat plate 20 is aided and insured by means of the tension spring 36, which is preferably of the leaf spring variety as shown in the drawings although another form of spring may be used without departing from the spirit of the invention. One end of the leaf spring 36 is rigidly fastened to the rear end of the throat plate and the heel of said spring bears firmly on the upper side of the arm 1. In its lower or under surface, the throat plate 30 is formed with two wedge-shaped or cam shaped surfaces 37, 38, arranged in line with each other and spaced or arranged apart a distance equal to the distance between the two needle orifices 32, 33, in the end of the throat plate. These cam surfaces are formed by cutting into the body or above the lower surface of the plate, so that the cam surfaces lie above the lower face of the plate; and with one of said cam surfaces (according to the adjustment of the throat plate) engages a slide 39, which is guided in a suitable way in the arm and has a projecting wedge shaped surface 40 that contacts with or bears against one of the cams 37, 38. To this slide, and to the rear end of said slide is fastened a reciprocating rod 42 which is guided in a suitable way or slot in the arm 1. This rod is adapted to be reciprocated by suitable connections with the main shaft of the machine, which shaft and connections are not illustrated herein. To enable the throat plate to be adjusted to bring either needle orifice thereof in position to receive the protruding end of the throat, and at the same time dispense with loosening or adjustment of the screw 35, the throat plate must be sufficiently loose to admit lifting the same clear of the tubular throat, the reciprocating wedge shaped cam, and the fixed pins or studs 35, 36, in the main arm 1, and arranged in such proximity to the spring at the heel of the throat plate that said spring can engage with one of the pins when the forward needle orifice receives the tubular throat and engages with the other pin when the throat is projected to cause its rear orifice to receive the tubular throat. The screw 35 is not turned down so tightly against the vibrating throat plate as to prevent said plate from having the necessary vertical play as the cam 41 on the slide impinges against one of the cams 37 or 38 on the bottom of said throat plate, the spring at

the heel of the plate serving to normally depress the forward perforated end of the plate as is obvious. Said screw is turned or adjusted so that its straight side is parallel to one of the edges of the slot 34 in the throat plate, and the diameter of the screw head is such that the straight side of the head when parallel with the side of the slot will practically prevent the throat plate from having edgewise movement as the throat plate is moved longitudinally. The top surface of the main arm is beveled or inclined rearward for a suitable distance from the pivot of the throat plate, and the spring of the throat plate bears on this beveled surface which thus permits the throat plate to rock or oscillate, and by lifting the forward end of the throat plate sufficiently to clear the tubular throat and moving the plate laterally to clear the studs 35, 36, the plate can be moved longitudinally and then readjusted to its proper position to cause its perforated end to receive the tubular throat and the spring heel to engage one of the studs. After the throat plate has been adjusted the wedge surface 40 on the slide 39 bears against one or the other of the cam surfaces 37, 38, on the said plate according to the adjustment thereof, whereby the slide can vibrate the throat plate no matter in which position it is adjusted when the cam on the main shaft is rotated to vibrate the lever and the reciprocating rod. I prefer to flare or bevel the needle-orifices 32, 33, in the throat plate and to temper or harden the perforated end of said plate to enable it to resist the needle should it become deflected to such an extent as to strike the throat plate.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a sewing machine, substantially as described the supporting arm having a circular shuttle-race and a tapered recess or opening therein at one side of the said circular shuttle-race, and the vertical tubular throat provided with an enlarged tapered base fitted and secured in the tapered recess in the arm, the inner side of the base being concentric

with the circular wall of the shuttle-race, as and for the purpose described. 50

2. In a sewing machine, substantially as described, the supporting arm provided with a shuttle race and with a tapered recess or opening at one side of said shuttle race and the transverse hole in the arm below said recess or opening, and a tubular needle throat having an enlarged tapered base fitted snugly in said recess or opening in the arm, on the line of the transverse opening therein, for the purpose described. 60

3. In a sewing machine, substantially as described, the combination with a supporting arm and the vertical needle throat, of the vibrating throat plate having the spaced needle orifices and the longitudinal slot, the fixed stud fitted in said slot, and a reciprocating slide having means for actuating the vibrating plate vertically, as and for the purpose described. 65

4. In a sewing machine, substantially as described, the combination with the supporting arm and the vertical needle throat, of the longitudinally adjustable vibrating plate provided with the needle-orifices and the slot, a fixed stud fitted in said slot, a spring normally bearing against the vibrating plate to depress the same, and a reciprocating slide having means for lifting said vibrating plate, as and for the purpose described. 75

5. In a sewing machine, substantially as described, the combination with a supporting arm and a vertical needle throat, of the slotted vibrating plate having the spaced needle-orifices, the fixed stud in said slot of the plate, the spring attached to the heel of the vibrating plate, the stops on the arm in line with the spring and plate, and the reciprocating slide having means for actuating the vibrating plate, as and for the purpose described. 85

In testimony whereof I affix my signature in presence of two witnesses. 90

WILLIAM HAMILTON HANNA.

Witnesses:

LAURA SHIPP,
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