No. 686,475. Patented Nov. 12, 1901.

H. C. PETERS.

STITCH SEPARATING MECHANISM FOR SEWING MACHINES.

(Application filed Apr. 1, 1899.)

(No Model.) 3 Sheets—Sheet 1

Fig. 1.

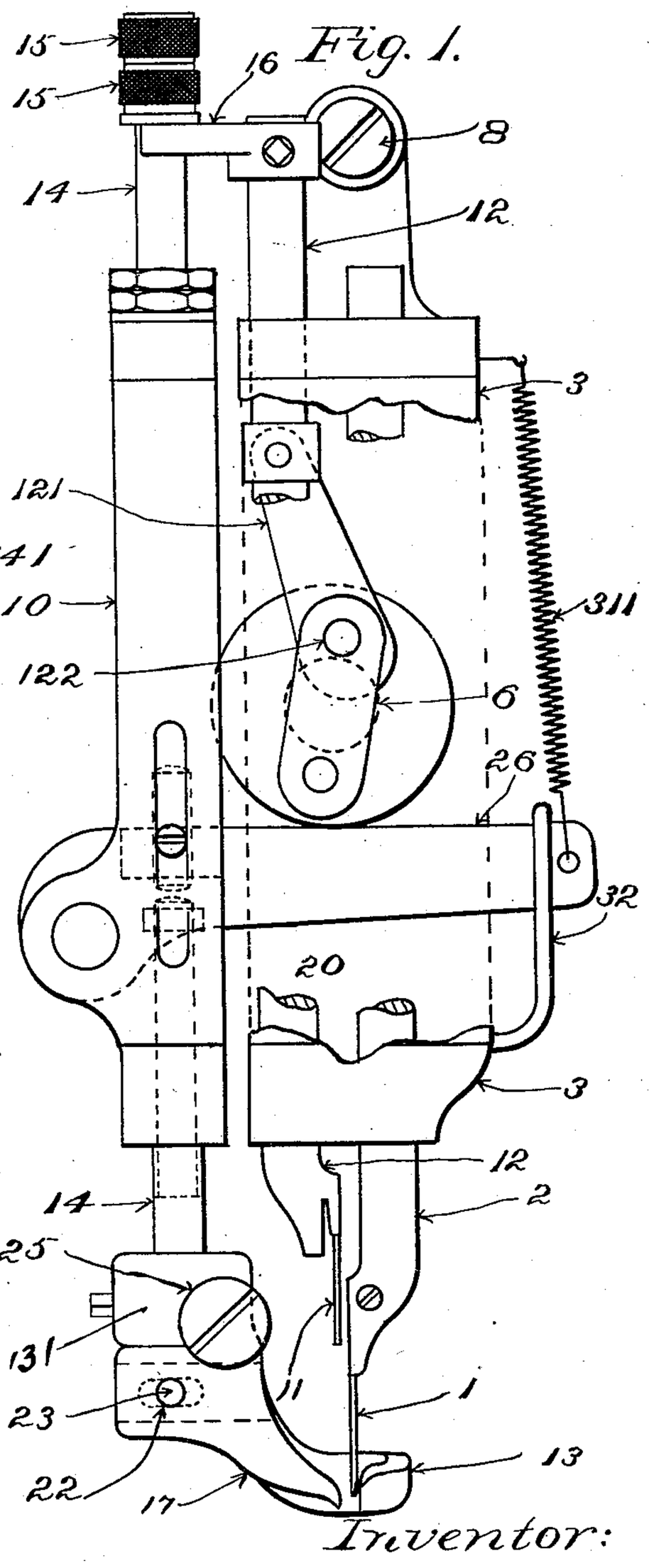
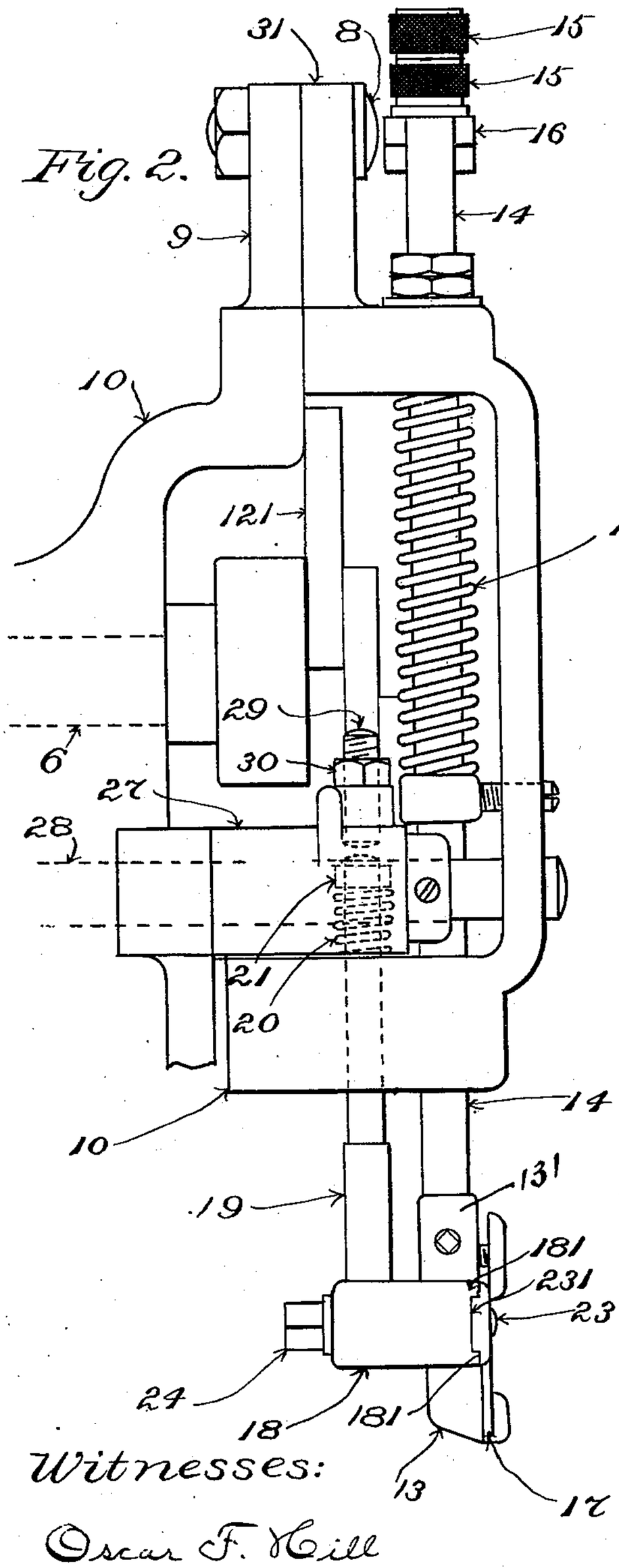


Fig. 2.



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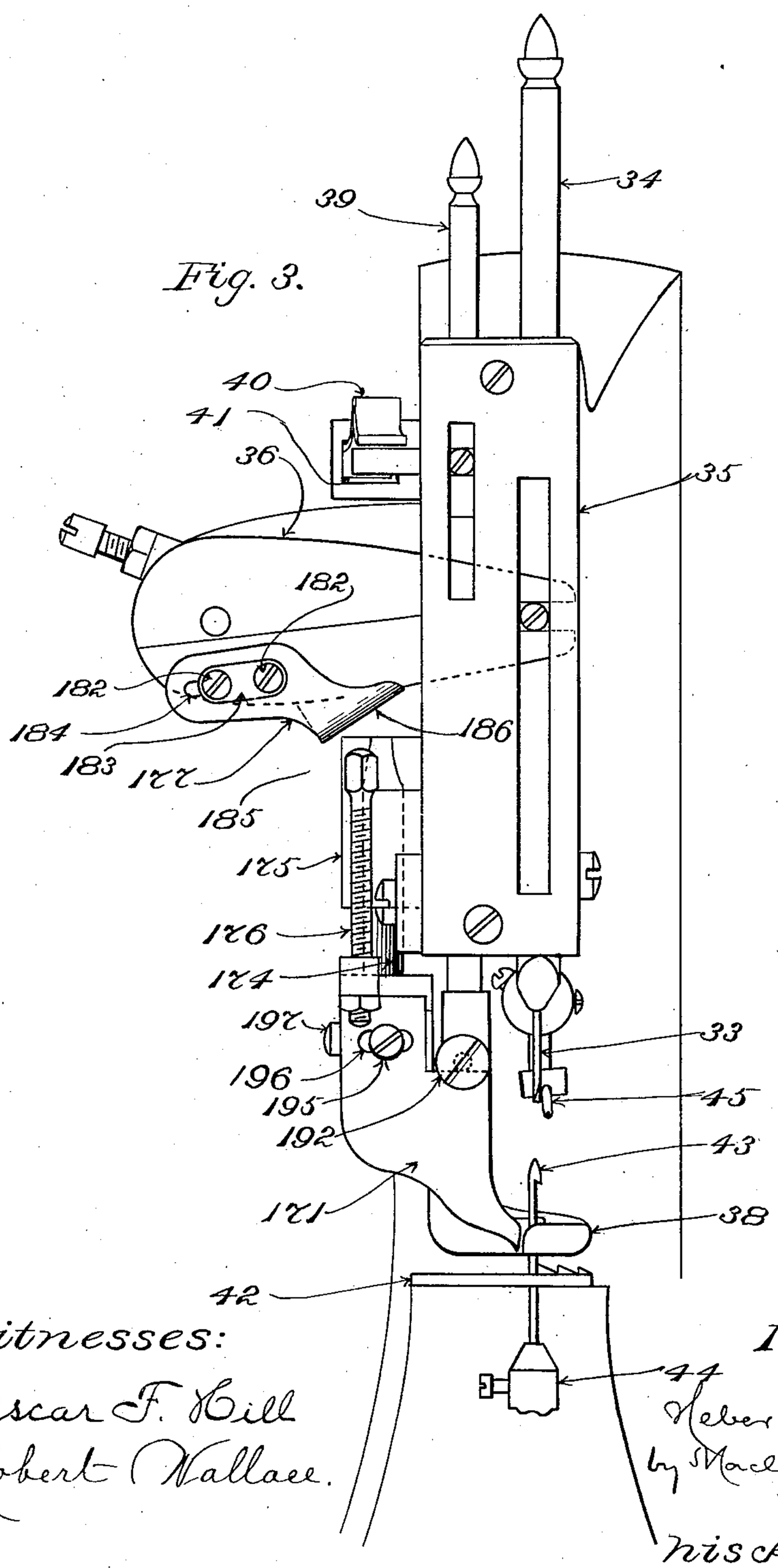
(No Model.) 3 Sheets—Sheet 2.

Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 6.

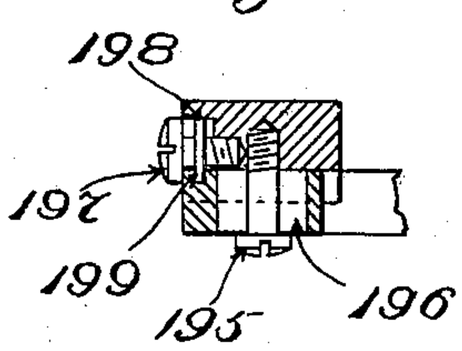

Fig. 5.

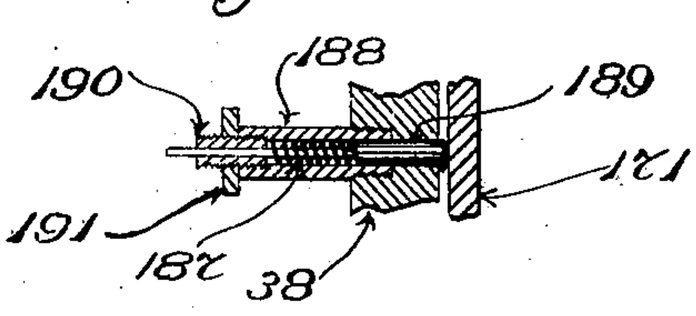

Fig. 4.

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UNITED STATES PATENT OFFICE.

HEBER C. PETERS, OF BOSTON, MASSACHUSETTS.

STITCH-SEPARATING MECHANISM FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 686,475, dated November 12, 1901.

Application filed April 1, 1899. Serial No. 711,379. (No model.)

To all whom it may concern:

Be it known that I, HEBER C. PETERS, 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 Stitch-Separating Mechanism for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has relation to the devices which are employed in wax-thread sewing-machines and the like for automatically separating, dividing, or picking up the stitches of the seams which are produced in such machines. Frequently the work also is indented adjacent to the line of stitches simultaneously with the stitch-separating, the tool that is employed to effect the separating being constructed suitably to effect the indenting as well.

I wish it to be understood that by the terms "stitch-separating mechanism," "stitch-separating devices," and "stitch-separating tool" as employed hereinafter I intend mechanism, devices, or a tool which either will separate the stitches only or both separate the stitches and indent the work.

The general aims of the invention are to provide means of improved character for actuating in proper timing with reference to the regular working parts of the sewing mechanism the tool which is employed for the stitch-separating or stitch separating and indenting; also, to render the tool more efficient in its working and to provide for causing the tool at every stroke thereof toward the work to enter fully into the stock that is being operated upon regardless of variations in the hardness and penetrability of the latter; also, in the case of a tool that is used for the purpose of indenting the stock while the latter is being stitched to provide for enabling and causing the said tool to move transversely with relation to the line of feed in the sewing-machine in order thereby to be maintained automatically in its working in close proximity to the upper of the shoe being operated upon in all of the movements of the said shoe while the sole thereof is being stitched around the edge thereof regardless of the curvature of the toe and also regardless of variations in the distance between the upper and the line of stitches at different places around the sole such as sometimes exist in shoes of certain styles. By causing the tool thus to move the indentations which it produces in the top surface of the sole will be located uniformly near the upper or substantially at a uniform distance therefrom at all places around the sole. Other aims of the invention will become apparent in the course of the following description.

In the accompanying drawings I have represented two embodiments of the invention, and thereby have illustrated two different modes of reducing the invention to practice.

Figure 1 of the drawings shows in end elevation the head and portion of the working mechanism of a well-known form of fair-stitch machine operating to form its stitches by punching a series of loops of thread into the upper surface of the work that is being operated upon. Fig. 2 is a representation thereof in side elevation looking from the left in Fig. 1. Fig. 3 is a view showing in front elevation portion of a well-known form of wax-thread sewing-machine. Fig. 4 is a view thereof in side elevation looking from the left in Fig. 3. Fig. 5 is a view in section transversely through the presser-foot in a horizontal plane corresponding with the axis of the spring-actuated pin 189. Fig. 6 is a detail view of the tool and stock or carrier therefor of Figs. 3 and 4.

Having reference first to the embodiment of the invention that is represented in Figs. 1 and 2, 1 designates an awl, 2 an awl-bar, and 3 a swinging portion of the machine-head. In the said swinging portion 3 the said awl-bar is received in bearings, through which latter it is free to slide endwise, it being operated as heretofore or in any preferred manner. 8 designates the bolt by means of which the upward extension 31 of the said swinging portion 3 of the head is connected pivotally with the upward extension 9 of the fixed portion 10 of the said head. In practice the said swinging portion 3 is moved about its pivot at 8 in well-known manner in occasioning the lateral movements of the awl by which the work is fed through the machine. 11 designates the thread-inserting tool, and 12 the carrier-bar therefor, the said carrier-bar 12 also being mounted to slide vertically in bearings

in the said swinging portion 3 of the head and usually being operated in practice by means of the link 121, connecting the same with the crank-pin 122 on the forward end of the shaft 6, the latter being indicated in dotted lines. 13 designates the presser-foot, and 14 the presser-bar, the last being mounted to slide vertically through bearings in the fixed part 10 of the head and being provided at its upper extremity with stops, herein shown adjustable on the said presser-bar and constituted by nuts 15 15. The upper end of the carrier-bar 12 for the thread-inserting tool is provided with a projection 16, which extends underneath the lower nut 15 and in the ascent of the carrier-bar 12 makes contact therewith, thereby lifting the presser-bar and raising the presser-foot from the surface of the work. 141 designates the spring, which depresses the presser-bar and presser-foot.

All of the foregoing parts are or may be as heretofore or as preferred, and for further information respecting the same and the parts usually coöperating therewith reference may be made to United States Letters Patent to Edwin F. Mower, No. 556,100, granted March 10, 1896, and No. 563,871 granted July 14, 1896.

17 designates the tool which is employed for the purpose of stitch-separating or stitch separating and indenting. Its working extremity is sharpened to an edge and otherwise shaped to engage properly with the work between the stitches, as shown most clearly in Fig. 1. The said tool 17 forms part of or is attached to a stock or carrier 18, the latter herein being shown located at the lower end of a stem 19. The upper reduced portion of the said stem is fitted to a bearing in the fixed part 10 of the head and projects somewhat at its free end above the lower portion of the said part of the head, it receiving on its projecting upper end a spiral spring 20, which is compressed between the head and a nut or collar 21 on the said stem. By the tendency of the spring 20 to expand the stem 19, stock or carrier 18, and tool 17 normally are held upraised from the work, the limit of the ascent thereof being determined by contact of the said stock or carrier 18 with the enlarged upper part 131 of the shank or stock of the presser-foot 13. The working extremity of the tool 17 is extended forward and downward into close proximity to the point at which the thread is driven into the work by means of the thread-inserting tool 11. Herein the said working extremity of the tool is arranged to engage with the work between two stitches at the distance of a completed stitch from the stitch-making point.

It is necessary that provision should be made for adjusting the position of the working extremity of the tool in order to compensate for changes in the lengths of the stitches resulting from occasional changes in the rate of feed of the work. Herein I have shown the stock or carrier 18 as formed with a slot 22, extending transversely therethrough, (see dotted lines in Fig. 1,) the length of the said slot being in the direction of the line of feed. Through the said slot is passed the bolt 23, by means of which the tool 17 is held to the stock or carrier 18, the threaded end of the said bolt entering a tapped hole in the said tool and the head 24 of the bolt being at the opposite side of the stock or carrier 18 from the tool 17. When the bolt is turned up tightly, the tool is clamped securely against one side of the stock or carrier 18. In order to hold the tool from displacement after having been set in proper position on the said stock or carrier 18—that is to say, in order to prevent the said tool from sliding or swinging in a vertical plane—the tool and the stock or carrier are provided with longitudinal ribs or projections, as at 181, 181, and 231, the projection 231 on the tool entering between the two ribs or projections 181 181 on the stock or carrier 18. The ribs or projections 181 and 231 constitute ways which extend in the direction in which the tool is adjusted on the stock or carrier, and consequently they do not interfere with such adjustment.

The tool 17 is guided in its vertical movements between the adjacent flat side of the presser-foot and the flat under side of the large head of the screw 25, the said screw being applied to the upper part or stock of the presser-foot and its head being sufficient in diameter to overlap one edge of the said tool even in the lowermost position of the latter. In the embodiment of the invention which is now being described the tool 17 is confined to movement in a given vertical plane and moves in a direct path toward and from the surface of the work.

As will be apparent, the spring 20 acts to hold the tool 17 in an upraised position above the upper surface of the work and to lift the same after it has been forced down into the work by the depressing means about to be described and forming part of the present invention. One of the important characteristics of the said depressing means is the fact that its action upon the tool 17 is positive and that it acts to drive the working end of the said tool positively into the work. Thereby is secured an efficient action of the tool, it being caused at every stroke thereof toward the work to enter fully into the stock that is being operated upon regardless of variations in the hardness and penetrability of the said stock. Whether the stock is hard or soft the tool is driven to the same extent into the stock, and there are no differences in this respect due to differences or variations in the hardness. Another of the characteristics of the said depressing means is the fact that it embraces a tappet or the like connected with part of the stitch-forming devices of the sewing-machine, the said tappet acting to drive the working end of the tool positively into the work. Another of the said characteristics is the fact that the depressing means for the tool communi-

cates a percussive blow to the tool, whereby to cause the latter to act with the greater certainty in causing the working end of the tool to enter to the required extent. The said percussive blow is by preference secured by providing for lost motion or play between certain of the members of the depressing means, allowing the tool and a part of the train of connections to remain at rest until suddenly started into motion by the contact or engagement therewith of another part of the said train in full motion. Preferably, though not in all cases necessarily, the characteristics are all embodied in one mechanism, as in Figs. 1 and 2. In Figs. 1 and 2 the motion is taken from the lower end of the link 121, which transmits movement to the carrier-bar 12 from the crank-pin 122 on operating-shaft 6. The said lower end of link 121 constitutes in this case the tappet aforesaid. Within the path of the said lower end of the link 121 projects the arm 26, one end of which is sleeved loosely upon the shaft 28, as at 27, the said arm having a projection, herein constituted by a screw 29, to engage with the upper end of stem 19 of the stock or carrier 18 for the tool 17. The said screw 29 is fitted to a tapped hole in a portion of the arm 26 and is adjustable vertically with respect to the said arm in order to enable the extent to which the tool 17 is forced into the work to be varied as required.

30 designates a lock-nut or jam-nut on screw 29 for preventing loss of adjustment. The said screw serves as an adjustable contact-piece for transmitting the pressure of the arm to the stem 19. The weight of arm 26 is sustained by means of a spring 311, so as to relieve the spring 20 of such weight, the latter spring being located so closely to the shaft 28 that if it had to bear the entire weight of arm 26 in addition to performing its other work its stiffness and size would be disadvantageous in the position in which it is placed. Normally the lower end of the contact-piece 29 is separated from the upper end of the stem 19 by a space, as in Figs. 1 and 2. As the crank-pin 122 approaches its bottom center, driving the thread-inserting tool 11 into the work, the lower end aforesaid of the link 121 makes contact with the arm 26, striking it downward, the said arm transmitting through the adjustable contact-piece constituted by screw 29 to the stem 19 the sudden force which drives the working end of the tool 17 into the work. The percussive blow that is transmitted to the tool may be derived either from the striking of the lower end of link 121 upon arm 26 or from the striking of contact-piece 29 upon the upper end of stem 19, preferably the latter. In Figs. 1 and 2 the arrangement is one in which the percussive quality of the blow that is transmitted to the tool is derived from the striking of the contact-piece 29 upon the upper end of the stem 19. If it is desired to derive the said percussive quality from the striking of the lower end of the link 121 upon the arm 26, then the contact-piece 29 will be adjusted so as to bear normally upon the upper end of the stem 19. As the crank-pin in its rotation passes its bottom center and rises the pressure of the lower end of the link 121 upon the tool-actuating arm 26 is relieved, and as the said end leaves the arm the latter and the tool are raised by the action of the springs 20 and 311.

32 designates a stop by means of which the rise of the tool-actuating arm 26 under the action of the spring 311 is limited.

Having reference now to the embodiment of my invention which is illustrated in Figs. 3, 4, and 5, 33 designates the awl; 34, the awl-bar, moving up and down in guides or bearings in the head 35; 36, the vibrating arm, which transmits motion to the awl-bar, and 37 the rock-shaft, on which the said arm 36 is mounted and by the rocking of which it is operated. 38 designates the presser-foot; 39, the presser-bar; 40, the depressing-spring for the presser-bar and presser-foot, and 41 the lifting-lever therefor. 42 designates the work-support; 43, the usual hooked needle; 44, the needle-bar, and 45 the thread-guide or looper by which the thread is laid into the hook of the needle. 171 designates the stitch-separating or stitch separating and indenting tool in Figs. 3 and 4, 172 its stock or carrier, and 174 a post extending upward from the said stock or carrier and fitting in a tubular bearing 175 to guide the stock or carrier and tool stock or carrier thereby in their vertical movements. 176 is a stem projecting upwardly from the said stock or carrier to receive the action of the force by which the parts are depressed to drive the working end of the tool into the surface of the work. In this embodiment of the invention the tappet, by means of which the tool 17 is actuated, is connected with a member of the awl-actuating devices. The said tappet is constituted of the contact-piece 177, the latter having the form of an arm secured upon the vibrating arm 36, by which the awl-bar is reciprocated. In the descent of the arm 36 this contact-piece 177 strikes against the upper end of stem 176, dealing thereto the blow which drives the tool into the work. The spring by means of which the tool is raised from the work after having been depressed against the same is designated 178, it being shown connected by one end thereof to a pin or the like at 179 on the head of the machine and by the other end thereof to an arm 180, which is pivoted at 181 by one end thereof to a fixed part of the machine, its other end bearing against a projecting portion at the under side of the stock or carrier 172. The said spring 178 may be otherwise applied and connected. The showing in connection therewith in the drawings is intended merely to show the adaptation of the same to the existing form of the sewing-machine which is represented in Figs. 3 and 4. In adapting the devices to the said existing form of the wax-

thread sewing-machine I secure the plate forming the shank of the arm or contact-piece 177 to the outer face of the vibrating arm 36, which serves for actuating the awl-bar. 182 182 designate screws for attaching the said arm or contact-piece 177 to the said arm 36, a clamping-plate 183 being interposed between the heads of the screws and the plate which constitutes the shank of the arm or contact-piece 177. A slot 184, extending longitudinally of the said plate or shank, permits of an adjustment of the said arm or contact-piece 177 in the direction of its length. Since, in the illustrated embodiment of the invention, the working portion 185 of the contact-piece projects some distance below the center on which the arm 36 vibrates, it is obvious that in the working stroke the said portion after engaging with the upper end of the stem 176 will draw transversely across the said upper end of the stem in the continued sweep thereof. In order to offset the tendency of the friction between the contact-piece and the upper end of the stem to strain the said stem transversely in the direction in which the contact-piece is moving, I form the said working portion 185 of the contact-piece with a reverse obliquity, as 186, which latter acts with a tendency to press the upper end of the stem backwardly in opposition to the forward pull that will be exerted upon the said stem in consequence of friction and the movement of the contact-piece in a transversely-extending arc.

For the purpose of causing the tool 171 when used for the purpose of effecting indenting to work at all times close in next the upper of the shoe that is being operated upon I mount the said tool so as to be movable on its support in a direction transversely with respect to the line of feed of the machine. I also combine therewith means of holding the said tool pressed with a yielding force toward the upper. In the present case I have mounted the tool so as to enable it to swing transversely about a vertical axis, this latter coinciding herein with the axis of the post 174, which, as described hereinabove, extends upward from the stock or carrier 172 of the tool 171. In order to enable the stock or carrier and the tool mounted thereon to swivel about the axis of the said post, the post is formed cylindrical and the bearing 175, which receives the said post, is also made cylindrical. I employ by preference a spring to bear the working end of the tool 171 transversely with respect to the line of feed. Herein I have shown a coiled spring at 187, (see Fig. 5,) the same being contained within a tube, as 188, fitted to an opening through the stock of the presser-foot 38. (See more particularly Fig. 5.) A pin 189 is placed within the tube 188, and it transmits the pressure of the spring to the tool 171. A screw-plug 190 is fitted into the tapped outer end of the tube 188 and serves for the purpose of adjustably compressing the spring 187, it being provided with a lock-nut 191 for the purpose of securing it in place after adjustment thereof. The described construction and combination of parts causes the working end of the tool to be held pressed transversely against the upper of the shoe being operated upon, so that both in rounding the toe of the said shoe and in working along the opposite sides of the sole the tool acts upon the upper surface of the sole uniformly close to the upper. Heretofore in the case of indenting devices acting at the distance of a stitch or more behind the stitch-forming point in the machine it has been found that in working around the toe of a shoe, the shoe being swung by the operator at each stitch upon the needle as a center, the swinging movement of the shoe carries the upper of the shoe so far outward from the working plane of the indenting-tool that the latter either acts too close to the edge of the sole or practically misses the sole altogether, so that the marking is not properly and satisfactorily effected. Some styles of shoes have broadened projecting soles, the exposed portions of which sometimes extend at the sides of the upper to varying distances at different points around the shoe, the line of stitching following closely the outer edge of the sole. In working upon shoes having soles of this character with the indenting devices which heretofore have been in use the latter fail to form the indentations or markings close to the upper at the wider portions of the sole. Consequently the appearance of the finished work is more or less unsatisfactory. My improved construction, in which the indenting device is movable transversely to a certain extent with reference to the stitching devices, overcomes this drawback, since the tool at all times works in close to the upper and forms indentations which extend practically into the upper around all portions of the sole. The upper portion of tool 171 works between the under side of the enlarged flat head of the screw 192, the latter being turned into the stock of the presser-foot, as shown, or into the presser-bar. The said head constitutes a stop by means of which the outward movement of the tool under the influence of the spring 187 is limited, and by turning the screw in or out the position of the said stop may be adjusted so as to regulate the extent of the swinging movement of the tool. By turning the screw in far enough the tool may be confined to movement in simply a vertical plane. The tool is shown formed with a projecting dovetail 193 on one side thereof, working in a dovetail guideway in the stock or carrier 172. 197 is a screw for adjusting the tool upon the said stock or carrier, it entering a tapped hole in the latter and having a circular rib 198, that engages a groove 199 in the said tool, as shown in Fig. 6. 195 is a screw for clamping the tool against the side of the stock or carrier to prevent loss of adjustment, and 196 is a slot in the tool, in which slot the stem of said screw 195 works.

I claim as my invention—

1. In combination, the stitch-separating tool, its stock or carrier, the longitudinally-movable stem attached to the said stock or carrier, a spring operating to uplift the tool, the arm acting to depress the stem and drive the point of the tool into the work, and means for operating the said arm, substantially as described.

2. In combination, the stitch-separating tool, its stock or carrier, the stem attached to the said stock or carrier, and the spring operating to uplift the tool, of the arm acting to depress the stem and drive the point of the tool into the work, the adjustable contact-piece for transmitting the pressure of the said arm to the said stem, and means for operating the said arm, substantially as described.

3. In combination, the stitch-forming devices of a sewing-machine, the stitch-separating tool mounted to rise and fall substantially at right angles to the surface of the work, and means for operating the said tool, the said means including a tappet actuated by a member of the stitch-forming devices and itself transmitting to the said tool a direct positive motion to drive it into the work, substantially as described.

4. In combination, the stitch-forming devices of a sewing-machine, the stitch-separating tool mounted to rise and fall substantially at right angles to the surface of the work, and means for operating the said tool, the said means including a tappet actuated by a member of the stitch-forming devices and itself transmitting to the tool a direct positive motion to drive it into the work, and including also a spring acting to raise the tool from the work, substantially as described.

5. In combination, the stitch-separating tool, means for guiding the same to move in a direct path toward and from the work, and driving devices for the said tool constructed to drive it directly into the work by a percussive blow transmitted to said tool, substantially as described.

6. In combination, the stitch-forming devices of a sewing-machine, the stitch-separating tool, and means for operating said tool, the said means comprising essentially a tappet actuated by a member of the stitch-forming devices, and connections actuated by the said tappet whereby the tool is driven directly into the work by a percussive blow transmitted to said tool, substantially as described.

7. In combination, the stitch-forming devices of a sewing-machine, the stitch-separating tool, a vibrating arm, means for operating the same, and motion-transmitting devices operated from the said arm with lost motion whereby to drive the tool into the work through a percussive blow, substantially as described.

8. In combination, the stitch-forming devices of a sewing-machine, the stitch-separating tool, a tappet and means to operate the same, connections between the tappet and the tool operated from the said tappet with lost motion and acting to drive the tool directly into the work, and a spring acting to carry the tool away from the work, substantially as described.

9. In combination, the awl, operating devices therefor, the stitch-separating tool, a spring acting to carry the said tool away from the work, and a tappet connected with a part of the said awl-operating devices and acting to drive the said tool positively into the work in the movement of the awl toward the work, substantially as described.

10. In combination, the awl, operating devices therefor, the stitch-separating tool, a spring acting to carry the said tool away from the work, and an arm connected with the said awl-operating devices and itself actuating the said tool to drive the latter positively into the work in the movement of the awl toward the work, substantially as described.

11. In combination, the awl, operating devices therefor, the stitch-separating tool, and means for operating the said tool to drive it into the work, including a tappet actuated by a member of the awl-operating devices, the said means having lost motion between certain of its members to occasion the transmission of a percussive blow to the tool, substantially as described.

12. In combination, the awl, operating devices therefor, the stitch-separating tool, a spring acting to carry the said tool away from the work, and means for operating the tool in opposition to the said spring, including a tappet actuated by a member of the awl-operating devices the said means having lost motion between certain of its members to occasion the transmission of a percussive blow to the tool to drive it into the work, substantially as described.

13. In combination, the awl, the stitch-separating tool, a tool-actuating arm, a connection of the said tool, and operating devices common to the said awl and arm, whereby in the movement of the awl toward the work the said arm is caused to operate the said connection and drive the tool into the work, substantially as described.

14. In combination, stitch-forming devices, the stitch-separating tool, a carrier therefor, a vertical pivot on which the carrier is mounted with capacity to turn transversely with relation to the line of feed, means whereby the carrier is held pressed outwardly to maintain the tool with yielding force close to the upper of a shoe being operated upon, and a stop to limit the outward movement of the tool, substantially as described.

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

HEBER C. PETERS.

Witnesses:
CHAS. F. RANDALL,
LEPINE HALL RICE.