(No Model.)

4 Sheets—Sheet 1.

S. & A. KEATS.

SEWING MACHINE.

No. 251,240. Patented Dec. 20, 1881.

Fig. 2.

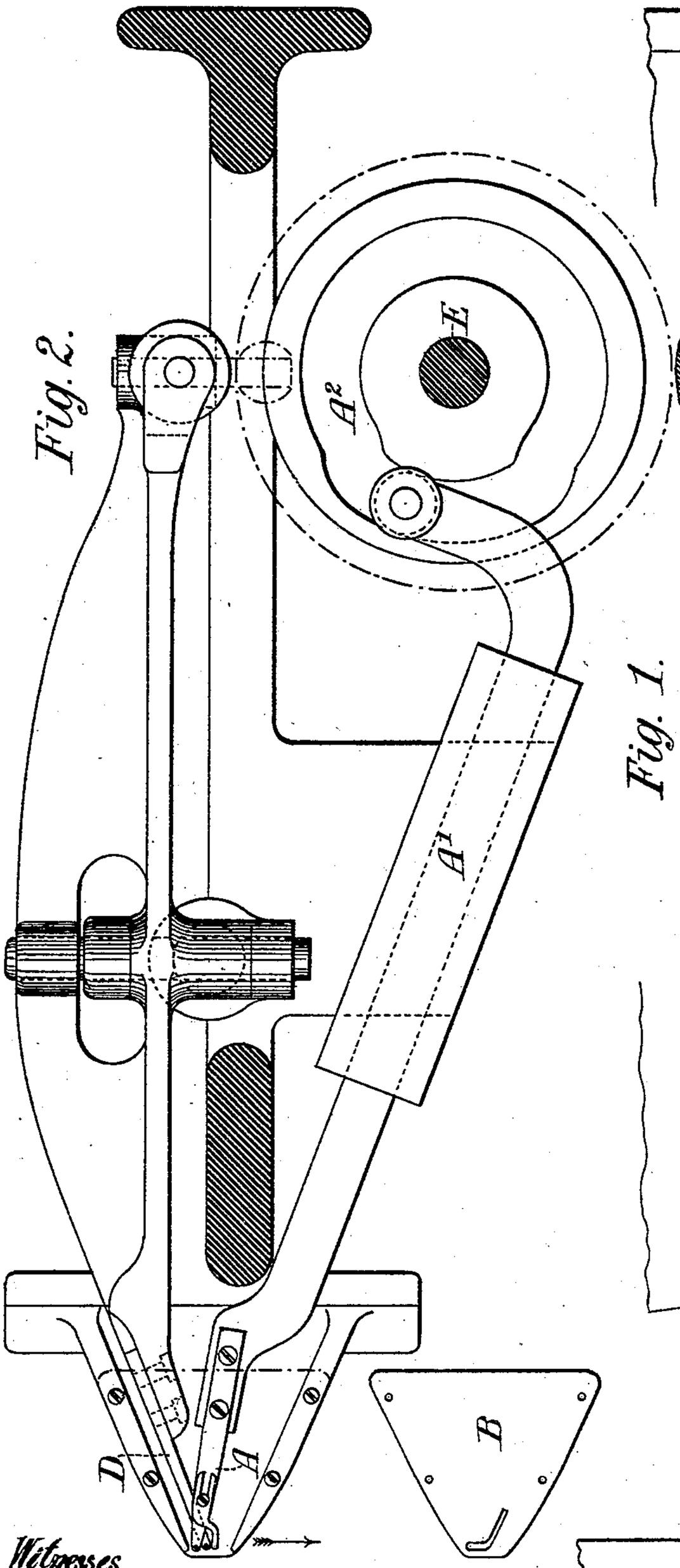
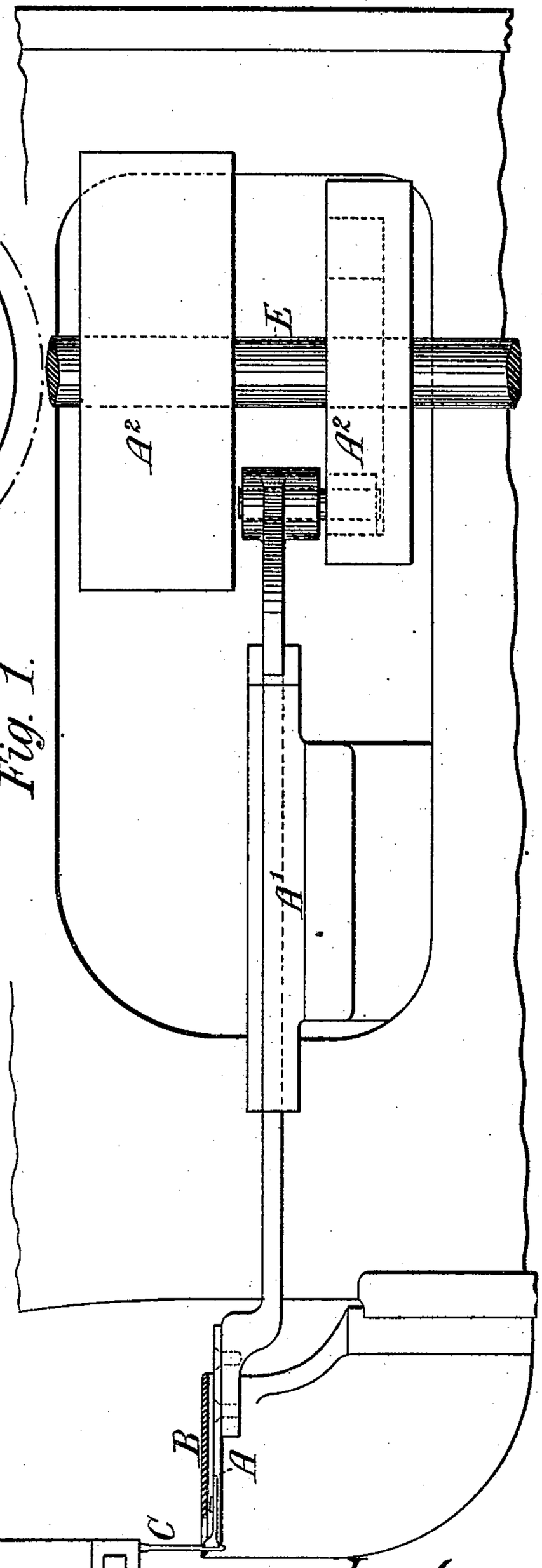


Fig. 1.



Witnesses.
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Inventors.
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(No Model.) 4 Sheets—Sheet 2.

S. & A. KEATS.

SEWING MACHINE.

No. 251,240. Patented Dec. 20, 1881.

Fig. 5.*

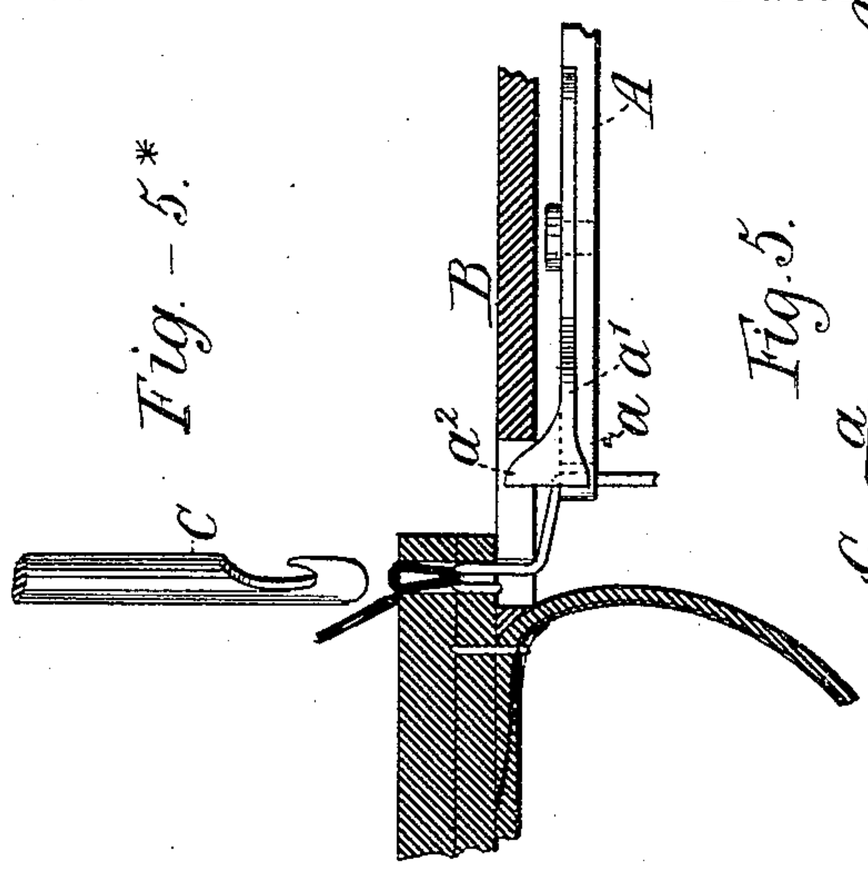


Fig. 5.

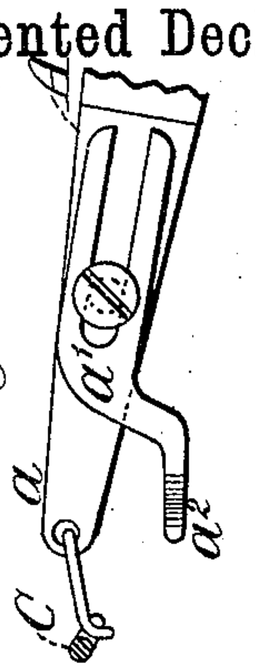


Fig. 4.

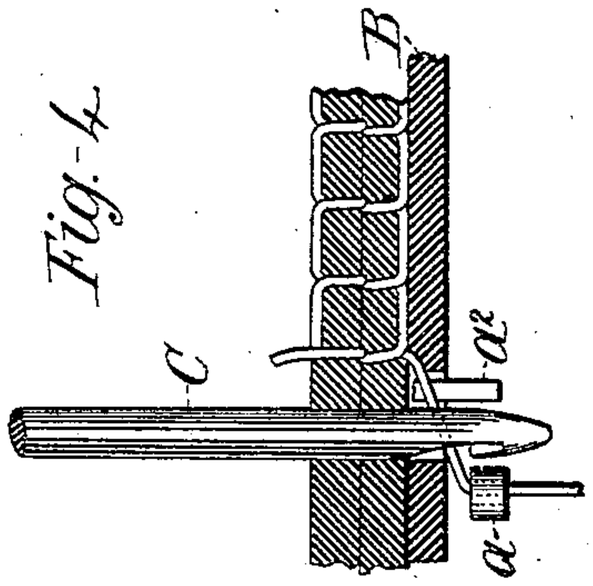


Fig. 3.*

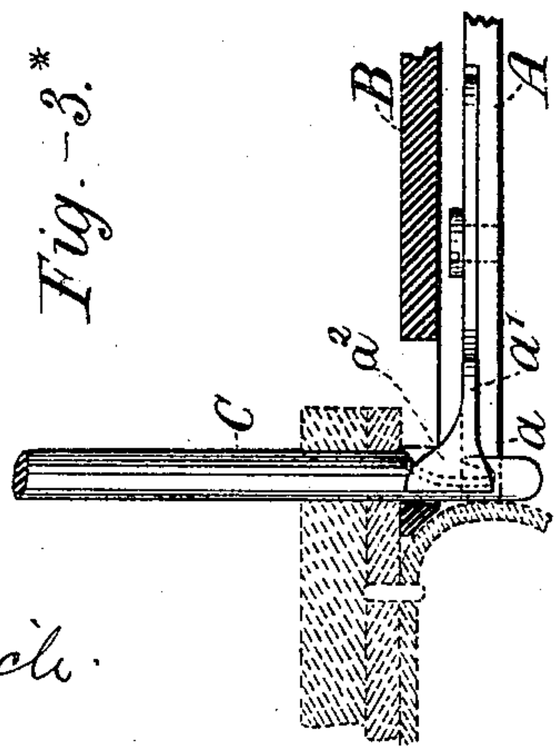
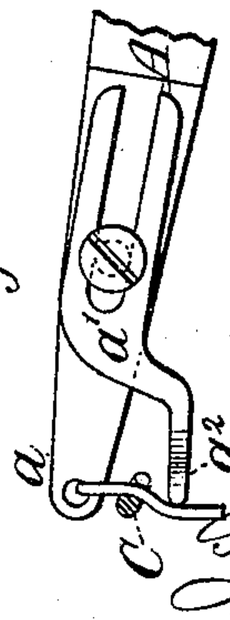


Fig. 3.



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(No Model.) 4 Sheets—Sheet 3.

S. & A. KEATS.

SEWING MACHINE.

No. 251,240. Patented Dec. 20, 1881.

Fig: 6.

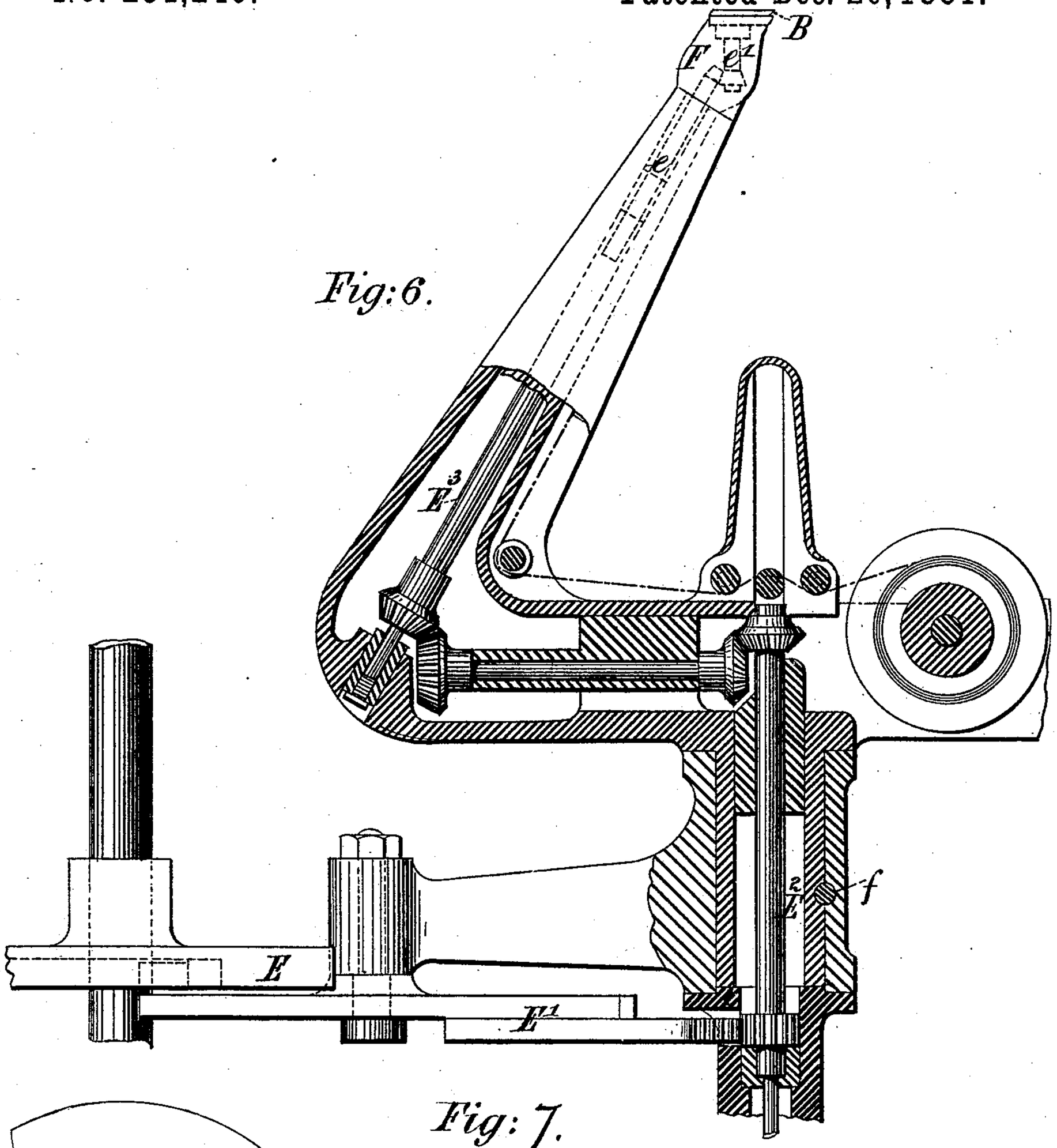
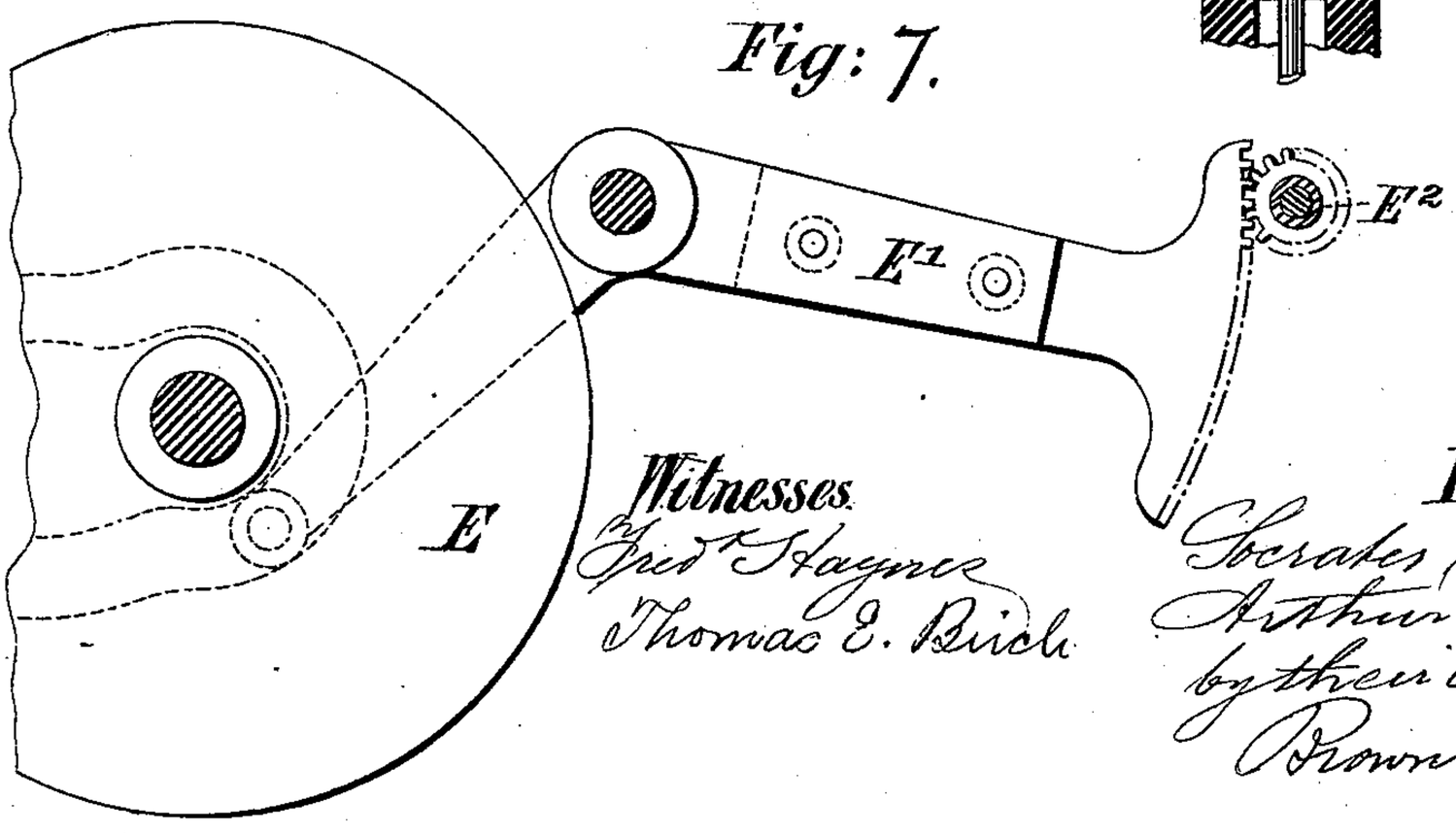


Fig: 7.



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(No Model.) 4 Sheets—Sheet 4.

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SEWING MACHINE.

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Fig: 9.

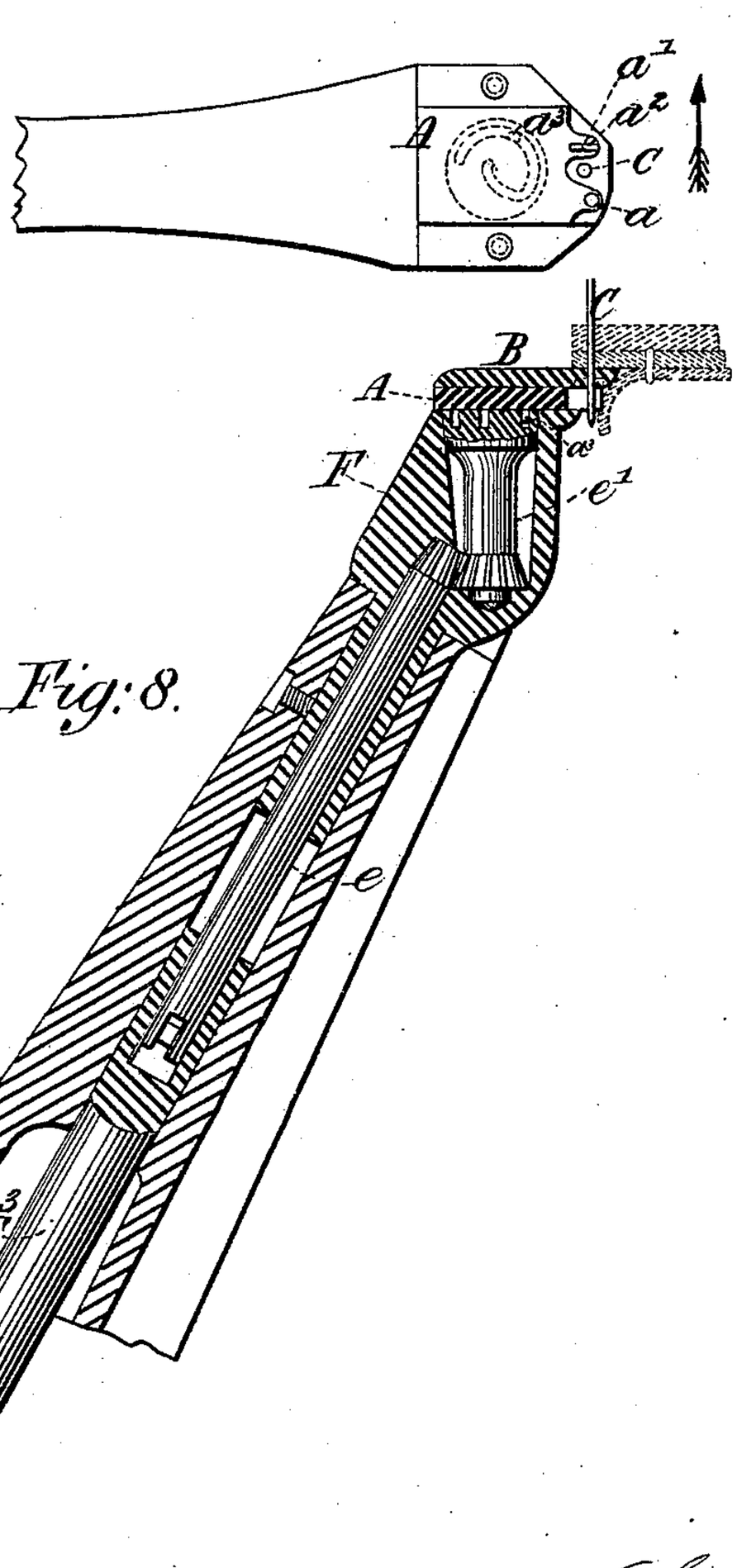
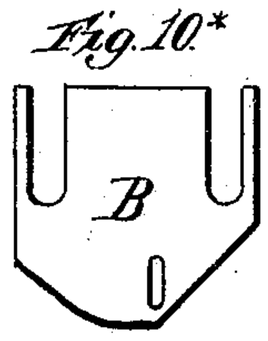


Fig: 8.

*Fig. 10.**



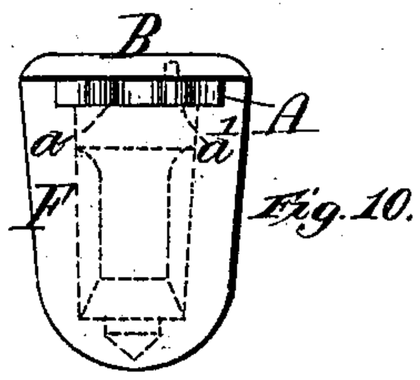


Fig. 10.

Fig: 11.

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by their Attorneys

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UNITED STATES PATENT OFFICE.

SOCRATES KEATS, OF LEEDS, COUNTY OF YORK, AND ARTHUR KEATS, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 251,240, dated December 20, 1881.

Application filed March 30, 1881. (No model.) Patented in England October 29, 1880, in France December 11, 1880, and in Austria December 16, 1880.

To all whom it may concern:

Be it known that we, SOCRATES KEATS, of Leeds, in the county of York, England, and ARTHUR KEATS, of Worship Street, in the city of London, in the county of Middlesex, England, have invented certain Improvements in Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in sewing-machines in which a hooked needle is used for pulling up a thread from below the work-supporter, either in conjunction with a shuttle or not, and whether the work is fed forward by a top or an under feed.

It consists, mainly, in a novel form of looper which insures the unfailing placing of the needle-thread in the hook of the needle by holding it straight across the path of the needle, and thus preventing "missed stitches" being made, which is a very frequent occurrence with existing loopers.

The invention is particularly applicable to machines used in the sewing of leather, whether for harness-manufacturers or for boot and shoe makers.

The advantage consequent on the use of this invention by boot and shoe makers is, by reason of the looper, in its movement, never extending beyond the hooked needle, the line of stitching for securing the sole to the welt may lie close to the welt-seam, as in hand-work.

The arrangement of the looper will vary according to the nature of the machine to which it is applied, and the means of driving will necessarily be modified to suit the space it is intended to occupy. In all cases, however, our looper will possess a forked termination, one prong being pierced to form an eyelet for the thread, and the other carrying a shoulder or support for the thread.

In the accompanying drawings we have shown our invention as applied to a table-machine and to what is known as a "swivel-horn" machine, it being supposed in both examples that the shuttle is above the work. We have not thought it necessary to show more of the machines than the parts requisite for explaining the mode of laying the thread into the hooked needle.

In Sheets I and II of the drawings, Figure 1 shows in side elevation, and Fig. 2 in sectional plan, so much of a table-machine adapted for stitching boot-soles to their welts as will serve to explain the nature of our invention. In these figures, A is the looper, situate close under the throat-plate B, which in this case forms the table of the machine. Above the table is the hooked needle C, which passes down, as usual, through the throat-plate, to receive the thread from the looper. D is a pricker-feed for piercing the leather and feeding it forward ready for the needle to enter it in the line of the piercing of the pricker. The forked looper is shown detached and on an enlarged scale at Figs. 3, 3*, 4, 5, and 5*, Sheet II, the better to explain its action.

Figs. 3, 3* show in plan and edge views the looper in the act of laying the thread into the hook of the needle, Fig. 3* showing in dotted outline a boot-sole being sewed to a welt. Fig. 4 is an end view of the looper, showing the thread stretched across it and ready to be received into the hook of the needle. Figs. 5 and 5* show in plan and edge views the looper as having retired from the needle to its normal position, the loop having been tightened up.

a is the prong of the looper in which the eyelet for receiving the thread is formed, and *a'* is an adjustable prong, which is made fast to the looper by a binding-screw entering a longitudinal slot formed at its rear, the object of making it adjustable both laterally and longitudinally being to fit the looper for working with hooked needles of different sizes.

Standing up from the adjustable prong *a'* is a shoulder, a^2, which serves to press the thread against the stem of the needle, holding it over the hook, and so presenting it as to insure the hooked needle, on its ascent between the prongs of the advanced looper, carrying up a loop of thread through the work.

In order that the thread may be stretched across the looper and have the shoulder of the prong *a'* to support it, it is requisite that the feed of the work shall be in the direction of the

arrow in Fig. 2. The act of feeding the work will put tension on the thread, and thus enable the shoulder, as the looper advances, to hold the thread in the path of the needle.

The looper, it will be seen, is a sliding bar, which passes through a fixed guide, A′, attached to the framing of the machine. This bar carries at its rear end an anti-friction bowle, that enters the groove of a cam, A^2, carried by a vertical cam-shaft, E. The rotation of this cam will give the looper a slight endwise motion, and thereby cause its prong-extensions to present the thread to the depressed needle, as explained, and then to withdraw, pulling the thread (which is specially important when boot-soles are being stitched to welts) to one side, and thus giving uniformity of position to the stitches. The back movement of the looper will cease at a moment which corresponds with the completion of the stitch by the tightening of the needle-thread, and thus all tendency of the stitches to become irregular or zigzag in appearance is removed.

By reference to Figs. 3 and 3*, in which the looper is represented in its most advanced position, it may be seen that the looper offers no obstruction to the needle working close to the upper. The needle is, in fact, at this time in contact, or nearly so, with the upper-leather, and consequently lays its stitches close in the crease of the boot, as in hand-sewing.

To provide for the looper being brought as close as possible under the throat-plate, a recess is cut in the under side of the throat-plate to allow of the shoulder a^2 entering therein. An incidental advantage of this contrivance is that the possibility of the thread slipping over or past the shoulder, and so missing a stitch, is avoided. The reduced motion of this looper as compared with that of ordinary loopers permits of its introduction with advantage, not merely to table-machines, but obviously to "post" machines, and also to what are known as "horn" machines, where the space for the looping mechanism is very limited, and thereby to extend the capabilities of this class of machine.

The adaptation of our looper to a horn-machine is illustrated in Sheets III and IV of the drawings, where Fig. 6 is a sectional elevation of so much of the horn-machine as will serve to explain the adaptation of our invention thereto. Fig. 7 is a plan view of the mechanism used for transmitting the motion to the vertical shaft through which the looper is actuated. Figs. 8, 9, and 10, Sheet IV, show in full size the looper adapted to a special form of nose constituting the termination of the horn, Fig. 8 being a sectional elevation of the parts, and showing in dotted outline a sole being sewed to a welt; Fig. 9, a plan view with throat-plate removed; Fig. 10, a back view of the detached nose. Fig. 10* is a plan of the throat plate, and Fig. 11 is a top view, on a larger scale, of the cam-shaft by which the looper is reciprocated.

In adapting the invention to the horn-machines we remove the upper part or nose of the horn, with its pinion-bar, whirl, and nose-cap, and replace them by the parts shown in the drawings. Thus we introduce a short pinion-bar, *e*, which receives its axial motion from the ordinary inclined shaft in the horn, which is actuated from the cam E on the cam-shaft by the quadrant-toothed lever E′, which imparts a reciprocating axial motion to the vertical shaft E^2, and through bevel-gear to the inclined shaft E^3.

The form of the looper A is that of a horizontal plate, which slides in guides formed for it in the nose F of the horn. The front edge of this plate is slotted to form prongs *a a′*, both of which, in this case, are formed in one with the plate, the prong *a′* carrying, as before, the shoulder a^2. This plate A is fitted on its under face with a pin, a^3, which projects into a cam-groove formed in the upper end of a short vertical shaft, *e′*, having its bearing in the nose F. This shaft *e′* is fitted with a bevel-pinion, which gears into and is driven by the pinion-bar *e*. Fig. 11 serves to show the form of the cam-groove by which the looper is reciprocated. It will now be understood that as a rotary motion in opposite directions alternately is imparted to the inclined shaft E^3 it will, through the pinion-bar *e*, give a corresponding motion to the shaft *e′*, and the cam-groove of that shaft, acting upon the pin a^3, will advance the looper to the needle when the latter is down and present at tension the thread which the needle-hook is to take on its ascent. When this is done and the needle has ascended it will retire and remain quiescent until the needle has again descended preparatory to taking up a fresh loop of thread. When using our improved looper the horn is made stationary by passing a pin, *f*, through the socket-bearing of the horn.

The position in which the horn will be fixed relatively to the needle to produce the work above indicated would vary according to the direction of the motion for feeding the work forward; but the looper must not be presented at too great an angle to the hook, or the hook would not take the thread with certainty. When this machine is used for securing boot-soles to their welts the horn should be fixed in such a position as will enable the looper to work at the angle to the feed indicated in the plan view, Fig. 9, the arrow in that figure representing the direction of the feed.

The looper, it will be understood, is applicable not merely to shuttle-stitch but to chain-stitch machines. We have not, however, thought it necessary to illustrate its application to the latter class of sewing-machines, as the mode of doing this will be obvious to any mechanic experienced in the manufacture of sewing-machines.

By adapting our improved looper to the horn-machine the capacity of that machine will be greatly enhanced, as it is rendered capable of stitching soles to welts, which operation ne-

cessitates the bringing of the line of sewing close up to the crease of the boot, as indicated in Fig. 8, where the needle is represented with its back touching the upper-leather. This could not be done with a whirl or any form of looper which required to be interposed between the needle and its work in order to lay its thread in the beard of the needle. The horn-machine, it will be obvious, when fitted with our looper, may also be used as an ordinary leather-stitching machine.

Having now explained the nature of our invention of improvements in sewing-machines, we claim—

The combination, with a hooked needle, of a reciprocating forked or slotted looper provided on one prong with an eyelet and on the other prong with a projection or shoulder, to form for the thread drawn from the eyelet and presented to the hooked needle a support for the purpose of securing the taking up of the thread by the hooked needle, in the manner and for the purpose above set forth, and illustrated in the drawings.

London, February 24, 1881.

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ARTHUR KEATS.

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