

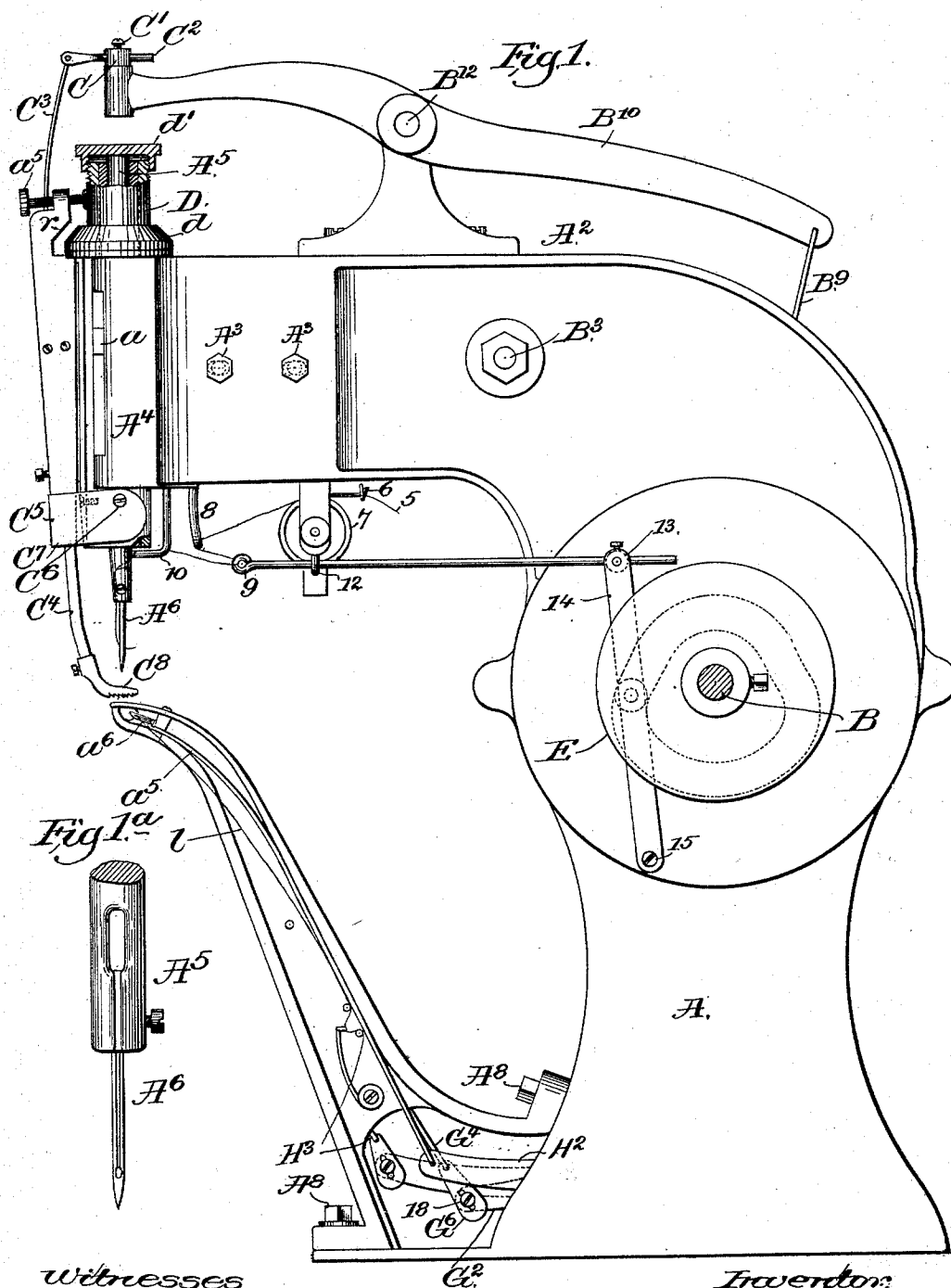
(No Model.)

4 Sheets—Sheet 1.

A. A. CUMING.
SEWING MACHINE.

No. 485,176.

Patented Nov. 1, 1892.



Witnesses
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Edward T. Allen

Inventor:
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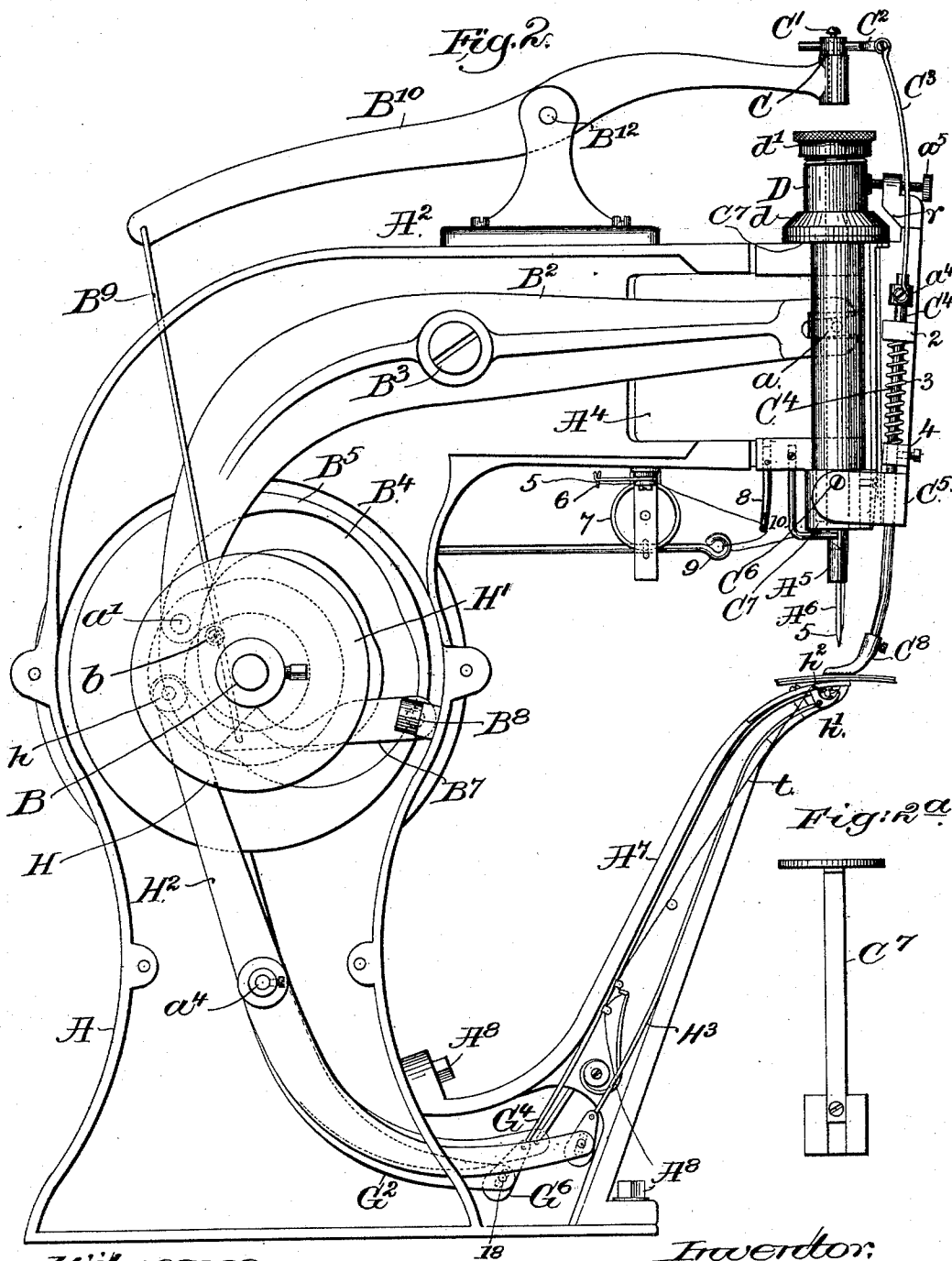
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4 Sheets—Sheet 2.

A. A. CUMING.
SEWING MACHINE.

No. 485,176.

Patented Nov. 1, 1892.



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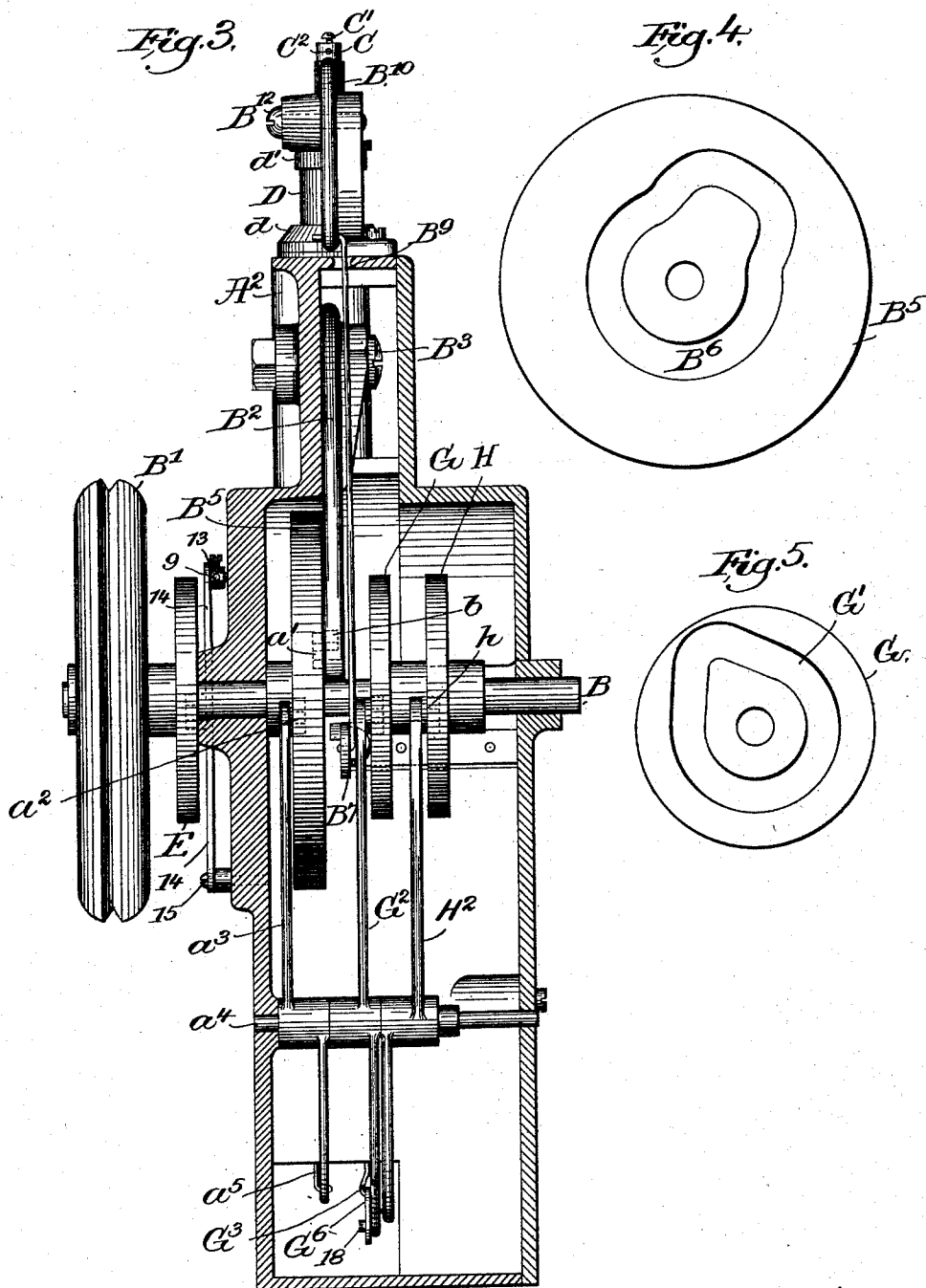
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A. A. CUMING.
SEWING MACHINE.

No. 485,176.

Patented Nov. 1, 1892.



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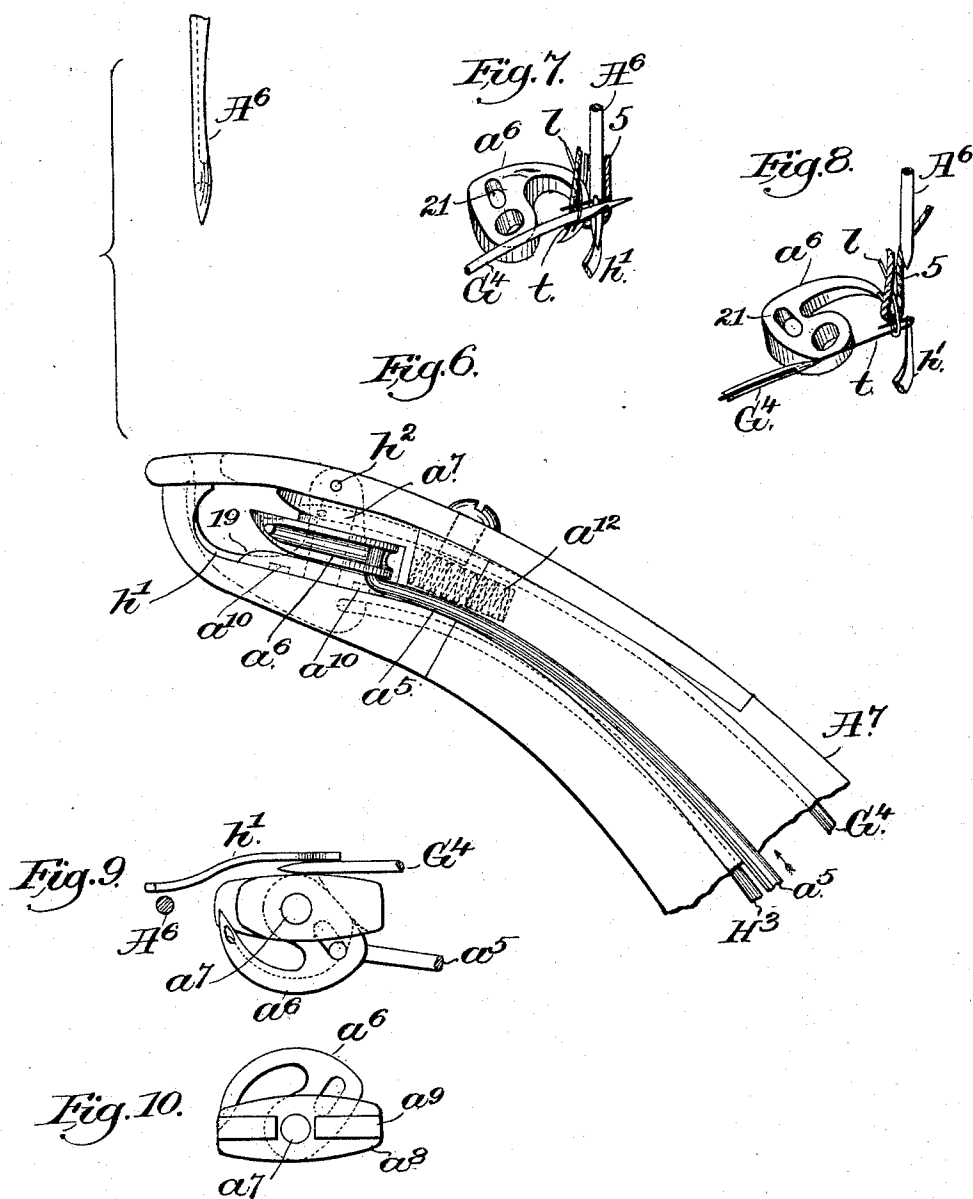
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4 Sheets—Sheet 4.

A. A. CUMING.
SEWING MACHINE.

No. 485,176.

Patented Nov. 1, 1892.



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UNITED STATES PATENT OFFICE.

ALFRED A. CUMING, OF HINGHAM, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 485,176, dated November 1, 1892.

Application filed January 11, 1892. Serial No. 417,660. (No model.)

To all whom it may concern:

Be it known that I, ALFRED A. CUMING, of Hingham, county of Plymouth, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

The machine herein to be described has been devised for the production of a stitch substantially as described in United States Patent No. 413,647, granted to me October 29, 1889. The stitch referred to is composed of three threads, one at one and two at the other side or face of the material. For the mechanical production of said three-threaded stitch I have devised an organization comprehending an eye-pointed penetrating-needle to carry a thread through the material, supported, preferably, upon a horn, a looper carrying a second thread and working in the arc of a circle about a substantially-vertical pivot, said looper entering and pulling a loop of looper-thread in the loop of needle-thread, an under or third thread-carrier resembling a needle and actuated to enter the loop of looper-thread, and a thread-catcher to enter and hold the loop of third thread after the latter has been passed through the loop of looper-thread. As the stitch is drawn up, set, and finished the loop of needle-thread acts to draw into the material a doubled part of the looper-thread, together with a doubled part of the third thread, the loop of third thread, not itself locked by the passage of another thread through it, serving by being bent through and about a bight of the looper-thread to keep the latter in the loop of needle-thread. The stitch referred to shows at one side staple-like stitches from one thread and at its other side staple-like stitches from two threads, the latter in practice being of the same or different sizes or materials. The stitch when in the material resembles a lock-stitch, and while it has all the advantages of a lock-stitch it is stronger and possesses greater elasticity, the loops of thread filling the hole made by the awl to a greater extent than is possible with a lock or shuttle stitch or with an ordinary chain-stitch, and consequently the stitch is especially advantageous

for leather and boot or shoe work. These stitch-forming devices operatively organized form one part of my invention.

In leather-work it is frequently necessary to use needles of different diameter, and to enable the looper referred to to work equally well with whatever diametered needle is employed I have mounted the looper-pivot on a feeler-block, which prior to the entrance of the looper into the loop of needle-thread feels for and takes a bearing in the needle then in the material, the feeler feeling the needle below the work-support. In this way the center of motion of the looper is always correct, whatever the diameter of the needle.

Prior to my invention I am aware that three threads have been used in a stitch; but I am not aware that any machine has ever had below the cloth-support and co-operating with an eye-pointed thread-carrying penetrating-needle two independently-actuated thread-carriers, such as the looper and needle referred to, the former leaving a loop in the loop of needle-thread and the latter leaving an unlocked loop in a loop of looper-thread, but not being itself locked.

This invention in sewing-machines does not seek to cover two eye-pointed thread-carrying needles above the material and a thread-carrying looper below the material to, by its thread, engage and lock the loops of needle-thread and in turn have its loop locked by the needle-thread, as such devices have been used for buttonhole and overseaming work, (see United States Patent No. 25,692, October 4, 1859,) the stitch made showing threads enchainned at the lower side of the material. I am also aware that two diagonally-placed eye-pointed thread-carrying needles have penetrated the material from its upper side one after the other for successive stitches, and that a third needle, also penetrating the upper side of the material and having a hook, has taken the thread from each of said needles in succession and drawn loops thereof up through the material, enchainning a loop of thread taken from one needle with a loop of thread taken from the other needle, the chain being between the parallel rows of stitches made by the eye-pointed needles, as in United States Patent No. 250,990.

Figure 1 in right-hand side elevation repre-

sents a sewing-machine embodying my invention, the feeding-sleeve being represented as broken out to illustrate its co-operation with the needle-bar; Fig. 1^a, a detail of part of the needle-bar and needle. Fig. 2 is a left-hand side elevation thereof. Fig. 2^a shows the oscillating yoke detached. Fig. 3 is a rear end elevation with the framework broken away, so as to show the operative parts otherwise concealed by the framework. Fig. 4 is a side elevation of the cam B⁵. Fig. 5 is a side elevation of the cam G; Fig. 6, an enlarged view of part of the work support or horn containing the stitch-forming devices which co-operate with the eye-pointed needle partially shown directly above it. Figs. 7 and 8 show different positions of the stitch-forming devices in the production of the stitch. Figs. 9 and 10 are details to be referred to, Fig. 10 being an under side view of some of the parts shown in Fig. 9.

The framework consists, essentially, of a base or column A, having an overhanging neck or arm A², to the forward end of which is adjustably connected, by bolts or set-screws A³, a carriage A⁴, in the front end of which are suitable bearings for the needle-bar A⁵, it having at its lower end a suitable needle A⁶. Loosening the bolts or screws A³, their shanks being of less diameter than the holes of the overhanging arm, through which they are extended, enables the needle-bar and needle to be adjusted to place the latter correctly with relation to the throat of the work-support.

The framework referred to has suitable bearings for the main shaft B of the machine, it having, as shown, a suitable fly or drive wheel B¹ and a series of cams, to be described, which operate the various parts of the machine. In this present instance of my invention the work-support A⁷ is made in the shape of a horn, the said work-support being attached to the framework by suitable screws A⁸.

Heretofore great difficulty has been experienced in attempts to use a narrow small-ended horn in connection with a sewing-machine making a stitch with more than a single thread; but by experiment I have devised stitch-forming devices, which I shall presently describe, which take up but very little room, are capable of being operated within the practical limitations of the tip of a horn, leaving the latter of such small size as to readily reach any part of the interior of a shoe which is to be stitched.

The needle-bar A⁵ in the present embodiment of my invention has at one side a loose block *a*, (represented by dotted lines in Fig. 2 and by full lines in Fig. 1,) which block is embraced by the slotted end of a needle-bar-actuating lever B², pivoted at B³, and having at its other end a suitable roller or other stud *a'*, which enters a groove B⁴ in a cam B⁵, fast on the shaft B, the said cam having at its opposite side a groove B⁶, (see Fig. 4,) in which enters a roller or other stud *a''*, (shown by

dotted lines in Fig. 2,) attached to one end of a looper-actuating lever *a*³, having its fulcrum at *a*⁴ and connected by a link *a*⁵ with a lever *a*⁶, to be described. The cam B⁵ has a roller or other stud *b*, (shown by dotted lines, Fig. 2,) which acts on a lever B⁷, pivoted at B⁸ and connected in suitable manner, as by a link B⁹, with a foot-lifting lever B¹⁰ (represented as pivoted at B¹²) on a suitable stand. The foot-lifting lever B¹⁰ has at its outer end a swivel-post C, to which is adjustably connected by a screw C¹ a stud C², which by a link C³ is attached in suitable manner to the upper end of the foot-carrying bar C⁴, the connection shown in the present instance being by a loop in the lower end of the link, which embraces a set-screw of a collar fast upon the said bar C⁴ by a set-screw.

The feed-carrying bar is extended through suitable bearings of a frame C⁵, pivoted at C⁶ upon an oscillating yoke C⁷, (shown separately in Fig. 2^a,) said frame having two collars provided with openings to embrace the upper and lower ends of the outer portion of the carriage A⁴, so that the said oscillating yoke may be moved about the needle-bar in any direction, the pivot C⁶, referred to, being substantially in line with the longitudinal center of the needle-bar, the yoke referred to being capable of being rotated partially to the right or left about the needle-bar, according to the direction it is desired to feed the material by or through the action of the foot C⁸ at the lower end of the bar C⁴. One of the bearings for the bar C⁴ is marked 2, and said bar is surrounded by a strong spring 3, one end of which rests against the said bearing and its other end against an adjustable collar 4 on the bar, the spring acting normally to keep the foot down upon the material.

The upper end of the frame C⁵ has a feed-regulating device, (shown as a screw *a*⁵), the inner end of which or a block at the said inner end contacts with a feed-cone D, and by the said cone the said frame C⁵ is caused to vibrate in one or another direction when the foot is rising upon the material to thus feed the said material on the horn, the operator controlling the direction of feed by turning the yoke and frame C⁵ more or less about the longitudinal center of the bearing for the needle-bar.

The feeding-cone is represented as a sleeve having a cam-shaped or beveled lower end *d* and a closed upper end *d'*, the sleeve deriving its vertical movements by the contact of the upper end of the needle-bar with the said cap *d'*, the sleeve being guided in its vertical movements by a portion of the bearing through which the needle-bar works.

The frame C⁵ has a beveled shoulder *r*, against which the beveled part *d* of the feeding-sleeve acts as the sleeve is lifted, the screw *a*⁵, referred to, contacting with the body of the sleeve as the latter descends, and by turning the screw in or out the feed may be shortened or lengthened. It is obvious

that the foot and bar perform not only the functions of a presser foot and bar, but also of a feed foot and bar.

In the feeding apparatus above described the frame C⁵ is free to vibrate by or through the action of the feeding-cone about a center substantially in line with the longitudinal center of the needle-bar, as thereby when the foot is moved to feed the material the spring also acts to keep the foot down upon the material and the feed of the material is always toward the needle, or from the operator toward the needle, or the feed is toward the throat in the work-support. This feeding mechanism, however, is not herein claimed, but forms subject-matter of another application, Serial No. 417,659. The needle is supplied with a thread 5, taken from a suitable spool or support and led, preferably, first through a guide 6, thence about a suitable tension device 7, which may be a pulley, thence through a guide 8 and a take-up 9, thence through a suitable guide 10 and through a slot in the needle-bar, (see Fig. 1^a, where the lower end of the needle-bar is represented as enlarged,) and then through the eye of the needle.

The take-up device 9 is represented as a rod guided at 12 in a suitable loop or bearing and extended through a swivel-block 13, (see Fig. 1,) attached to the upper end of a lever 14, pivoted at 15, and having a suitable roller or other stud, which enters a cam-groove (the shape of which is best shown in Fig. 1) in a cam E, fast on the shaft B. The shaft has B fast upon it two cams G¹ and H. The cam G (see Fig. 5) has a groove G', which receives a roller or other stud projecting from one arm of a lever G², having its fulcrum upon the rod a⁴, the opposite end of the said lever being attached by a suitable link or connection, as G³, to one end of a thread-carrier G⁴, which carries the third thread marked t. In order to adjust the position of the thread-carrier G⁴ correctly with relation to the other parts, it is preferred to and the junction of the connection G³ with the lever G² is made in an adjustable manner, as by a small plate or block G⁶, it having a slot through which is extended a suitable screw 18. The cam H has in its inner side a groove, the shape of which is best shown by the dotted lines H' in Fig. 2, said groove receiving a roller or other stud h at the upper end of a lever H², having its fulcrum on the rod a⁴, the opposite end of the said lever being adjustably joined, as described, with relation to the lever G² with a connection H³, operatively joined with the loop detainer or holder h', pivoted at h² upon the work-support or horn, the point of the said loop-detainer being projected upwardly, the connection being attached to it between its fulcrum and its free end. The looper a⁶, the shape of which is best shown in Figs. 7 and 8, has an eye, through which is extended a looper or second thread l, taken from some suitable spool or bobbin. (Not

shown.) This looper has its fulcrum upon a stud a⁷, erected upon a feeler a⁸, in this present instance of my invention slotted at its under side, as at a⁹, to receive and be guided by suitable studs, as a¹⁰, (represented by dotted lines in Fig. 6,) said studs or projections guiding the said feeler in its movements. The front end 19 of the feeler is so shaped or arranged as to contact with the rear side of the needle when the latter is down through the material and preparatory to the passage of the point of the looper through the loop of needle-thread drawn out from the eye-pointed needle A⁶. A spring a¹², suitably supported in the horn or work-support acts against a portion of the said feeler and serves normally to push the feeler toward the tip of the horn, the said spring operating to move the feeler in that direction whenever the connection a⁵ is moved in the direction of the arrow near it in Fig. 6, preparatory to and as the looper a⁶ commences to move in the direction to pass through the loop of needle-thread, the movement of the feeler, however, taking place, and the point 19 thereof coming in contact with the needle, as stated before, the point of the looper arrives in position to enter the loop of needle-thread. This feature of mounting the looper upon a movable carriage or feeler the position of which is registered with relation to the needle preparatory to the passage of the looper with its thread through the loop of needle-thread constitutes a novel feature of my invention, and by it it is possible for the looper to properly co-operate with a needle of any usual diameter without adjustment of parts.

Prior to my invention I am not aware that a looper of any form has ever been mounted upon a feeler so that the pivotal point of the looper might be automatically put into correct operating position with relation to a needle whatever may be the diameter thereof, so this part of my invention is not limited to the exact form of devices shown. In other words, the employment of the feeler preceding the action of the looper insures always the correct entrance of the looper into the loop of needle-thread. The connection a⁵ in this present embodiment of my invention is represented as a wire, one end of which is bent up and enters a slot 21 in the looper.

I will now briefly describe the operation of the stitch-forming devices, it being supposed that a stitch has already been made. The needle A⁶ will be made to penetrate the material. The cam-groove B⁶, acting on the lever A³, will start the looper forward after the needle reaches its lowest position, and at the same time the spring a¹² will cause the feeler to contact with the side of the needle and immediately thereafter the point of the looper a⁶ will enter the loop of needle-thread. The needle A⁶ will penetrate the material, and by the time that the needle reaches substantially its lowest position the feeler, by or through the

action of the spring a^{12} , permitted by the cam B^6 , controlling the looper a^6 , will come against the rear side of the needle. The looper, being then in correct position with relation to the needle, will be moved about its fulcrum to enter the loop of needle-thread, the carrier G^4 for the third thread will instantly be thrust forward through the loop of looper-thread, and the thread catcher or detainer h' will rise and enter the loop of third thread, the parts being then substantially as in Fig. 7. Now the carrier for the third thread starts back, leaving its loop in the loop of looper-thread and held by the thread-catcher h' , and as or about as the third thread-carrier is so being retracted the needle rises through the work, the looper retaining the loop of needle-thread until the eye of the needle A^6 is substantially out of the work, when the looper is retracted, leaving the threads substantially as in Fig. 8. The needle now continues to rise, drawing the loop of looper-thread yet in it and in doubled form into the work, and just before the needle finishes its upper stroke to set the stitch and actuate the feed the loop catcher or detainer retreats from the loop of looper-thread, so that the needle as it completes and draws the loop of looper-thread into the material will also draw the bent or doubled end of the third thread t into the hole in the stock made by the needle. When the threads are of the same color, it requires a fairly-close observer to detect the presence of the third thread referred to, and yet the two doubled-over loops completely fill up the needle-hole with thread, the wax, which will of course be present on the thread in usual manner, making a very tight or plugged seam. During this operation of forming the stitch the take-up is actuated to aid in setting the stitch, and the needle-bar as it is completing its upward movement lifts the conical feeding-sleeve and effects the feeding of the material for a new stitch. It will be noticed that the foot C^8 never draws the material away from the needle after a stitch or draws it from the needle toward the operator; but, on the contrary, the foot when it acts to feed the material pushes the material from a circle outside the needle-hole of the machine, through which the needle works, toward the said needle-hole, and it will also be noticed that the pivot for the frame C^5 is brought as closely as possible to the work-support.

It will be obvious to those skilled in the art that the particular devices employed to actuate the stitch-forming mechanism referred to may be variously modified without departing from my invention, and it will also be obvious that the shape and direction of move-

ment of the actuating parts of the devices referred to, especially those contained in the horn, would have to be modified in order to adapt the stitch-forming mechanism to a machine having a flat bed.

I claim—

1. A sewing-machine containing the following instrumentalities, viz: an eye-pointed thread-carrying needle to penetrate the material, a work-support, a thread-carrying looper located below the material and co-operating with the said needle, a thread-carrier to contain and present a third thread, and a loop-detainer to enter and detain temporarily the loop of third thread, whereby the latter is retained in doubled form in the loop of looper-thread during the time that the needle-bar rises to draw the loop of looper-thread into the material, substantially as described.

2. The work-support, a needle, and a feeler to contact with the needle, combined with a looper having its fulcrum on said feeler and adapted to co-operate with the needle, substantially as described.

3. The reciprocating eye-pointed needle, a thread-carrying looper adapted to put a loop of its thread through the loop of needle-thread, and a third thread-carrier adapted to enter the loop of looper-thread, combined with a loop-catcher to hold the loop of third thread and cause the latter to hold the loop of looper-thread while the said loop of looper-thread is being drawn into and concealed in the work by the loop of needle-thread, substantially as described.

4. The horn constituting a work-support, the movable carriage or feeler thereon, the circularly-moving thread-carrying looper having its fulcrum on the said carriage, and an eye-pointed needle and needle-bar, combined with devices to actuate the said needle, looper, and carriage, substantially as described.

5. The overhanging arm, the carriage adjustable thereon and having bearings for the needle-bar, the needle-bar therein, its attached needle, means to actuate the needle-bar, and the horn-like work-support, combined with the feeler and the circularly-movable thread-carrying looper mounted thereon, a carrier for a third thread, and devices to move the said feeler-looper and third thread-carrier, substantially as described.

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

ALFRED A. CUMING.

Witnesses:

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