

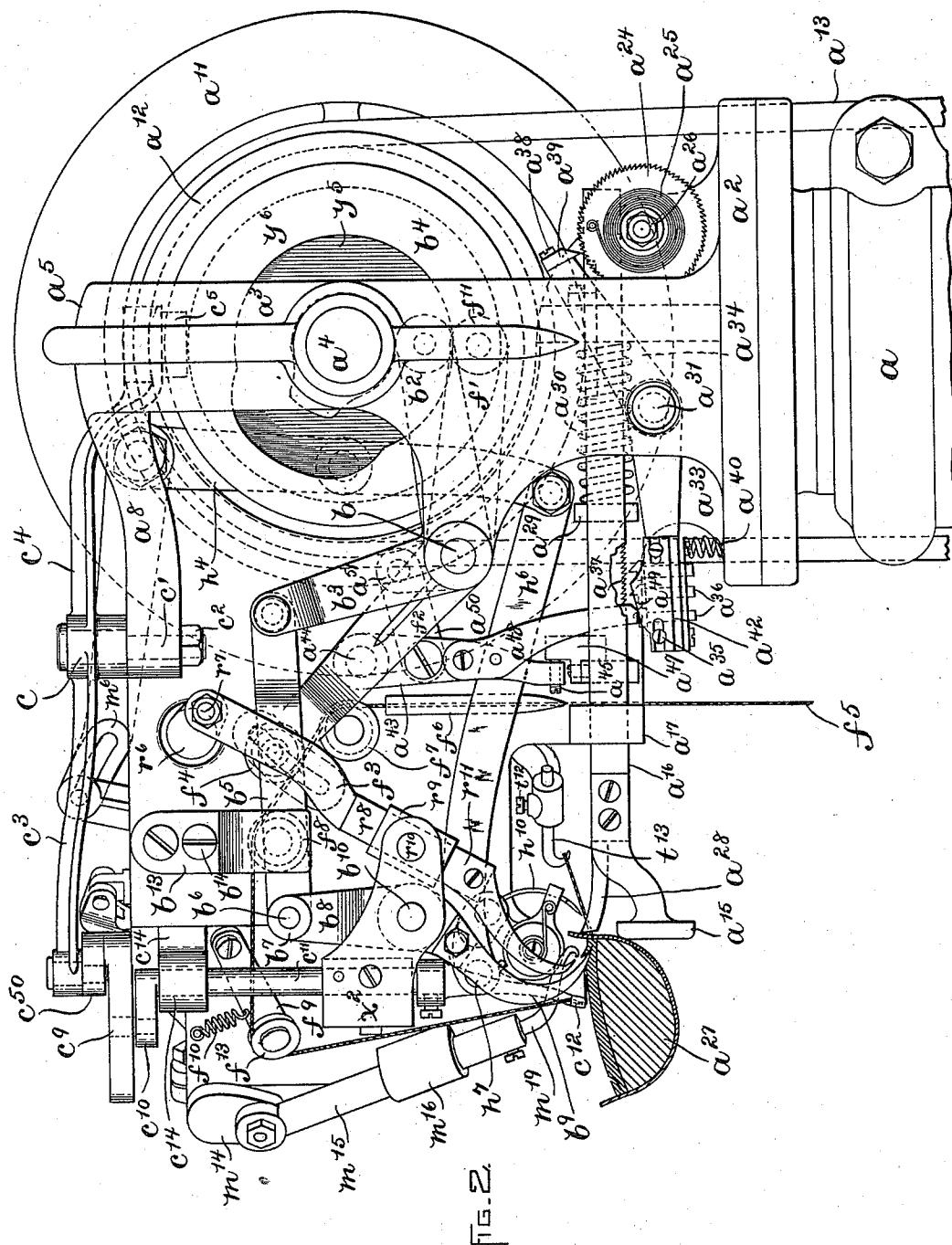
(No Model.)

6 Sheets—Sheet 2.

P. A. COUPAL.
SEWING MACHINE.

No. 579,426.

Patented Mar. 23, 1897.



WITNESSES:

A. S. Hammon.
W. P. Bell.

INVENTOR:

Peter A. Coupal.
By Wright & Burnett
Atty.

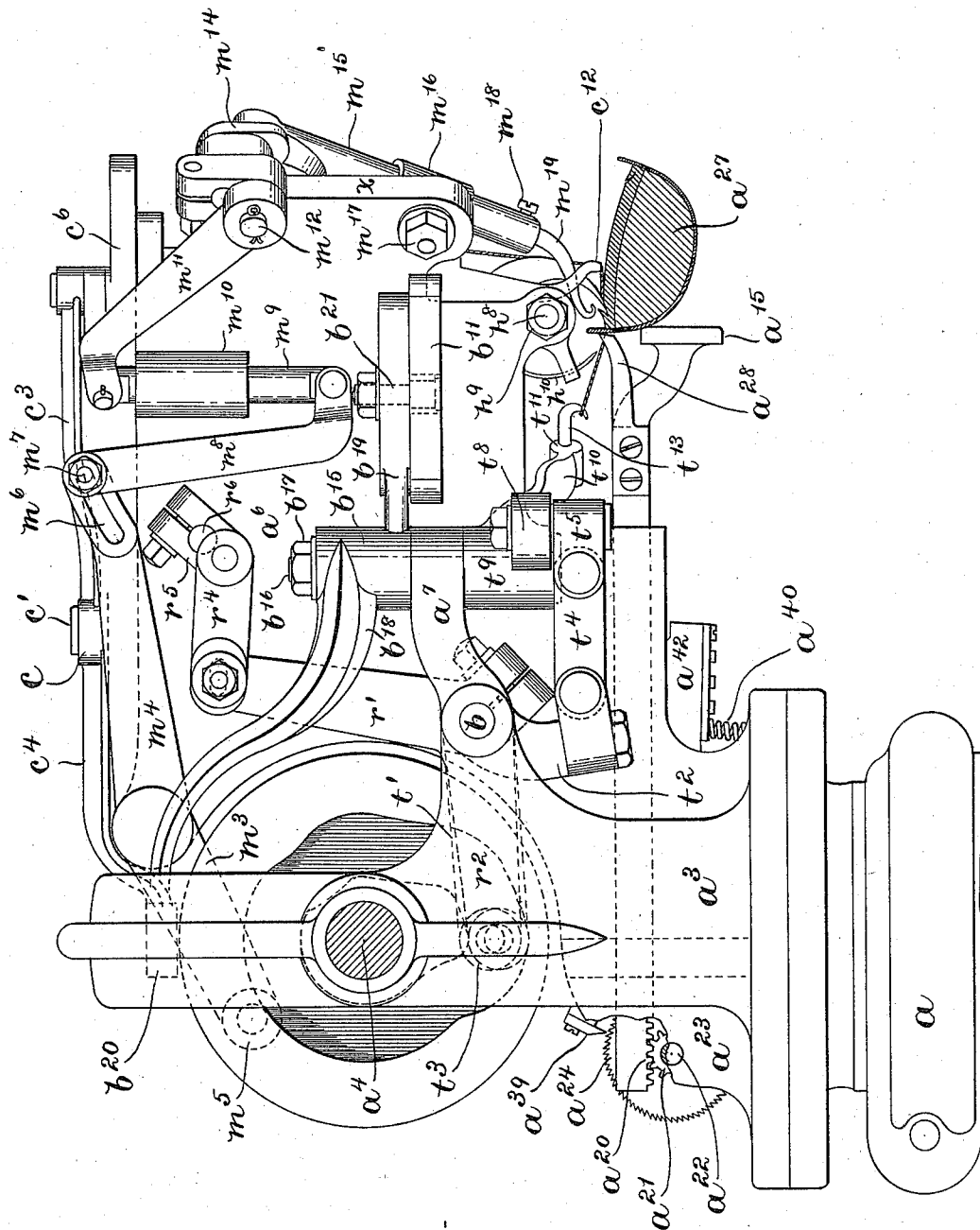
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6 Sheets—Sheet 3.

P. A. COUPAL.
SEWING MACHINE.

No. 579,426.

Patented Mar. 23, 1897.



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FIG. 3.

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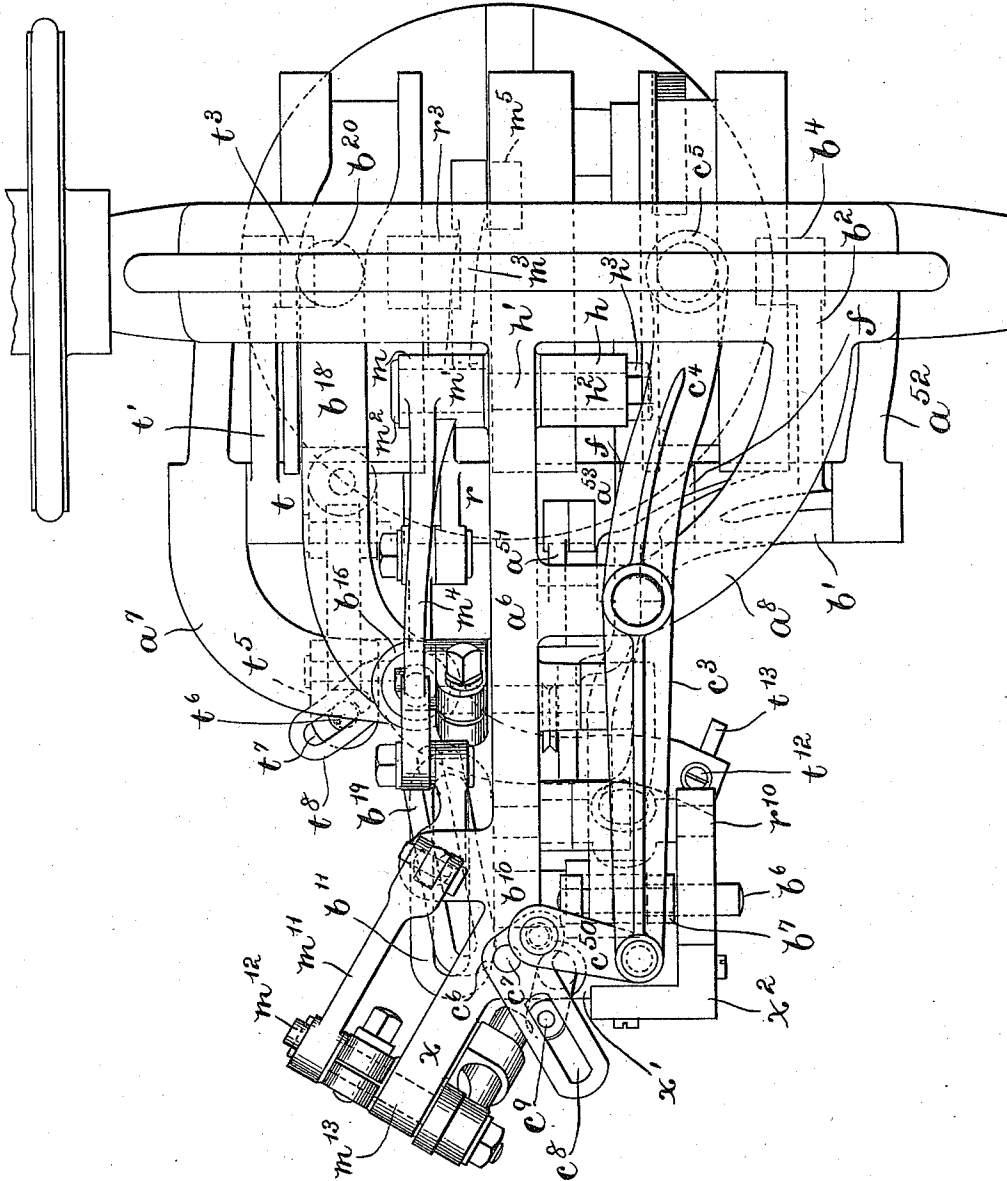
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6 Sheets—Sheet 4.

P. A. COUPAL.
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Patented Mar. 23, 1897.



4. 4

WITNESSES:

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(No Model.)

6 Sheets—Sheet 5.

P. A. COUPAL.
SEWING MACHINE.

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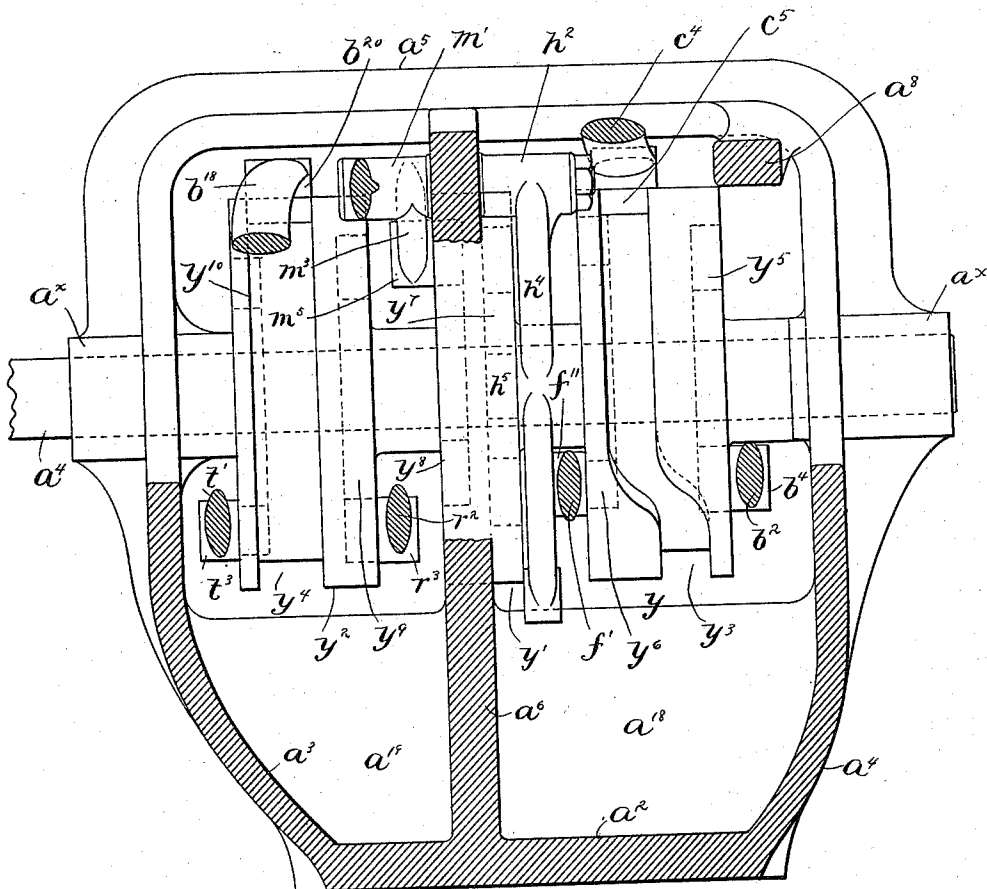


FIG. 5.

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(No Model.)

6 Sheets—Sheet 6.

P. A. COUPAL.
SEWING MACHINE.

No. 579,426.

Patented Mar. 23, 1897.

FIG. 6.

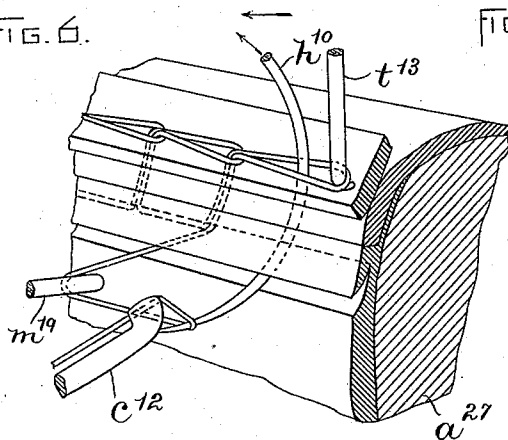


FIG. 7.

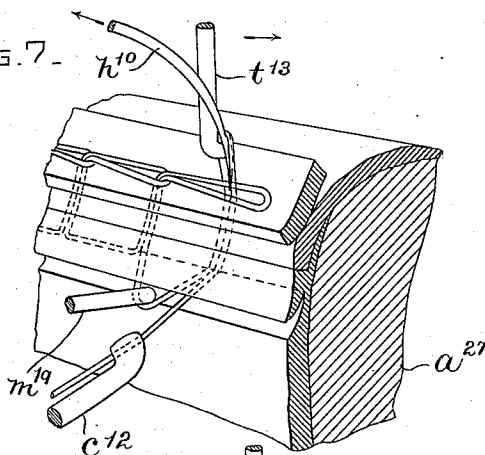


FIG. 8.

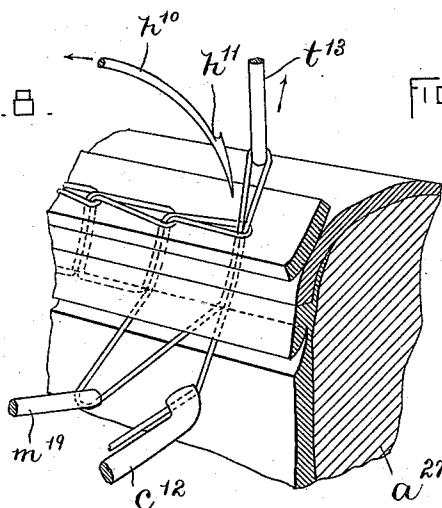


FIG. 9.

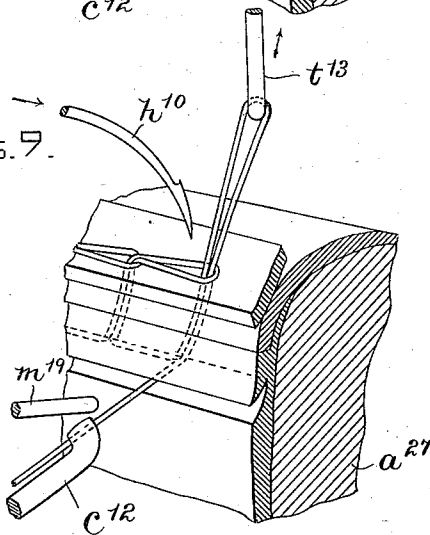
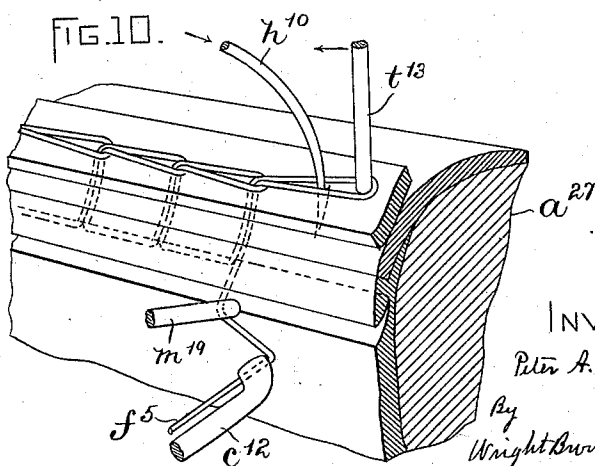


FIG. 10.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PETER A. COUPAL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM GORDON, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 579,426, dated March 23, 1897.

Application filed September 9, 1895. Serial No. 561,876. (No model.)

To all whom it may concern:

Be it known that I, PETER A. COUPAL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to a new and improved machine for sewing shoes, and particularly to the mechanism whereby the stitch can be set without the use of the needle and while the needle is out of the stock.

The invention consists in certain novel features of construction and relative arrangement of parts which will be hereinafter fully described in the specification, clearly illustrated in the drawings, and particularly pointed out in the claims.

Reference is to be had to the accompanying six sheets of drawings, forming a part of this application, in which like characters indicate like parts wherever they occur.

Figure 1 represents a front elevation of the machine constructed in accordance with my invention. Fig. 2 represents a side elevation thereof. Fig. 3 represents a side elevation of my machine, the view being taken from the opposite side from that shown in Fig. 2, the hand-wheel and belt-pulley being removed. Fig. 4 represents a top plan view of my machine. Fig. 5 represents a vertical sectional view of the several parts that make up the framework, the levers being removed in order to show the arrangement of the cams. Figs. 6 to 10 represent different positions occupied by the needle, the looper, thread-arm, and thread-hook during the operation of making and setting a stitch.

a represents the collar of the stand on which the machine rests, the stand not being shown.

a' represents the framework of the machine proper, which consists of the bed piece or plate a^2 , arranged to rest on the collar a and be secured thereto in any desired way, and two upright arms a^3 , which rise from the plate a^2 on opposite sides of the latter and are provided with journal-bearings a^x at a suitable distance above said plate and in which is mounted a shaft a^4 . These arms a^3 extend a suitable distance above the bearings a^x and are connected by an overhanging bar a^5 , as

shown, a web a^6 extending upward from the plate a^2 between the arms a^3 and running from the back to the front, the plate being cut away around the shaft a^4 a sufficient distance to permit the cams to be placed thereon, as shown in Fig. 3, the plate a^2 , the arms a^3 , bar a^5 , and the web a^6 all being cast in one piece. The front end of this web is formed with a deflecting portion x and with a lug x' , arranged on opposite sides of said web, as represented in Figs. 1 and 4. It is to this web that most of the lever mechanisms of the machine are attached.

a^7 represents an arm cast integral with one of the arms a^3 and connecting the latter with the web a^6 , this arm a^7 joining the arm a^3 a short distance below the shaft a^4 , as shown to the left in Fig. 1 and in Fig. 3.

a^8 represents an arm on the opposite side of the web from the arm a^7 and joining the overhanging bar a^5 to the top of the web a^6 , as shown in Figs. 1, 2, 4, and 5. To one end of the shaft a^4 is secured a hub a^9 by means of a set-screw a^{10} . This hub a^9 carries a hand-wheel a^{11} and a belt-wheel a^{12} , arranged to carry a belt a^{13} , that connects the wheel to any desired source of power.

Upon the shaft a^4 are rigidly mounted three cam-disks y y' y^2 , as shown in Fig. 5, the disks y and y^2 being formed upon their peripheries with path-cams y^3 y^4 , respectively. Each of the three cam-disks is provided upon each side with a path-cam, as indicated in dotted lines in Fig. 5, the two peripheral path-cams y^3 y^4 being indicated in full lines. It is from these path-cams that the several parts of the machine derive their motion and by which the several movements are properly timed.

a^{15} represents a back support connected to the end of a bar a^{16} , that is mounted to slide in apertures formed in a lug a^{17} , projecting from the side of the lower edge of the web a^6 , and in a web a^{18} , that extends up a short distance from the plate a^2 and joins the web a^6 with the arms a^3 . The rearend of this bar is provided on its under side with rack-teeth a^{20} , that mesh with a pinion a^{21} , loosely mounted on a pin a^{22} , that extends outward from a rearward extension a^{23} of the web a^6 . A ratchet-wheel a^{24} is also loosely mounted

upon this pin and is cast integral with the pinion a^{21} or secured thereto in any desired way. The ratchet-wheel is retained on the pin by a nut a^{26} . A coiled spring a^{25} has one
 5 of its ends secured to the pin and its other end to the ratchet-wheel and tends to hold the back support yieldingly against the shoe a^{27} , except when the ratchet-wheel is locked, as hereinafter described.

10 a^{28} represents a back gage arranged above the back support a^{15} and beside its bar a^{16} and mounted to slide in apertures in the lug a^{17} and web a^{18} . The free end of this back gage is forked to permit the passage of
 15 the needle and awl and bears against the shoe above the back gage.

a^{29} represents a collar part on the back support between the lug a^{17} and the web a^{18} . A helical spring a^{30} is arranged on the back
 20 support between the collar a^{29} and the web a^{18} and holds the forked end of back gage yieldingly against the shoe except where the back gage is locked, as hereinafter described.

a^{31} represents a pintle secured in the lower
 25 part of the web a^6 by a nut a^{32} , as shown in Fig. 1. Upon this pintle is loosely mounted a hub a^{41} , having two lever-arms a^{33} and a^{34} . To the end of the arm a^{33} is adjustably secured a block a^{42} by means of screws a^{35} .
 30 This block carries one or more dogs a^{36} , arranged to engage ratchet-teeth a^{37} on the back gage a^{28} , as shown in Fig. 2, to lock said gage. To the end of the arm a^{34} is secured by a screw a^{38} a dog a^{39} , arranged to engage
 35 the teeth of the ratchet-wheel a^{24} to lock the latter and the back support. The back gage and back support are locked by the mechanism just described while the stitch is being made and set, but are pressed outward by the
 40 springs at other times.

a^{40} represents a helical spring, one end of which rests upon the plate a^2 , while the other end is engaged by the block a^{34} , whereby the lever-arms a^{33} a^{34} are operated to make their
 45 respective dogs lock the back gage and back support, except when the end of the arm a^{33} is depressed, as hereinafter described.

a^{43} represents an arm pivoted at one end upon a stud a^{44} , that projects from the web
 50 a^6 . The lower end of this arm carries a set-screw a^{45} , that engages a lug a^{47} , secured to the back gage a^{28} , in order to limit the movement of the back gage. To the arm a^{43} is secured a finger a^{48} , that is arranged when said
 55 arm is operated to engage an incline a^{49} on the block a^{42} and depress the latter, thereby unlocking the back gage and also the back support.

a^{50} represents a link connecting the arm a^{43}
 60 with the arm a^{51} of a hub a^{53} , that is fast on a shaft b , so that as the said shaft is oscillated the arm a^{43} , with its attached parts, will be operated. The shaft b extends through the web and at its ends is mounted in bearings formed in the arm a^7 and in the end of
 65 a short arm a^{52} , that projects from the arm a^3 below the arm a^8 . Loosely mounted upon

the shaft b is a hub b' , formed with two lever-arms b^2 b^3 . The arm b^2 carries on its end a roller b^4 , arranged in the path-cam γ^5 in the
 70 outer face of the cam-disk γ . The end of the arm b^3 is connected to one end of a link b^5 , the opposite end of which is connected to a pin b^6 , carried by lugs b^7 on one arm of a lever b^8 , the opposite arm of said lever carrying
 75 the awl b^9 . The lever b^8 is pivoted between its ends upon a sliding pintle b^{10} , one end of which is mounted in the angle-iron x^2 , that is secured to the lug x' and extends parallel with the web a^6 . The opposite end of
 80 the pintle b^{10} extends through the web a^6 and is there connected to or formed integral with a slotted bar b^{11} . The lever b^8 is maintained in a predetermined position on said sliding
 85 pintle b^{10} by nuts b^{12} , fast on said sliding pintle on each side of said lever. The motion imparted to the awl b^9 by means of the path-cam γ^5 and its associated parts vibrates said awl to make a path through the stock for
 90 the needle, while the motion imparted to said awl by the sliding of the pintle while the awl is in the stock carries the shoe forward, the awl being returned to its normal position by the sliding pintle as soon as the former
 95 leaves the stock, the end of the lever b^8 sliding on the pin b^6 without affecting the link b^5 . A lug b^{13} is secured to the web a^6 by screws b^{14} . The lower end of this lug is slotted, as shown in Fig. 1, to straddle the link
 100 b^5 and steady the latter against any sidewise movement due to the sliding of the lever b^8 . The means for operating the sliding pintle b^{10} to feed the shoe are best shown in Fig. 3, in which b^{15} represents a hub loosely mounted
 105 upon a stud b^{16} , that projects from the upper side of the arm a^7 . This hub is retained on said stud by a nut b^{17} and is provided with two lever-arms b^{18} b^{19} . The arm b^{18} carries at its end a roller or projection b^{20} , arranged in the peripheral path-cam γ^4 of the cam-disk
 110 γ^2 . The arm b^{19} is slotted at its end and is connected to the slotted bar b^{11} of the sliding pintle by a bolt and nut b^{21} . By means of the construction of the arm b^{19} and the slotted bar b^{11} the amount of movement of the
 115 pintle, and consequently the amount of feed, can be regulated at pleasure.

f represents a hub loosely mounted on the shaft b . This hub is formed with two lever-arms f' f^2 , the former at its end being provided with a roller f^{11} , that is arranged in
 120 the face of the path-cam γ^6 of the cam-disk γ , while the end of the arm f^2 is constructed as a slotted link f^3 , in which is secured a pulley f^4 , under which the thread f^5 is arranged, the thread passing through a guide f^6 , over
 125 two pulleys f^7 f^8 , secured to studs on the web a^6 on each side of the pulley f^4 , over a pulley f^{13} on the end of an arm f^9 to the looper c^{12} . The arm f^9 is pivoted at one of its ends, and
 130 a spring f^{10} is secured to said arm between the pintle and the pulley f^{13} to exert an upward pull on the pulley and on the thread f^5 . As the pulley f^4 is forced downward between

the pulleys f^7 f^8 it will draw enough thread from the supply for the next stitch.

c represents a hub loosely mounted upon a bolt c^1 , secured by a nut c^2 in the arm a^3 .

5 This hub is formed with two lever-arms c^3 c^4 . The arm c^4 at its end is provided with a roller arranged in the peripheral path-cam y^3 of the cam-disk y , while the end of the arm c^3 is connected by a link c^{10} to an arm of a bell-crank lever c^6 , that is pivoted on a stud c^7 , projecting from the web a^6 . The other arm of the bell-crank lever is slotted, as at c^8 , and in this slot is arranged a pin c^9 , projecting from the end of a crank c^{10} on one end of a rock-shaft c^{11} . This shaft is mounted in lugs c^{14} , that project from the lug x' of the web a^6 . A looper c^{12} is connected to the lower end of this shaft in a position when operated to wrap the thread about the needle when the latter is forced through the shoe or stock, as is common.

h represents a hub mounted upon the end h^2 of a bolt h^1 , as arranged in the top of the web a^6 , close to the bar a^5 , as shown. This hub h is retained upon the bolt h^2 by a nut h^3 . This hub, which is on the same side of the web a^6 as the back-support mechanism, carries an arm h^4 , that midway its ends is provided with a roller h^5 , that is arranged in the face of the path-cam y^7 of the cam-disk y' . At its lower end this arm is pivoted to one end of a link h^6 . The opposite end of this link (see Figs. 2 and 3) is pivoted to a member h^7 , that is mounted upon a bolt h^8 , secured in the lower end of the web a^6 by a nut h^9 . This member h^7 carries the needle h^{10} , which, instead of being provided with a slot or eye, is provided with a hook h^{11} at its end and is arranged to enter the stock from the opposite side of the awl b^9 . (Shown in Fig. 2.)

m represents a hub mounted upon an extension m' of the bolt h^1 , that is upon the opposite side of the web a^6 from the end h^2 of said bolt. This hub is maintained upon the end m' by means of a head m^2 , and is provided with two arms m^3 m^4 . The arm m^3 is provided with a roller m^5 , arranged in the face of path-cam y^8 of the cam-disk y' . The arm m^4 is formed with a slotted end m^6 , (see Figs. 2 and 3,) in which is mounted a bolt m^7 , connected to one end of a link m^8 . The opposite end of this link is pivoted to the lower end of a pin m^9 , that is arranged in a bearing m^{10} , secured to the web a^6 . The opposite end of this pin m^9 on the upper side of the bearing m^{10} is pivoted to one end of a link m^{11} . The opposite end of this link is pivoted to an arm m^{12} of a rock-shaft m^{13} , that is mounted in the end of the deflecting portion x of the web a^6 . The opposite end of this rock-shaft is provided with a crank-arm m^{14} , that is pivoted to one end of a vertically-moving bar m^{15} , which between its ends is mounted to slide in a pivoted bearing or eyebolt m^{16} , secured by nut m^{17} to the lower end of the deflecting portion x . To the lower end of this bar m^{15} , by a screw m^{18} , is secured a

thread-finger m^{19} , that is located upon the same side of the work as the looper c^{12} , and to be upon the opposite side from the needle h^{10} and the thread-hook, hereinafter described.

r represents a hub fast on the shaft b , carrying arms r^1 r^2 , by which the channel-guide is operated. Consequently as the channel-guide is operated the shaft b will be oscillated, and thereby impart movement to the hub a^{53} and its connected parts to lock and unlock the back gage and back support. The arm r^2 carries a roller r^3 , arranged in the face of the path-cam y^9 of the cam-disk y^2 . The arm r^1 at its end is pivoted to a link r^4 , that in turn is pivoted to an arm r^5 , fast upon a rock-shaft r^6 . This rock-shaft extends through the web a^6 and at its opposite end is provided with a crank pin or lever r^7 , that is pivoted to a link or rod r^8 , arranged to slide in a bearing r^9 , pivoted to a bolt r^{10} , that is arranged in the end of the angle-iron x^2 and the side of the web a^6 . To the lower end of this rod r^8 is secured the channel-guide r^{11} , it being evident from the construction just described that the locking and unlocking of the back support and back gage will be timed with the movements of the channel-guide r^{11} .

t represents a hub loosely mounted on the shaft b . This hub is provided with arms t^1 t^2 . The arm t^1 at its end carries a roller t^3 , that is arranged in the face of the path-cam y^{10} of cam-disk y^2 . The arm t^2 extends from the lower side of this hub and is pivoted to one end of a link t^4 . (See Figs. 1, 3, and 4.) The opposite end of this link is pivoted to a strap t^5 , that carries a pin or bolt t^6 , arranged in the slot t^7 of an arm t^8 , fast upon a hub t^9 . This hub is mounted upon an extension of the bolt b^{10} on the lower side of the arm a^7 , as shown in Fig. 3. This hub t^9 also carries an arm t^{10} , that extends around under the lower edge of the web a^6 , and is provided with a slotted end t^{11} , in which, by a screw t^{12} , is secured a thread-hook t^{13} , that is arranged on the same side of the work as the needle and on the opposite side of the work from the looper and the thread-finger m^{19} .

The operation of the needle, the channel-guide, awl, pull-off arm, back support, and back gage are the same as is common in machines of this class, and a detailed description thereof is unnecessary.

The operation of the means for setting the stitch while the needle is out of the stock is best illustrated in Figs. 6 to 10. In Fig. 10 I have shown the position of the parts at the beginning of a stitch operation. The thread-finger m^{19} is close to the stock and the looper has passed the thread over the finger in order to hold the thread in a convenient position for the needle to engage the same, the thread being measured by the pull-off arm and held in the usual way. The thread-hook t^{13} holds the previous loop so that the needle can pass through it. The hook, looper, and finger are stationary, or in the position shown in Figs.

10 and 6, while the needle enters and leaves the stock, except for a slight movement of the looper and finger (see Fig. 6) after the needle has pierced the stock to insure the thread engaging the needle. As the needle pulls a new loop through the previous loop (see Fig. 7) the thread-hook t^{13} moves to the left close to the needle to cast off the previous loop and immediately moves to the right a short distance and dwells to remove the new loop from the needle, to throw the previous loop upon the stock or to the position shown in Fig. 8, and to hold the loop while the finger sets the previous stitch. After the hook t^{13} has completed the operation just described and has come to a dwell the thread-finger, which has a movement toward and away from the stock and which during the operation just described has been held stationary close to the stock, (see Figs. 10 and 7,) is drawn away from the stock to the position shown in Fig. 8 a distance sufficient to set the previous stitch on the needle side of the stock, as shown, the thread rendering about the loop held by the thread-hook. As the thread-finger completes its movement to set the previous stitch and drops the thread the thread-hook t^{13} moves from the position shown in Fig. 8 to that shown in Fig. 9 to pull through the slack thread dropped by the thread-finger. Then the thread-hook has a movement toward the stock to assume its initial position to hold the loop in position to permit the needle to pass through the same, as shown in Fig. 10. As the thread-hook returns to its initial position after drawing through the slack thread dropped by the thread-finger the thread-finger takes up the slack of the thread caused by such inward movement of the thread-hook. The thread-finger after it drops the thread moves toward the work and engages the thread of the new stitch, (see Figs. 9 and 10,) and, as stated above, when the thread-hook moves toward the work the thread-finger again moves outward, as shown in Fig. 6, to take up the slack. The thread-finger engages the thread continuously, except at the time when it drops the thread of the old stitch (see Fig. 9) in order that the thread-hook may take up the slack. In the form of machines as shown the thread-finger, in addition to the functions already stated, serves to draw the thread from the supply.

From the foregoing it will be seen that the thread-finger sets the previous stitch on the needle side while the latter is out of the stock, the thread rendering about the loop held by the thread-hook and not about the needle. There is a decided advantage in setting the stitch on the needle side, since the stitch is drawn or set against a firm part of the leather and can be set as firm as desired without danger of injuring the leather. When, on the contrary, the stitch is set in the channel of the sole, the strain is liable to tear away the lip or tear the thread through the lip. The thread-hook in its outward movement merely

takes up the slack of the thread dropped by the thread-finger and has no stitch-tightening function, strictly speaking.

The several movements of the parts just described are properly timed with respect to one another by means of the path-cams and lever mechanisms heretofore described.

I do not claim the combination, in a shoe-sewing machine, with a hook-needle and means for actuating the same, of a stitch-tightening device located on the same side of the work as the needle and means for operating said device to engage the loop of thread pulled through by the needle and to tighten the stitch while the needle is still out of the work, as I am not the first inventor thereof, my invention being embodied in the following claims.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. In a machine organized for sewing shoes, a hook-needle, a stitch-tightening finger located on the opposite side of the material to be sewed from the needle, and adapted to set the previous stitch while the needle is out of the work, and a thread-pulling hook located on the needle side, and adapted to remove the loops from the needle, and place them in position for the needle to pass the succeeding loop therethrough.

2. The combination in a shoe-sewing machine with a hook-needle, and means for actuating the same, a stitch-tightening device on the awl side of the work, means for operating said device to set the previous stitch, while the needle is out of the work, and a thread-hook on the needle side of the work, means for actuating the same, said hook being adapted to remove the loop from the needle as it is drawn through the work and the previous loop, and to hold the new loop while the thread-finger sets the previous stitch on the needle side of the work, when the needle is out of the stock, then to be moved to take up the slack, and to place the loop held by said hook in position for the next stitch.

3. In a machine organized for sewing shoes, in combination, a hook-needle and means for actuating the same, a thread-pulling hook located on the needle side of the work, a thread-finger located on the opposite side of the work, means for actuating said parts, said hook being adapted to remove the loop from the needle as it is drawn through the work and the previous loop, and to hold the new loop while the thread-finger sets the previous stitch on the needle side of the work, then to be moved to take up the slack, and to place the loop held by said hook in position for the next stitch.

4. In a machine of the class described, a needle, mechanism for operating said needle

to pass a loop of thread through the material
and the preceding loop, means for removing
the last loop from the needle, and means for
drawing the thread from the supply side to
5 set the previous stitch on the needle side of
the material while the needle is out of the
material, said first-mentioned means being
timed to move thereafter to take up the slack
thread on the supply side.

10 5. In a sewing-machine, the combination
with a hook-needle on one side of the work,
and a stitch-tightening device on the other
side of the work operating to set the stitch
while the needle is out of the work and oper-

ating means therefor, of means on the needle 15
side of the work for taking from the needle
the loop pulled through by the needle and
holding the same during the tightening of the
previous stitch.

In testimony whereof I have signed my 20
name to this specification, in the presence of
two subscribing witnesses, this 5th day of
September, A. D. 1895.

PETER A. COUPAL.

Witnesses:

A. D. HARRISON,
C. F. BROWN.