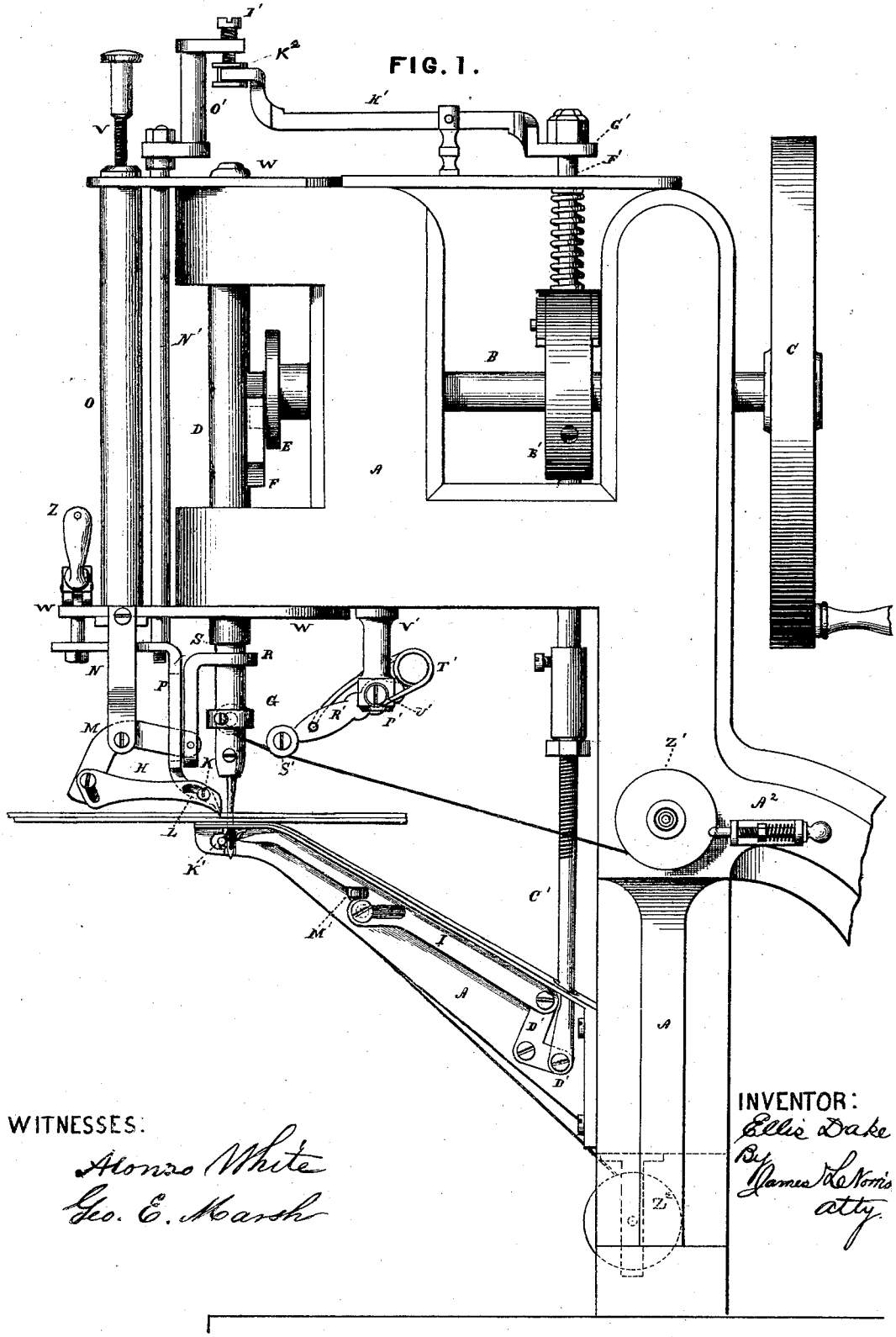
2 Sheets--Sheet 1.

E. DRAKE.
Sewing-Machines.

No. 155,932. Patented Oct. 13, 1874.

FIG. 1.



WITNESSES:

Alonzo White

Geo. E. Marsh

INVENTOR:

Ellis Drake

By James L. Norris

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2 Sheets--Sheet 2.

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FIG. 2.

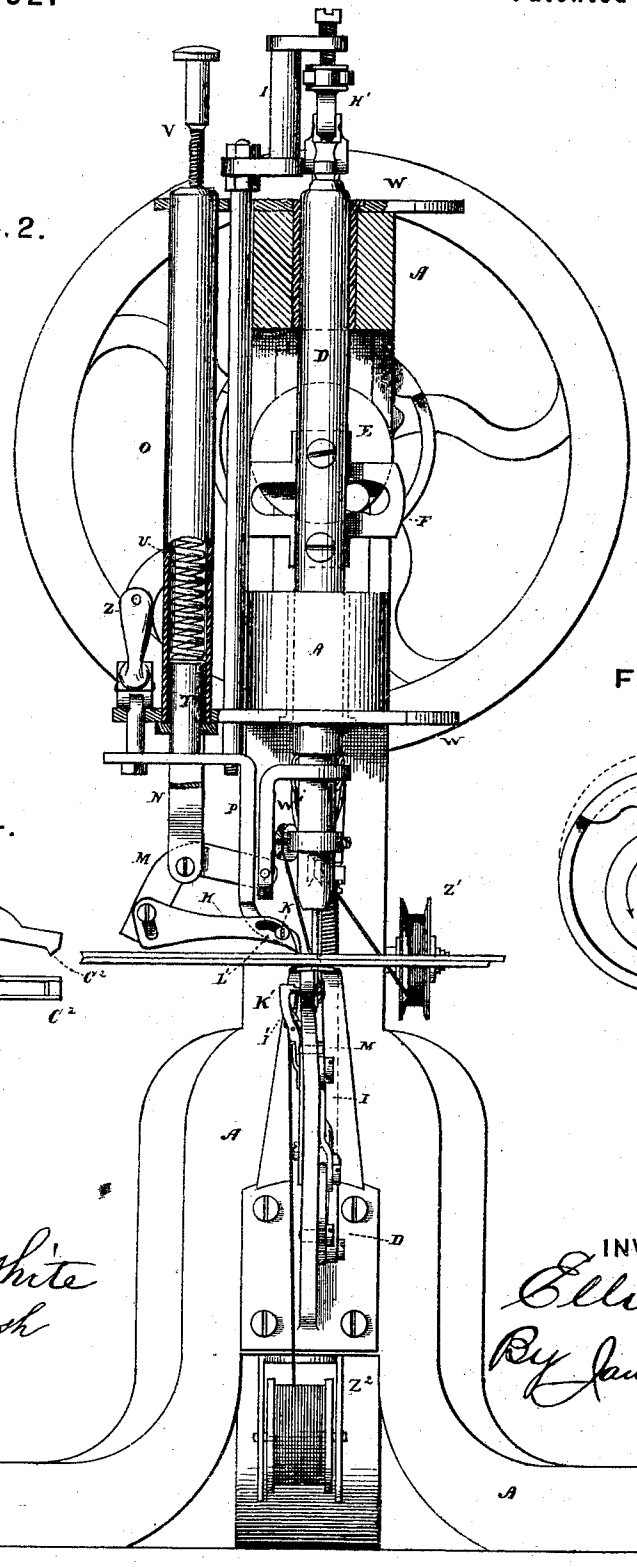


FIG. 3.

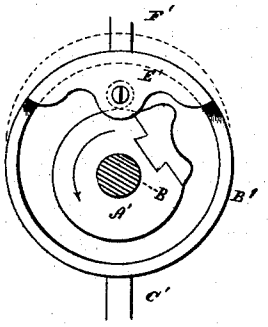
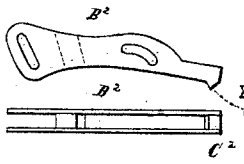


FIG. 4.



WITNESSES:
Alonzo White
Geo. E. Marsh

INVENTOR:
Ellis Drake
By James L. Norris
atty.

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

ELLIS DRAKE, OF STOUGHTON, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN S. SMITH, OF LEICESTER, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **155,932**, dated October 13, 1874; application filed July 7, 1874.

To all whom it may concern:

Be it known that I, ELLIS DRAKE, of Stoughton, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification:

My invention relates to a sewing-machine for forming a new and improved stitch which I have invented; and it is especially designed for sewing leather and other heavy work, being particularly adapted to harness-making, shoemaking, and the like.

My invention consists in various new and improved combinations and arrangements of devices for producing stitches; and, also, in a new and improved adjustable feed device, so constructed and arranged that it may be set to move the goods in various directions across the table of the machine; and in certain new and improved combinations and arrangements of the several parts forming said feed device; also, in an improved marker or pricker, to be used in connection with said feed device, all of which will be fully hereinafter specified and set forth.

In the drawings, Figure 1 represents a side elevation of my improved sewing-machine. Fig. 2 represents a front elevation of the same. Fig. 3 represents a detached view of ring and eccentric, which transmit motion from the driving-shaft of the machine to the devices for operating the lower thread; and Fig. 4 represents a detached view of the pricker for marking between the stitches.

A represents the frame of the machine, which supports the various working parts of the same; and B the driving-shaft, provided with a fly-wheel, C, by means of which the proper motion is transmitted to the various parts. D represents a reciprocating needle-bar, operated by an eccentric or cam, E, upon the end of the driving-shaft B, said eccentric working in a slotted cross-bar, F, secured to the said needle-bar. Around the lower portion of the said needle-bar is secured a collar, G, which may be adjusted vertically thereon, the object of which is to operate the feed device. The said feed device consists of two feed-points, H H, secured near the front ends to the presser-foot P by means of bolts K, passing through slots L L in the feed-points, and at the rear ends to the end of a feed-arm, M, in a similar manner, so as to allow the said points to work freely thereon, and rise and fall at proper times during their backward and forward motions. The feed-arm M is pivoted between the ends of the supporting-arms N N, which are attached to the cylinder O, which carries the presser-foot P. Said feed-arm is in the form of a bent lever, as shown, and the upper end is provided with a clutch, R, which embraces the lower end of the needle-bar, and is operated by means of the adjustable collar G thereon on the upward stroke of said needle-bar, and by a shoulder, S, on the said bar on its downward stroke, thus giving the proper reciprocating motion to the feed-points, and raising them during their backward motion from the cloth, as will be readily understood. The presser-foot P is attached to the lower end of a rod, T, extending upward through the cylinder O, which contains a spring, U, to give the same the proper downward pressure upon the work. The said presser-foot falls between the feed-points upon the cloth, as shown. The upper end of the rod T is provided with an adjusting-screw, V, by means of which the pressure of the spring may be varied to suit the nature of the work. The cylinder O is firmly secured to two supporting-plates, W W, one at each end, which are pivoted to the frame A, around the upper and the lower bearings of the needle-bar, so that the whole feed device which they carry can be given a half-revolution around said needle-bar, and independent of the same, in order to change the direction in which the work is fed, as convenience may require. Z is the lifter, by which the presser-foot and feed device may be lifted from the work.

The "throw" of the feed-points, which determine the length of the stitch, is adjusted by means of the adjustable collar G on the needle-bar, by raising or lowering the same.

A^1 represents a "double cam" attached to the driving-shaft B of the machine, which works within a collar, B^1, secured to a spindle, C^1, passing downward through the frame of the

machine, and connected at its lower end to a toggle-lever, D′, which transmits motion to the machinery for working the lower thread, as will be presently described. The said collar B^1 contains a friction-roller, E′, which rests upon and is operated by the double cam A^1, giving a vertical reciprocating motion to the collar B^1, and operating the various devices connected thereto. To the upper side of said collar is attached a short spindle, F′, passing upward, through a clutch, G′, upon one end of a lever, H′, attached to the top of the machine. Said spindle is surrounded by a spiral spring, which gives the collar its downward motion after it has been raised by the cam A^1. The toggle-lever D′ is connected to and operates the looper I, giving it a backward and forward reciprocating motion as the spindle C^1 rises and falls.

It will be perceived that the double cam A^1 gives two motions in succession to the collar and spindle, and these movements are transmitted to the looper. The first movement takes place just as the needle begins to return through the work, and causes the looper to advance through the loop of the upper thread and seize the lower thread from the thread-guide K^1, and then recede, bringing the loop of the lower thread through the loop of the upper thread, and holding it in this position until the needle is just about to leave the cloth, when a similar movement takes place, the looper advancing only until its point comes directly under the throat through which the needle passes in this instance, which releases the loop and allows it to be drawn up into the work. The thread-guide K^1 consists of a lever, I′, pivoted to the side of the machine opposite to that on which the looper is placed. The front end of said lever is bent at right angles, and passes through an opening in the frame directly below and in front of the needle-throat, and is provided with an eye for carrying the under thread, as shown. Near the rear end of said lever, where it is pivoted to the frame, is attached a stud, M′, projecting through an aperture in the frame of the machine and coming directly opposite a small slot on the lower edge of the looper. The said stud is made to operate the lever and cause its eyed end to approach and meet the looper as it moves forward, so that it can receive the thread and recede again after the loop is taken. The first movement is caused by the looper passing said stud, and the second by means of a suitable spring to throw the lever back.

In order to form the loop of various lengths to suit the thickness of different stock or work operated upon, I make use of a series of devices operating automatically in combination with the feed-device and the devices for operating the looper.

N′ represents a spindle attached to the presser-foot of the machine and extending upward through the supporting-plates W W, carrying on its upper end a bent arm, O′, which extends over the front end of the lever H′. Through the upper end of said bent arm extends downward an adjusting-screw, I′, carrying on its lower end a collar, K^2, which is embraced by a clutch on the end of the lever H′. The spindle C^1 is made adjustable, so that it can be lengthened or shortened, and thus increase or decrease the length of the throw of the looper, to cause it to form a longer or a shorter loop, as may be desired; and the lever H′ may be adjusted so as to regulate the amount of thread given out by the needle in forming the upper side of the stitch by the set-screw I^1 at its front end, by which the extent of the motion imparted to lever H′ by spindle N′ may be varied at pleasure, in order to regulate the size of the loop formed by the under thread. It will be perceived that the throw of the spindle N′ will depend in extent upon the thickness of the material operated upon; and in rising and falling said spindle will operate the lever H′ so as to regulate the throw of the spindle and allow the friction-roller E′ to approach the double cam A^1 just sufficiently to give the looper below a movement of sufficient extent to form a loop of a length corresponding to the thickness of the material, thus automatically regulating the length of the loop to suit the various thicknesses of work that may be operated upon. P′ represents a device for taking up the thread, consisting of a lever, R′, carrying a roller, S′, at its end, and operated by an adjusting-spring, T′, which may be set so as to press with more or less force upon the thread by means of a set-screw, U′. These devices are attached to a standard, V′, secured to the frame A of the machine.

The needle-bar is provided with a thread-roller, W′, at its lower end, and suitable spools Z^1 and Z^2 are attached to the frame A for holding the thread. In connection with the spool Z^1 I employ a tension device, A^2, consisting of a notched spring-bar so set that its notched end will engage the periphery of the spool at one end, and bring the desired pressure to bear upon the same.

In order to crease or mark the spaces between the stitches, I provide an attachment, shown in Fig. 4, which may be secured to the presser-foot feed-arms in the place of the feed-points. This device consists of two pieces, B^2 B^2, similar in shape to the feed-points, but somewhat longer, connected together and provided at their front end with a chisel-shaped marker, C^2, which forms the crease or mark between each stitch. The said pieces are slotted in the same manner as the feed-points, and are attached to the presser-foot and feed-arm in the same way.

What I claim as new, and desire to secure by Letters Patent, is—

1. The double cam A^1, in combination with the driving-shaft B and collar B^1 and the spindle C^1, when connected with and operating the looper, substantially as described.

2. The feed-points H H, secured to the presser-foot by pin K and provided with slots,

as described, and attached to the feed-arm M, in combination with the collar G and shoulder S, by which said feed-points are operated, said feed-points being so arranged that a downward and forward motion will be given them at the same time, to move the material across the face of the table.

3. The spindle N′, which carries the presser-foot, in combination with the lever H′ and spindle F, by means of which the throw of said spindle is regulated for the purpose of controlling the movement of the collar B and regulating the length of the loop of the under thread, as herein set forth.

4. The combination of the spindle N′, arm O′, set-screw I′, and lever H′, by means of which the throw of the spindle F may be adjusted, as and for the purposes herein set forth.

5. The collar B^1 and adjustable spindle C^1, in combination with the toggle-arm D′ and looper I, operating together, as described.

6. The device for taking up the thread, consisting of the lever R′, roller S′, and adjustable spring T′, attached to the standard V, the roller acting directly on the thread as the needle rises, all substantially as herein described.

7. The marker or creaser B^2 B^2, for attachment to the feed-arm M and presser-foot P, as described, and adapted to be operated by the collar G and shoulder S on the needle-bar, as herein shown, for the object specified.

In testimony that I claim the foregoing I have hereunto set my hand.

ELLIS DRAKE.

Witnesses:
JABEZ TALBOT, Jr.,
SARAH E. TALBOT.