

(Model.)

4 Sheets—Sheet 1.

F. BEAN.
SEWING MACHINE.

No. 309,516.

Patented Dec. 23, 1884.

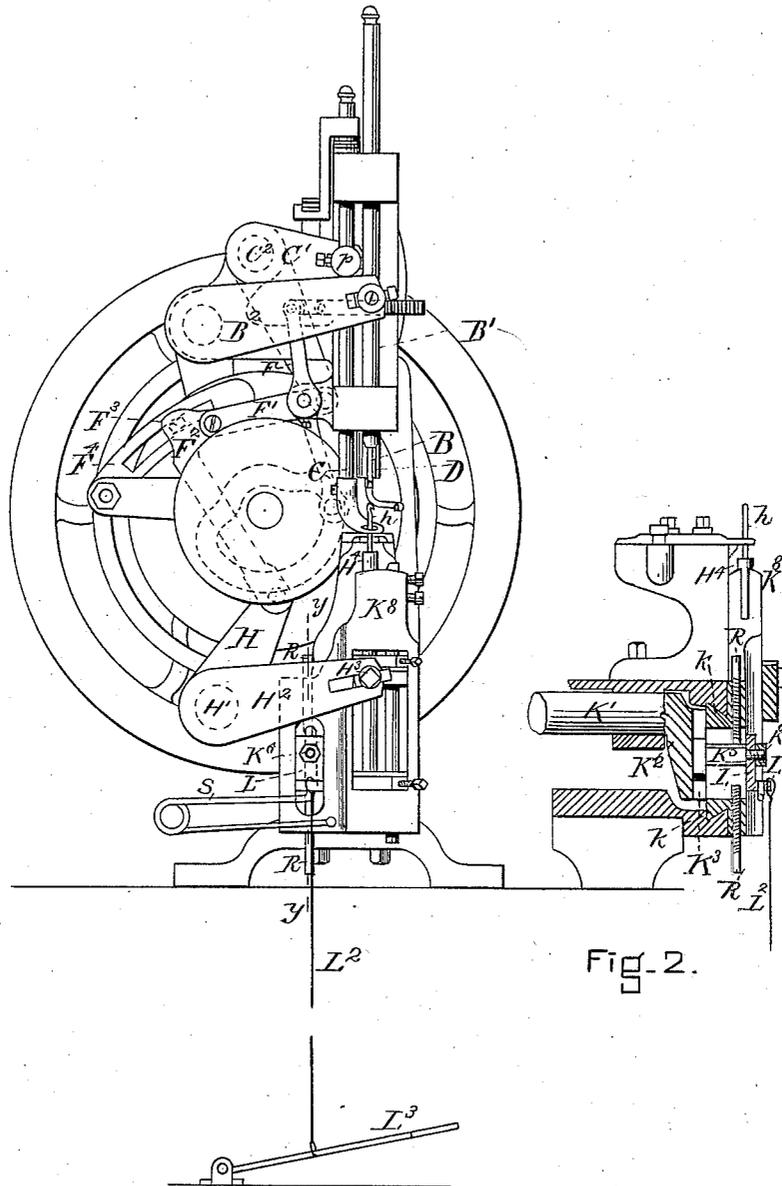


Fig. 1.

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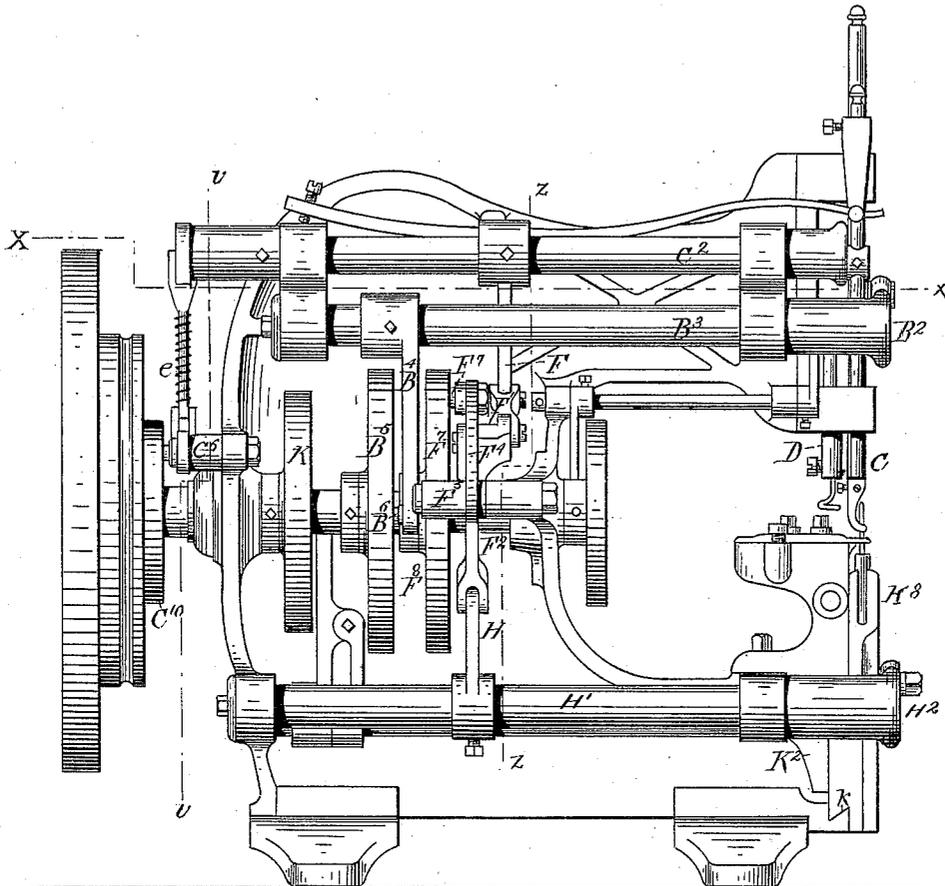


Fig. 3.

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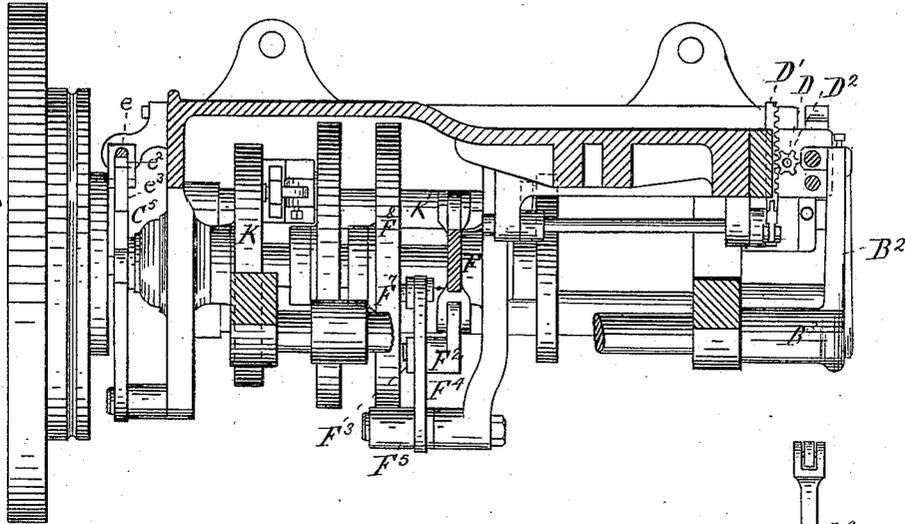


Fig. 4.

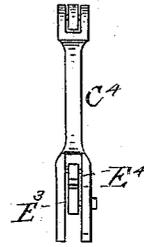


Fig. 7.

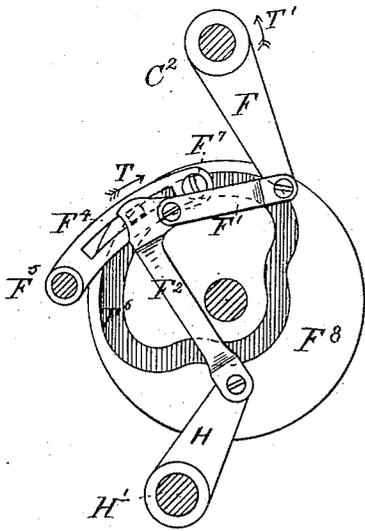


Fig. 5.

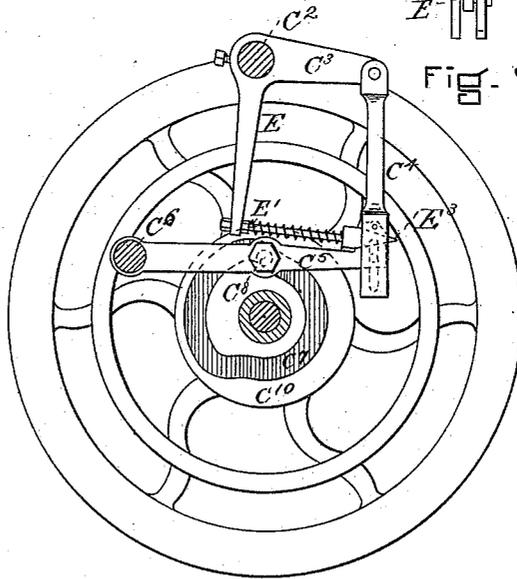


Fig. 6.

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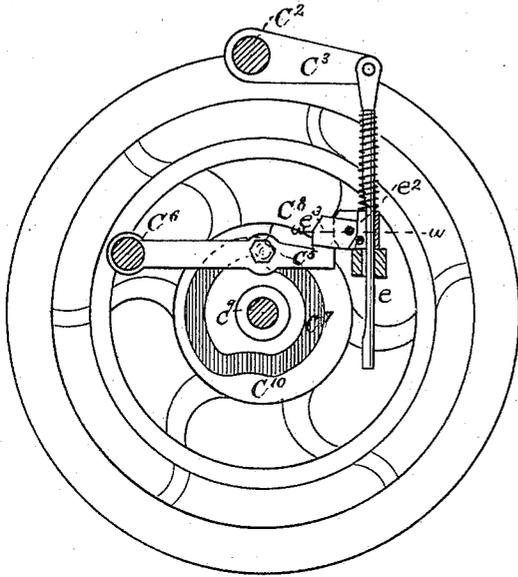


Fig. 8.

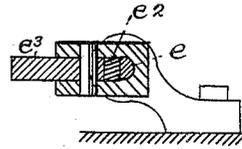


Fig. 9.

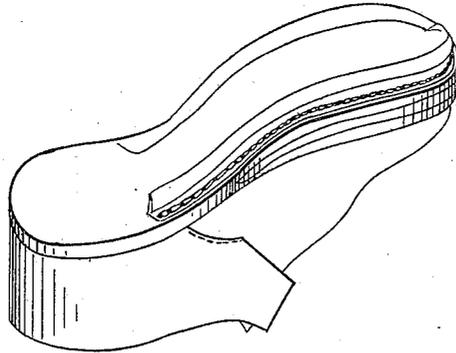


Fig. 10

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UNITED STATES PATENT OFFICE.

FRANK BEAN, OF MEDFORD, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 309,516, dated December 23, 1884.

Application filed November 19, 1883. (Model.)

To all whom it may concern:

Be it known that I, FRANK BEAN, a citizen of the United States, residing at Medford, in the county of Middlesex 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 that class of sewing-machines in which the stitch is formed by a single thread drawn through the work by a hook; and it has for its objects so constructing the machine that the position of the presser-foot as it varies with the thickness of the work regulates the length of motion of the thread-drawing hook, and that the operator may change the length of stitch while the machine is in motion by means of a foot-lever. I attain these objects by the mechanism illustrated in the accompanying drawings, in which
Figure 1 is a front elevation of my machine.
Fig. 2 is a sectional view on line *yy* of Fig. 1, showing the feed-adjusting device. Fig. 3 is a side elevation. Fig. 4 is a horizontal section on line *xx*, Fig. 3. Fig. 5 is an elevation of parts that show immediately behind the line *zz*, Fig. 3. Fig. 6 is an elevation showing parts that relate immediately to the device for transmitting motion from a cam-groove to the presser-foot, being a modification of the device shown in Fig. 8. Fig. 7 is a detail. Fig. 8 is an elevation showing parts immediately behind the line *vv* of Fig. 3. Fig. 9 is a horizontal section on line *ww*, Fig. 8. Fig. 10 is a perspective view of a shoe to illustrate the difference of the length of stitch in the shank and ball, also to show the varying thickness of the sole.

My machine, in its general operation and method of sewing, is the same as the ordinary single-wax-thread machine, and most of the parts are constructed substantially as in the ordinary manner. Therefore I do not consider it necessary to fully describe all of its parts and their operations.

Let B, Fig. 1, represent the awl; B', awl-carrier; B², an arm on the shaft B³ for actuating the awl-carrier, said shaft B³ being operated by the arm B⁴, face-cam B⁵, and cam-pin B⁶. (See Fig. 3.) D, Fig. 1, is the thread-carrier,

which is operated by the rack and pinion D' 50
D², Fig. 4.

C, Fig. 1, is the presser-foot and its rod, made in the usual manner. This presser-foot is actuated by the cam-disk C¹⁰, Figs. 3 and 8. The cam-groove C⁷, acting on the cam-pin C⁸, 55 causes the lever C⁵ to swing on its fixed pivot C⁶, Fig. 8. This motion of the lever C⁵ is communicated through a toggle-clamp, e³, to a swinging block, e², thence to the flatted rod e, thence through the arm C³ to the rocker-shaft 60 C², Fig. 8. From the rocker-shaft C², Fig. 3, motion is communicated to the presser-foot C by means of a slotted arm, C', and a pin, p. (See Fig. 1.)

By the devices shown in Figs. 6 and 8 I am 65 enabled to cause the presser-foot C to rise a fixed distance above the stock being worked, irrespective of its thickness. For instance, the distance the presser-foot shall rise and fall is determined by the shape of the cam, Figs. 70 6 and 8—say one-fourth of an inch—the operating-lever C⁵ passing through that distance at every revolution of the cam C¹⁰, and as the rod e, Fig. 8, is not held by the clamping-toggle e³ except when the lever C⁵ is rising, it 75 may be seen that the rod e may be moved irrespective of the lever C⁵. Thus, if thick stock is placed under the presser-foot, the presser-foot will rest at a distance above the needle-plate of the machine equal to the thickness of 80 the stock, and acting through the arm C', rocker-shaft C², and arm C³, Fig. 8, will hold the rod e up, so that the rod e occupies a position when at rest exactly corresponding with the position of the presser-foot—that is, 85 in a position elevated or depressed corresponding to the thickness of the stock. Now, if we examine the clamping device at e³, Fig. 8, we shall see that in the upward movement of the lever C⁵ the rod e is taken from its position, 90 already determined by the thickness of the stock, and raised to a position above it equal to the full throw of the cam-groove C⁷.

The object of giving the presser-foot a uniform movement above the stock is to obtain a 95 motion regulated by the thickness of the stock that may be transmitted to the hook *h*, so that the vertical movement of the hook shall be

more or less as the stock being sewed increases or decreases in thickness, it being evident that to do good work more length of thread must be used for each stitch in thick work than would be required in thin work.

My device for regulating the motion of the hook *h* by the presser-foot C consists of an arm, F, attached to the rocker-shaft C², link F¹, link F², provided with a pin, F³, which slides in a slot made in the lever F⁴, Figs. 1 and 5, the lever F⁴ being operated by the cam-groove F⁶, which acts upon the pin F⁷. The motion given to the slotted lever F⁴, Fig. 5, is a determined motion about the center F⁵; but the motion it transmits to the link F² is a variable motion, it being greater when the pin F³ is moved upward in the direction of the arrow T and less when it is moved in the opposite direction, and as the position of the pin F³ is governed by the presser-foot mechanism it is evident that the variation in motion of the link F² is governed by the position of the presser-foot C—that is, if the presser-foot is raised by the stock it will cause the rocker-shaft C² to revolve in the direction of the arrow T¹, and thus cause the arm F, acting through the link F¹, to draw the pin F³ up the slot in the direction of the arrow T, thus increasing the motion of the link F². The motion of the link F² is transmitted to the hook *h* by the arm H, rocker-shaft H¹, Fig. 5, arm H², pin H³, and sliding bar H⁴, Fig. 1. In Fig. 6 I have shown a modification of the device shown in Fig. 8 for regulating the motion of the presser-foot. In this case the arm C³ has, instead of the rod *e*, a mortised link-piece, C⁴, which serves to connect it with the lever C⁵. Immediately above the end of the lever C⁵, that enters the mortise in the lever C⁴, I place a wedge, E³, said wedge being connected by a shank-piece, E¹, to an arm, E, which projects from the rocker-shaft C². This wedge E³ presents a thick or thin part between the end of the lever C⁵ and a friction-block, E⁴, Fig. 7, placed in the mortise of the link C⁴, in accordance with the position of the arm E and rocker-shaft C², which position is determined, as has already been explained, by the thickness of the work under the presser-foot.

It being desirable to use stitches of different lengths in sewing shoes, I have invented the following device for the purpose of enabling the operator to change the length of stitch by simply depressing the foot-lever L², Fig. 1. This can be done without stopping the machine or interfering with its work.

K¹, Fig. 2, is a rocker-shaft operated by an ordinary cam motion, and has upon its end a slotted arm, K², the slot being represented by K³.

K⁸, Figs. 1, 2, and 3, is a horizontally-sliding housing which holds the reciprocating bar H¹ of the hook *h*. This housing K⁸ slides horizontally in dovetail grooves. (Represented at *h*, Fig. 2.)

K⁵ K⁶ represent a bolt or stud attached to the sliding housing K⁸ in such a manner that it may slide vertically in the said housing, the part L, Fig. 2, being rigidly attached to the stud K⁵, but free to slide vertically in the housing.

L¹ is a projection on the piece L, and serves to connect the piece L by means of the rod L² to the foot-lever L³. The inner end, K⁴, of the stud K⁵ rests in the slot K³ of the swinging arm K².

R R, Fig. 2, are adjusting-screws which limit the vertical motion of the stud K⁵. As the length of the stitch depends upon the throw of the stud K⁵, it is evident it will be longer when the stud K⁵ is drawn downward the lower end of the arm K², and shorter when it is allowed to rest in a higher position.

S, Fig. 1, is a spring which throws the piece L and the stud K⁵ upward when it is not forced downward by the lever L³. In working this machine the ordinary length of stitch is determined by the upper adjusting-screw, R; but when the operator wishes to lengthen the stitch he places his foot upon the lever L³ and draws the stud K⁵ down.

In Fig. 10 I have shown a shoe sole side up, for the purpose of showing the length of the stitches, but in sewing the shoe its position is reversed—that is, the sole side is down and the welt upward.

I claim as my invention—

1. In a sewing-machine, the combination of the presser-foot bar C and its operating mechanism, consisting of the arm C¹, rock-shaft C², arm C³, and rod *e*, with the cam mechanism for operating the same, consisting of the cam C⁶, cam-groove C⁷, lever C⁵, and clamping mechanism *e*³ *e*², operating together substantially as described, and for the purpose set forth.

2. In a sewing-machine, the combination of the rock-shaft C², the arm F, link F¹, and the slotted lever F⁴, with the cam-pin F⁷, cam F⁶, cam-groove F⁶, link F², having pin F³, arm H, rock-shaft H¹, arm H², rod H⁴, hook *h*, and complementary means, as described, for completing a stitch, all working together substantially as described, and for the purpose set forth.

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Witnesses:

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