

E. L. HOWARD.

Hem-Stitching Attachments for Sewing-Machines.

No. 154,485.

Patented Aug. 25, 1874.

Fig. 1.

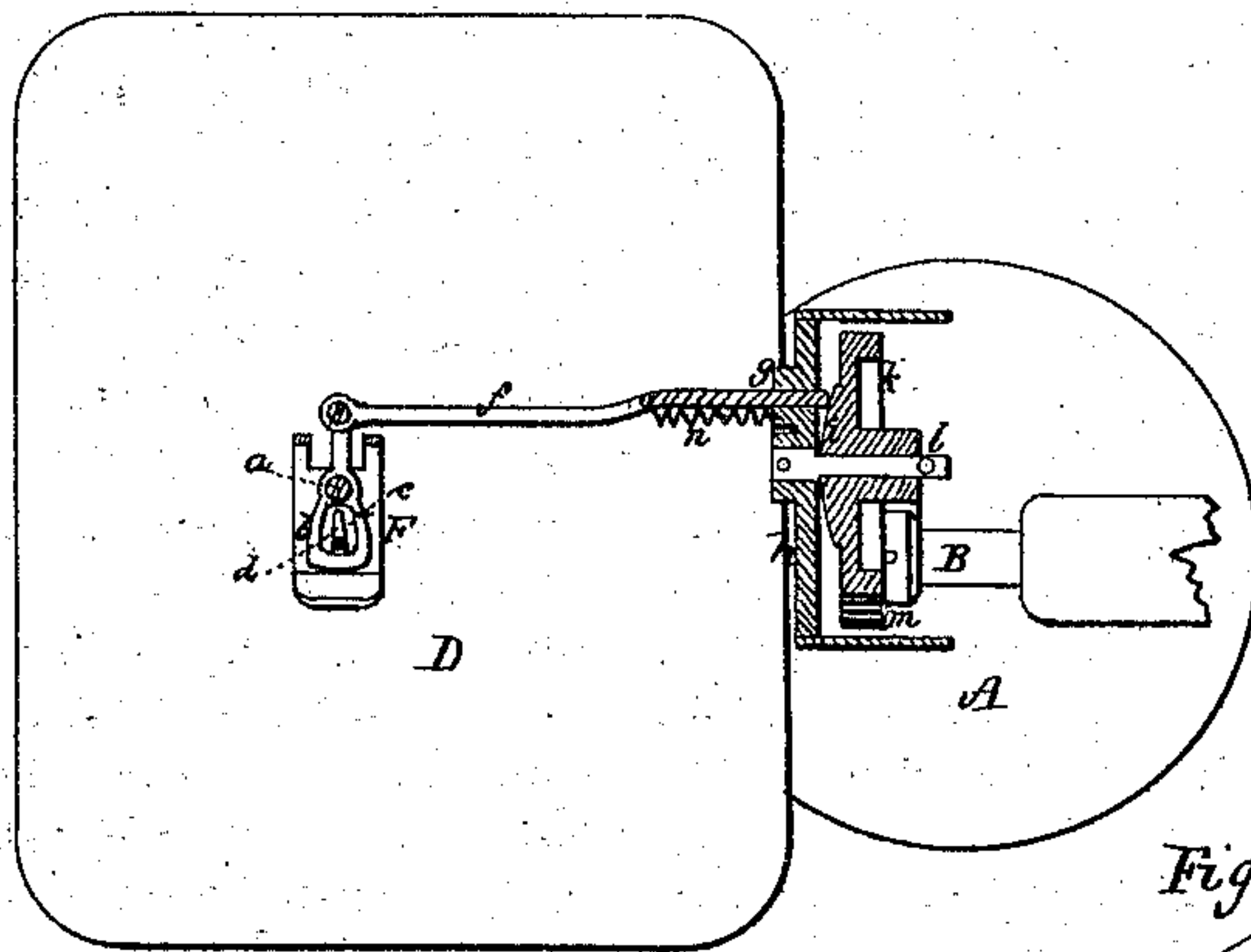


Fig. 3.

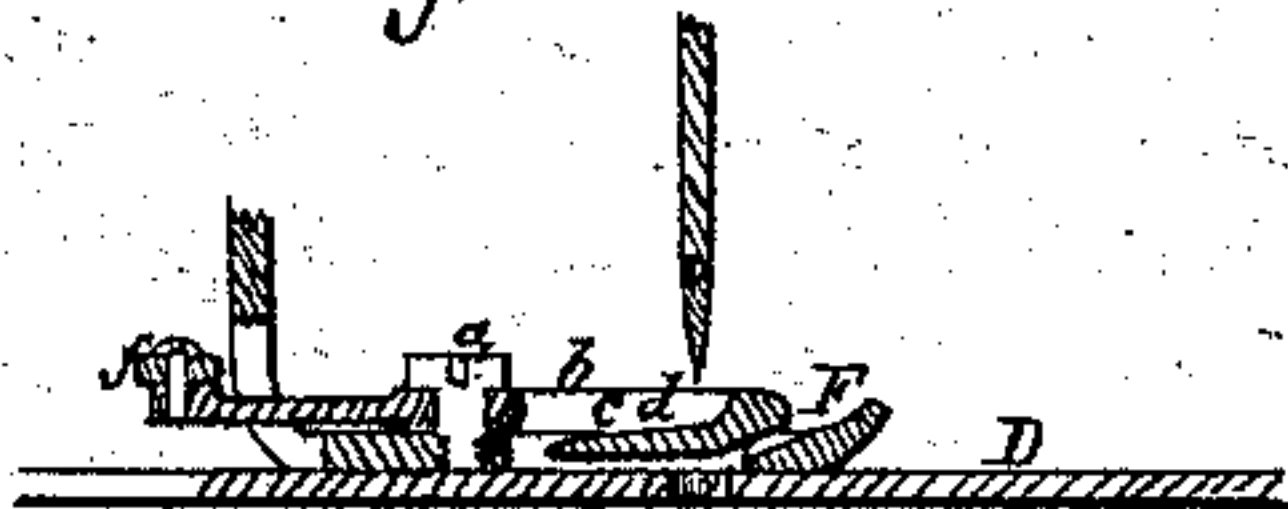


Fig. 4.

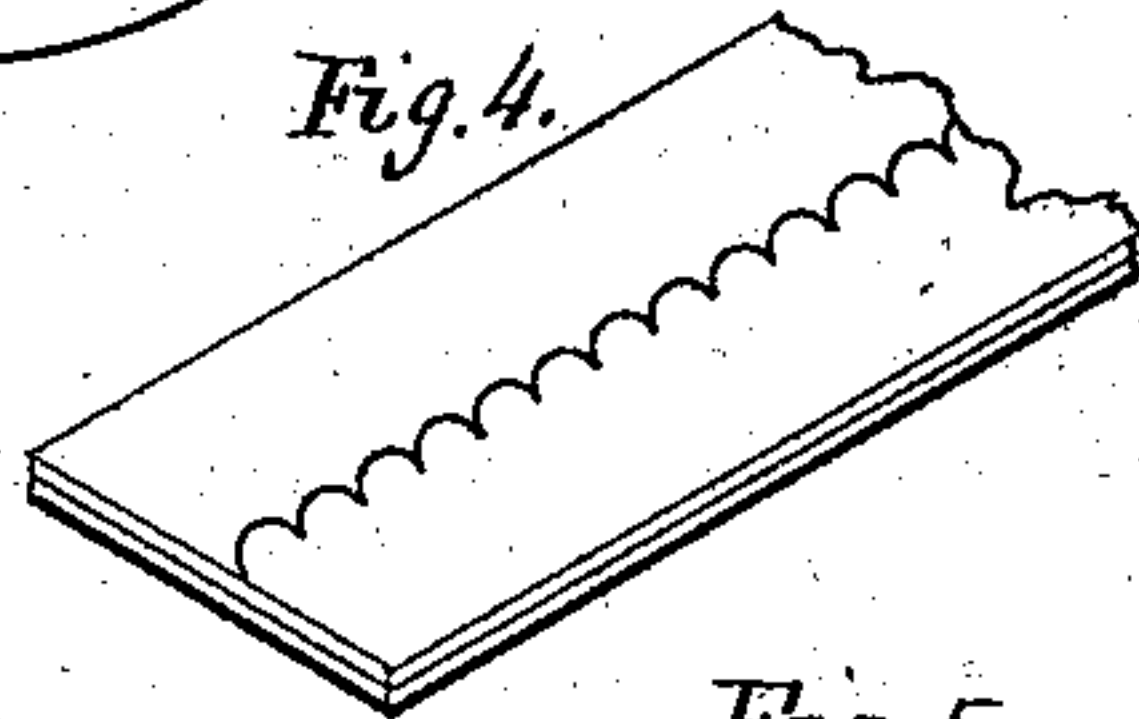


Fig. 5.

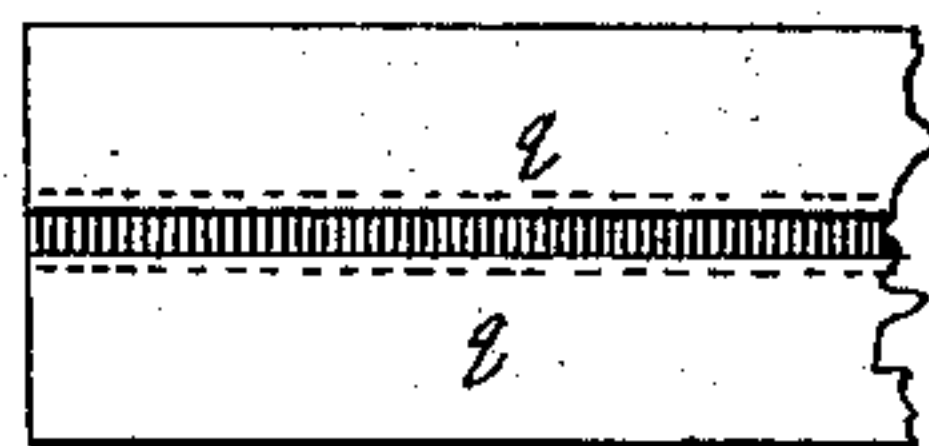
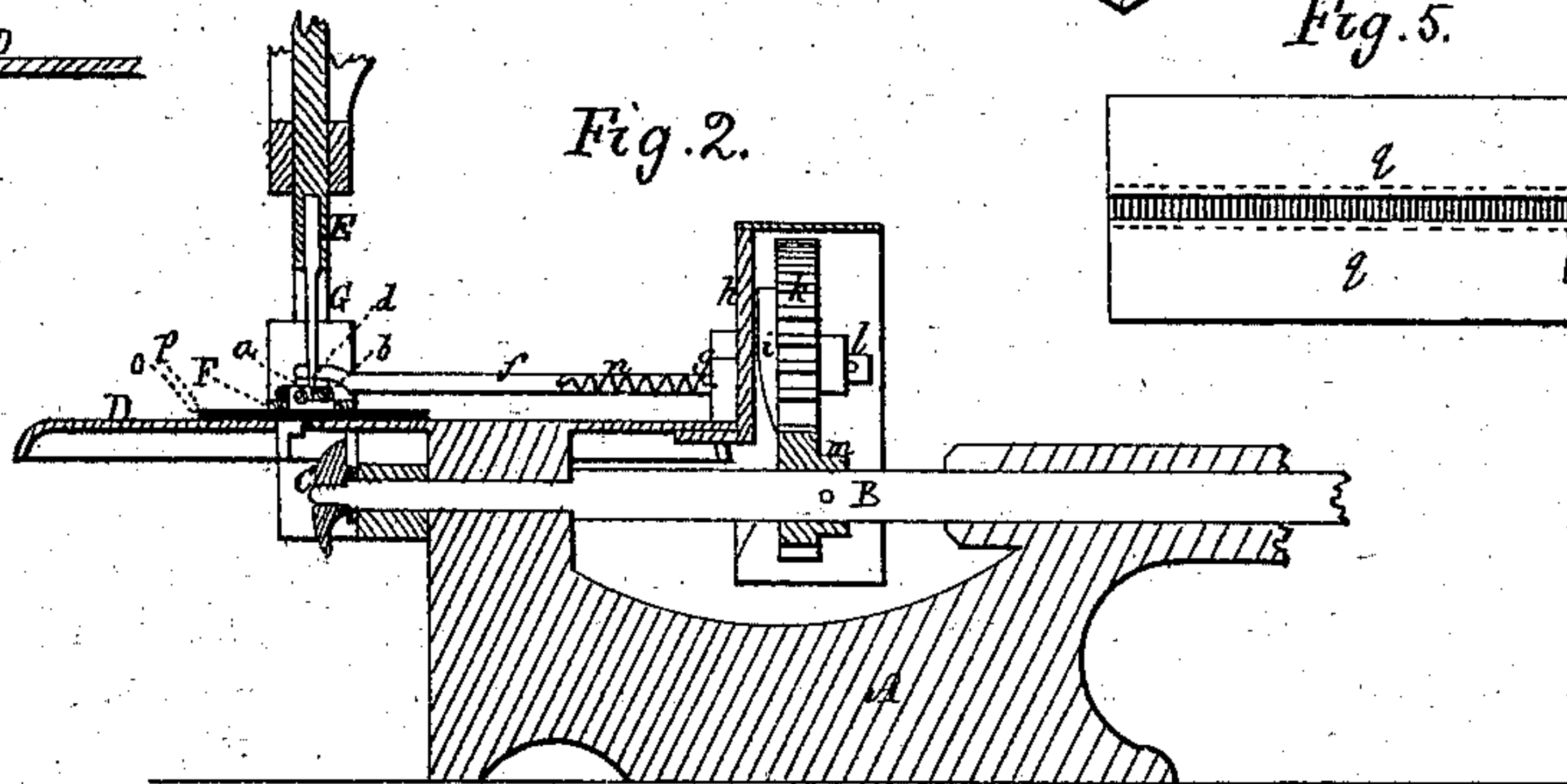


Fig. 2.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN HEM-STITCHING ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **154,485**, dated August 25, 1874; application filed June 22, 1874.

*To all whom it may concern:*

Be it known that I, ELIJAH L. HOWARD, of Boston, Suffolk county, Massachusetts, have invented a certain Hem-Stitching Attachment to Sewing-Machines, of which the following is a specification:

The purpose of my present invention is to execute in various fabrics by machinery, in a simple and economical manner, an ornamental stitch known as hem-stitch; and I prefer, in carrying out my object, to embody the necessary mechanism in a removable attachment, which may be adapted to any and all sewing-machines now in use, rather than to incorporate it in a machine as an elementary part thereof, which would necessitate a machine of peculiar construction. My improvement, in the form as herein exemplified, consists in the employment of a stitch-slackener or horn, pivoted in rear of the needle to or above the presser-foot, and extending in advance of the needle, and so disposed with respect to such needle, or the path of movement described by it, as to swing or vibrate upon such pivot in a horizontal plane to and fro, and from side to side of such needle; the needle or upper thread, as it is being drawn into the material, passing over and including said shifting horn or slackener, the result being that each stitch, as it passes rearward from off the horn or former by the feed or advance of the material, is left slack upon one side of such material to the extent of the size of the former or its degree of elevation above the presser-foot or the material being stitched, the arrangement of parts being such that, before each descent of the needle, the former shifts its position from one side to the other of such needle, and, by interposing itself between the upper thread and material, compels such upper thread or the upper portion of the stitch to form over it.

In the drawings accompanying this specification I have represented, in Figure 1, a horizontal section of a Wilcox and Gibbs sewing-machine with my improvement or attachment applied thereto; Fig. 2 of such drawings being a longitudinal section of such portions of said machine as will illustrate the nature of my improvements. Fig. 3 is a vertical section, on an enlarged scale, of the shifting

stitch-former and presser-foot, to be hereinafter explained. Fig. 4 of the accompanying drawings represents a series of slack stitches as left by the machine prior to stitching the two portions of material apart, while Fig. 5 represents the completed stitch.

In these drawings, which exhibit one practical method of operating the stitch-former, A represents the base or standard of a Wilcox and Gibbs sewing-machine, the driving-shaft of which is shown at B, the rotary hook at C, the sewing-plate at D, the needle-bar or lower portion thereof at E, the presser-foot at F, and the rod which supports the latter at G, such parts constituting the main elementary features of said machine as generally manufactured, and, in themselves, containing nothing of my invention, my employment of such machine, in this instance, being merely for the purpose of showing a practical application of my improvement, which is adaptable to sewing-machines of any construction.

In carrying my improvement into practice, I pivot by a screw or stud, *a*, to the upper part of the presser-foot, and at some point intermediate between its rod or bar G and the needle-bar, a horizontal bar, *b*, the rear-end extremity of which extends rearward of the rod G, and is connected with, and operated by, a pitman, as hereinafter explained, the outer or forward end or portion of the said bar *b* being of an open or annular character, in order to create an inclosure or yoke, *c*, to receive the horn or former and allow the stitch to form about it. From the forward part of the eye *c* a horizontal horn, *d*, extends rearward, such horn being preferably tapering and pointed, in order to permit the stitches or loop formed about it to readily escape from it, and being free and unobstructed at rear to offer no impediment to the shedding of such loops or stitches. The base of the horn *d*, or its point of juncture with the yoke *c*, is disposed slightly in advance of the needle of the machine, which is shown at *e* in the drawings; and in order to vibrate or oscillate the bar *b* upon its pivot, and impart alternating motions of the former *d* in the arc of a circle, I pivot to the tail of said bar *b* one end of a horizontal pitman, *f*, and the opposite end of such pitman I dispose within a bar or



bearing, *g*, making part of an upright standard, *h*, erected upon the inner end of the sewing-plate of the machine, the last-named end of said pitman abutting against a wiper-cam, *i*, formed upon the adjacent face of an upright spur-gear, *k*, which is mounted upon a lateral stud, *l*, projecting from the standard *h* to one side of the bearing *g*, before named, the said gear engaging and being driven by a pinion, *m*, fixed to the driving-shaft B of the machine, the pitman *f* being impelled toward and against the wiper-cam *i* by a spring, *n*, as shown in Figs. 1 and 2 of the drawings, or by any suitable means.

Rotations of the pinion *m* effect corresponding rotations in an opposite direction of the gear *k*, and with each revolution of such gear the bar *b*, by the action of the cam *i*, pitman *f*, and spring *n*, is compelled to vibrate or oscillate upon its fulcrum, the parts being so timed that, after each ascent of the needle, and while it is out of the material and above the horn or former *d*, the latter, as before stated, shifts its position from one side of the needle to the other, and, consequently, compels such needle to carry its thread through the material alternately upon opposite sides of such former.

In hem-stitching with my improved attachment, two bands or pieces of fabric are laid upon one another and run, together, through the machine, as shown by the black lines *o p* in Fig. 2 of the drawings. As the feed advances the fabric, a series of stitches are formed about or over the former, and pass away or shed from its rear and pointed end, and are left in a series of loose loops, as shown in Fig. 4. Each band or portion of fabric is now doubled or folded upon itself, and the two stretched as far apart as the length of the stitches will permit, both the upper and under line of rows of stitching, which in the machine were outside of the fabric and visible, being now concealed by the fold of cloth, the result being the hem-stitch shown in Fig. 5.

To heighten the ornamental appearance of the work, and otherwise add to the strength and durability of the stitch, one or more rows, *q*, of stitching may be executed upon each doubled piece of fabric immediately inside of its margin or fold, as shown, also, in Fig. 5.

The distance of separation of the two halves or portions of fabric when the stitch is completed, and, consequently, of the length of the hem-stitches, is governed by the size of the former or horn, or its distance above the fabric; and, in order to vary the length of these stitches, interchangeable horns of different sizes may be provided, or one alone may be

employed, so combined with the bar *b* as to be adjustable in height or position with respect to the fabric.

I do not confine myself to pivoting or mounting the shifting-horn or its support upon the presser-foot, although this is a convenient locality, as it may be found, in practice, practicable to attach it to the presser-foot bar or other portion of the machine. Nor do I confine myself to operating this bar by a pitman, as shown, as it may be driven by the needle-bar or by other method, as it would manifestly be a mere variation in mechanical details, which would occur to the mind of any good mechanic, as to the best position of the shifting-horn, or the means adopted for actuating it.

I propose varying the character of the stitch produced by my apparatus by making the horn *d* tubular, and passing through it a cord of any desired material or color, which shall be fed along with the material, and fill the loops as they are shed from the horn and inclose the cord.

I claim—

1. An attachment for sewing-machines to create a hem-stitch, consisting of a bar or horn pivoted to the presser-foot or other portion of the machine, and vibrating or oscillating with respect to the needle or path of movement of the latter, in such manner as to compel the formation about such bar or horn of a succession of loose stitches, substantially as and for purposes stated.

2. The bar *b*, constructed as herein shown—that is, as containing as part thereof the loop portion or eye *c*, or an equivalent construction, and horn *d*, under such an arrangement, substantially as herein shown, that each and every loop of thread formed over the horn is free to pass unobstructed from the point or free end of the latter as the fabric is fed along, essentially as and for purposes stated.

3. The oscillating or vibratory bar, bearing as an attachment or part thereof a horn or former, about which the thread forms in loose bights when pivoted to the presser-foot, substantially as and for purposes stated.

4. The herein-described mechanism for actuating the shifting-bar *b*, consisting of the pitman *f* and cam *i*, the pitman being impelled against the cam by a spring or otherwise, and the cam rotated by suitable means, substantially as and for purposes stated.

E. L. HOWARD.

Witnesses:

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W. E. BOARDMAN.