

J. H. BROWN & L. MAYER.
Hem-Stitch Sewing-Machine.

No. 227,375.

Patented May 11, 1880.

Fig. 1.

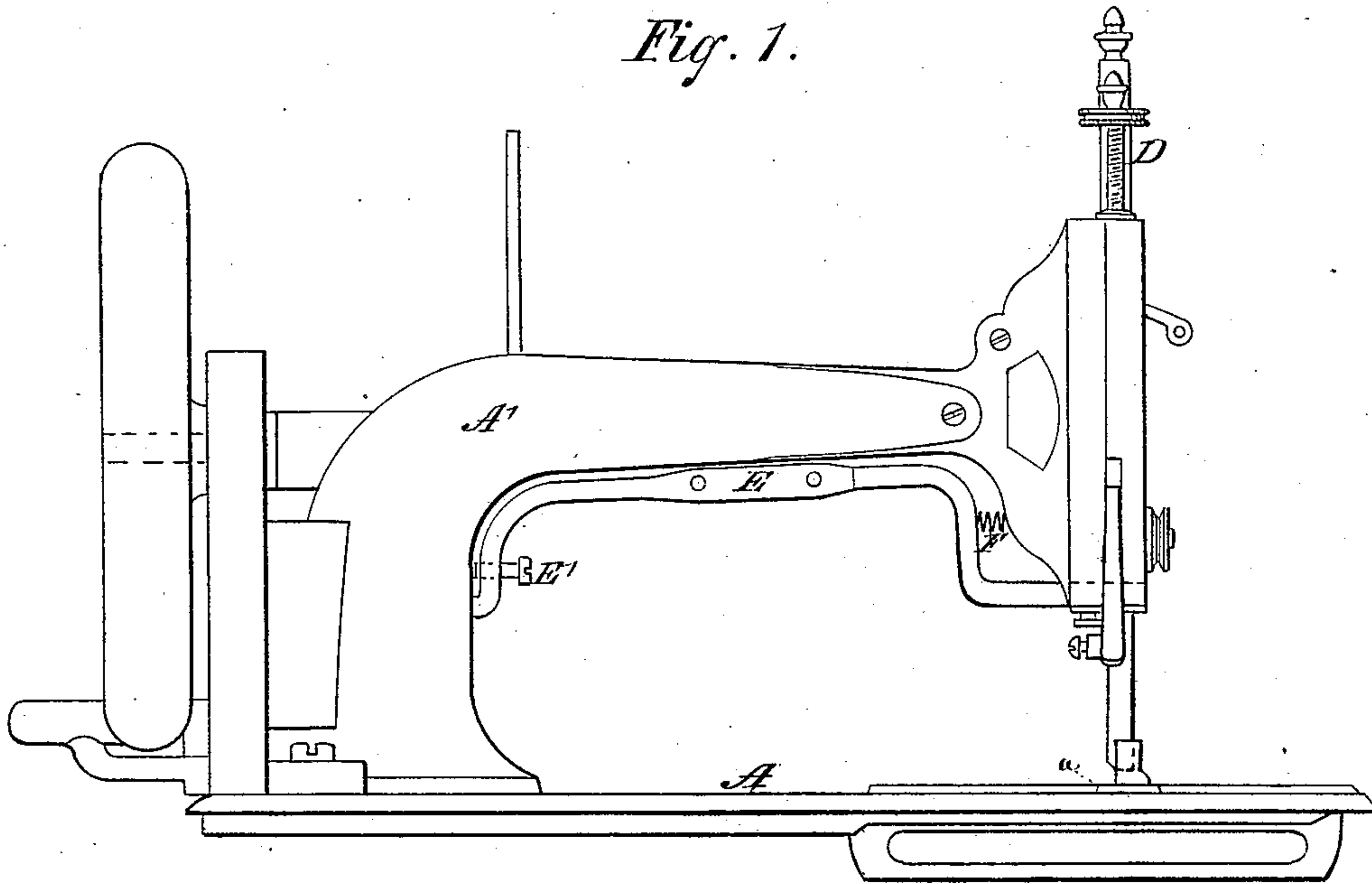
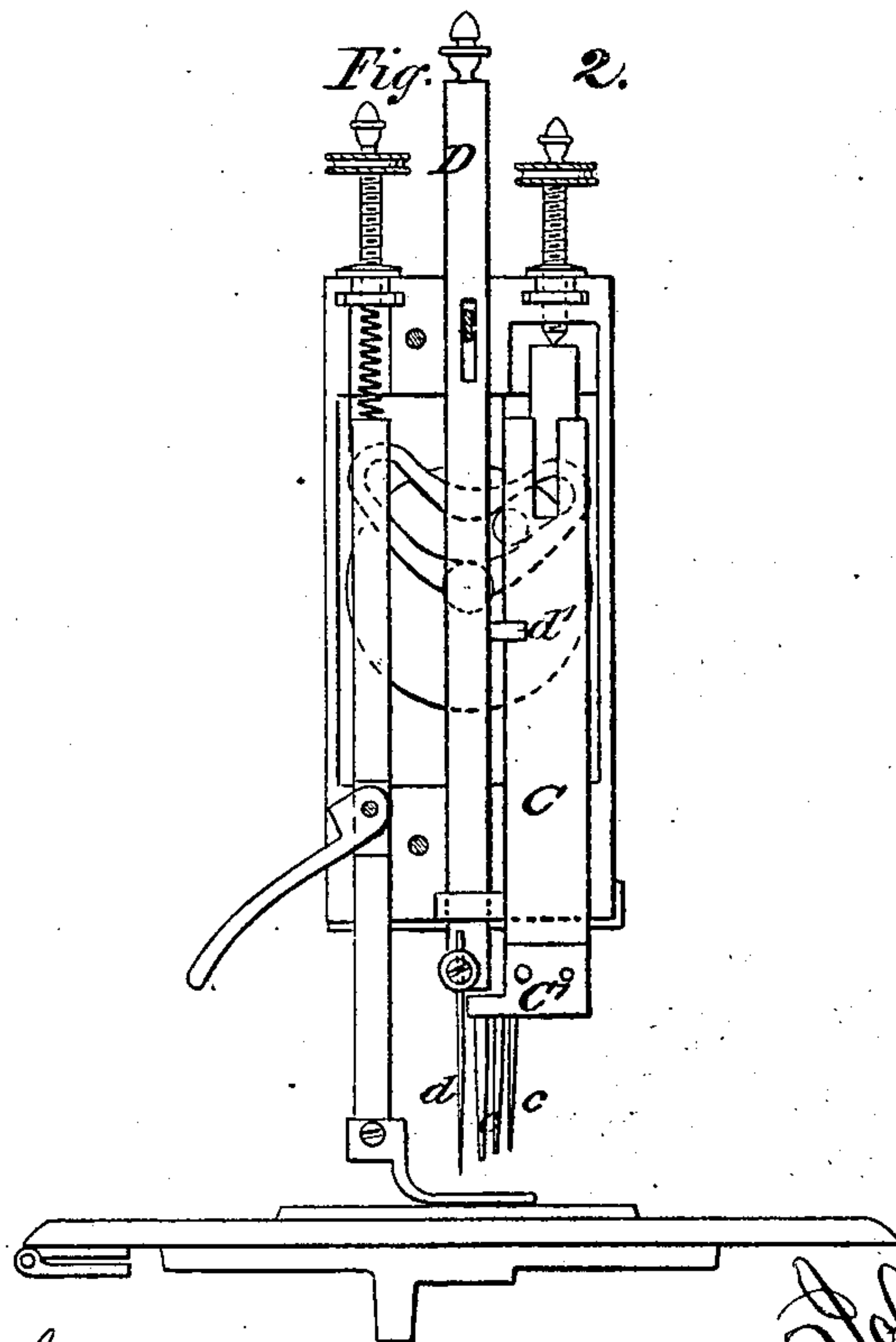


Fig. 2.



WITNESSES:

Charles C. Stetson
E. B. Bolton

INVENTOR:

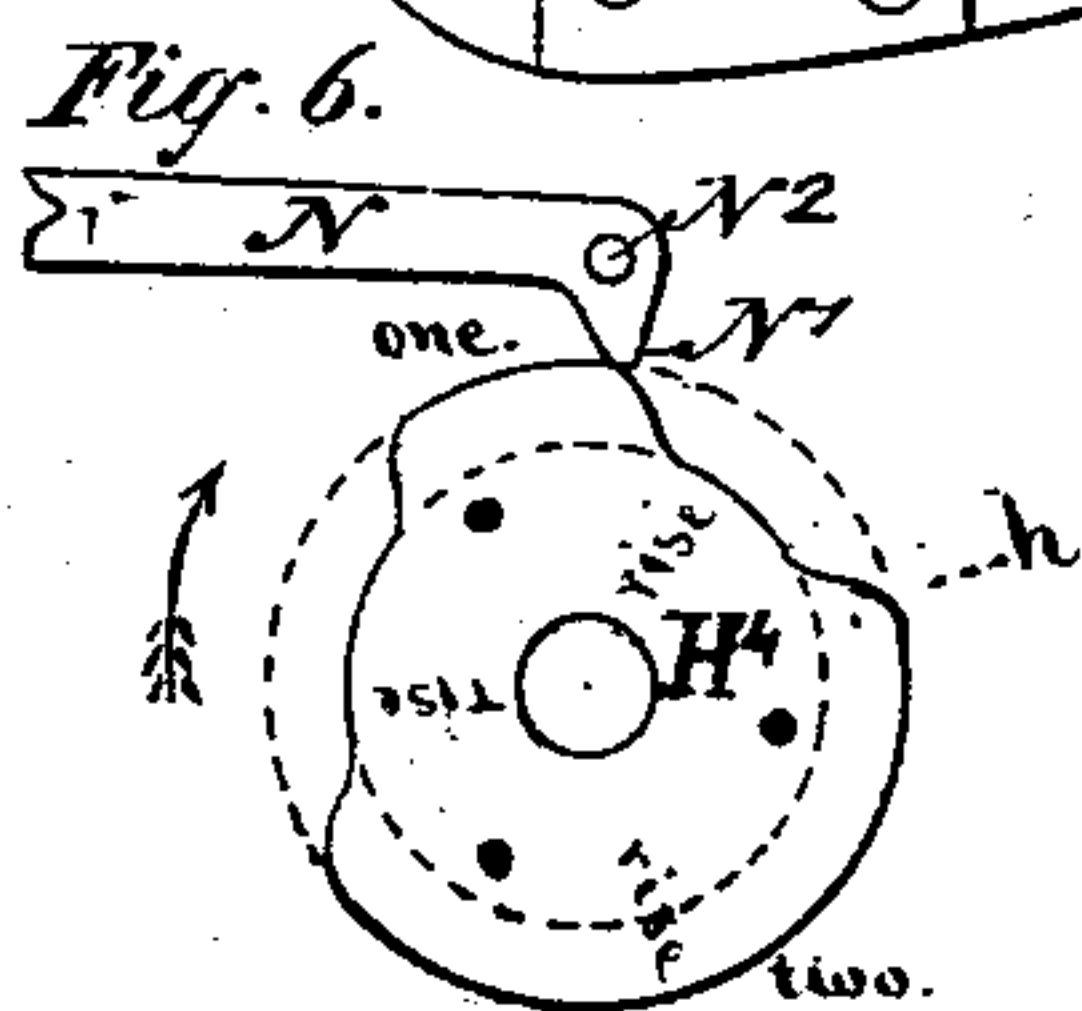
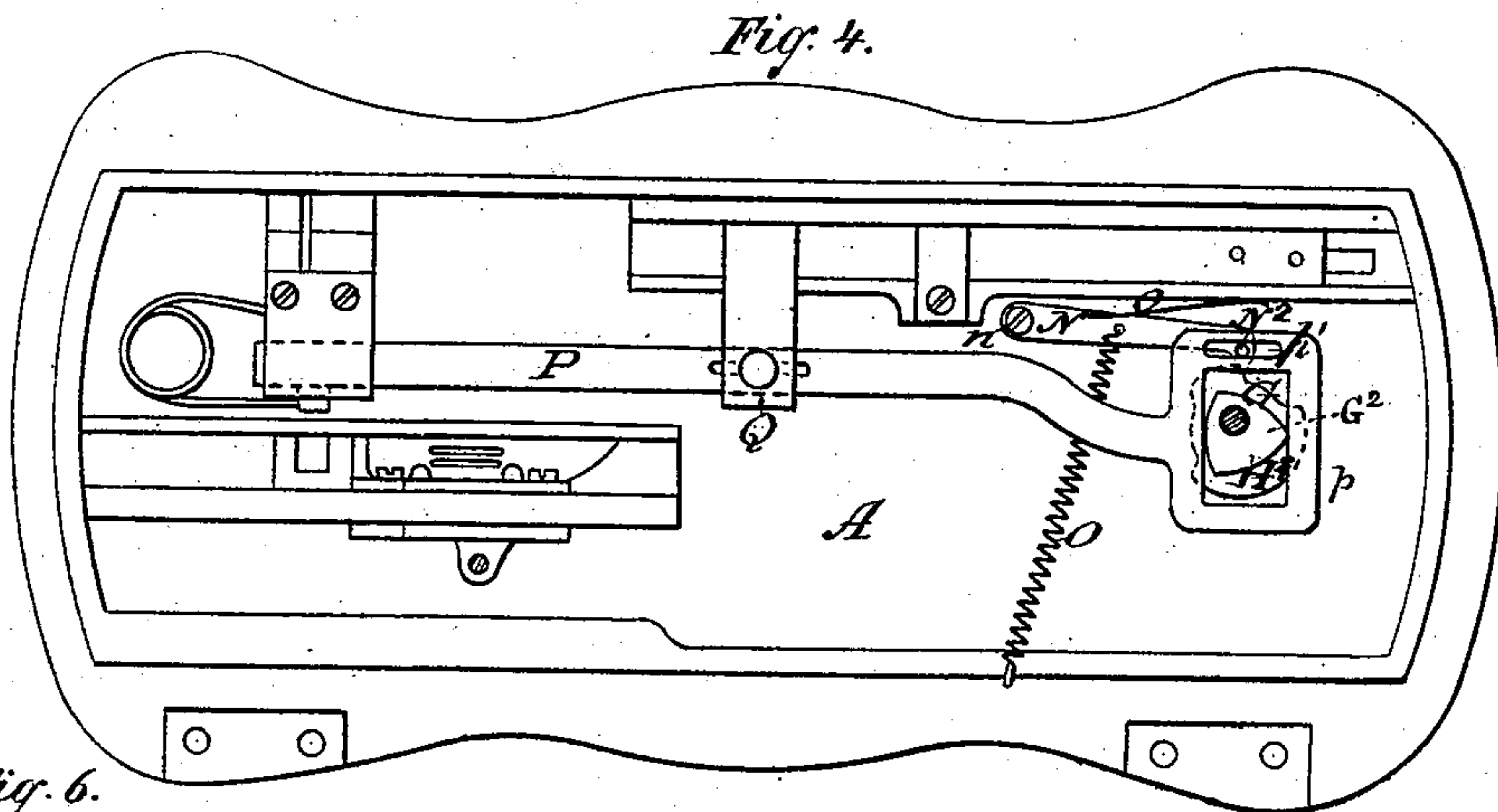
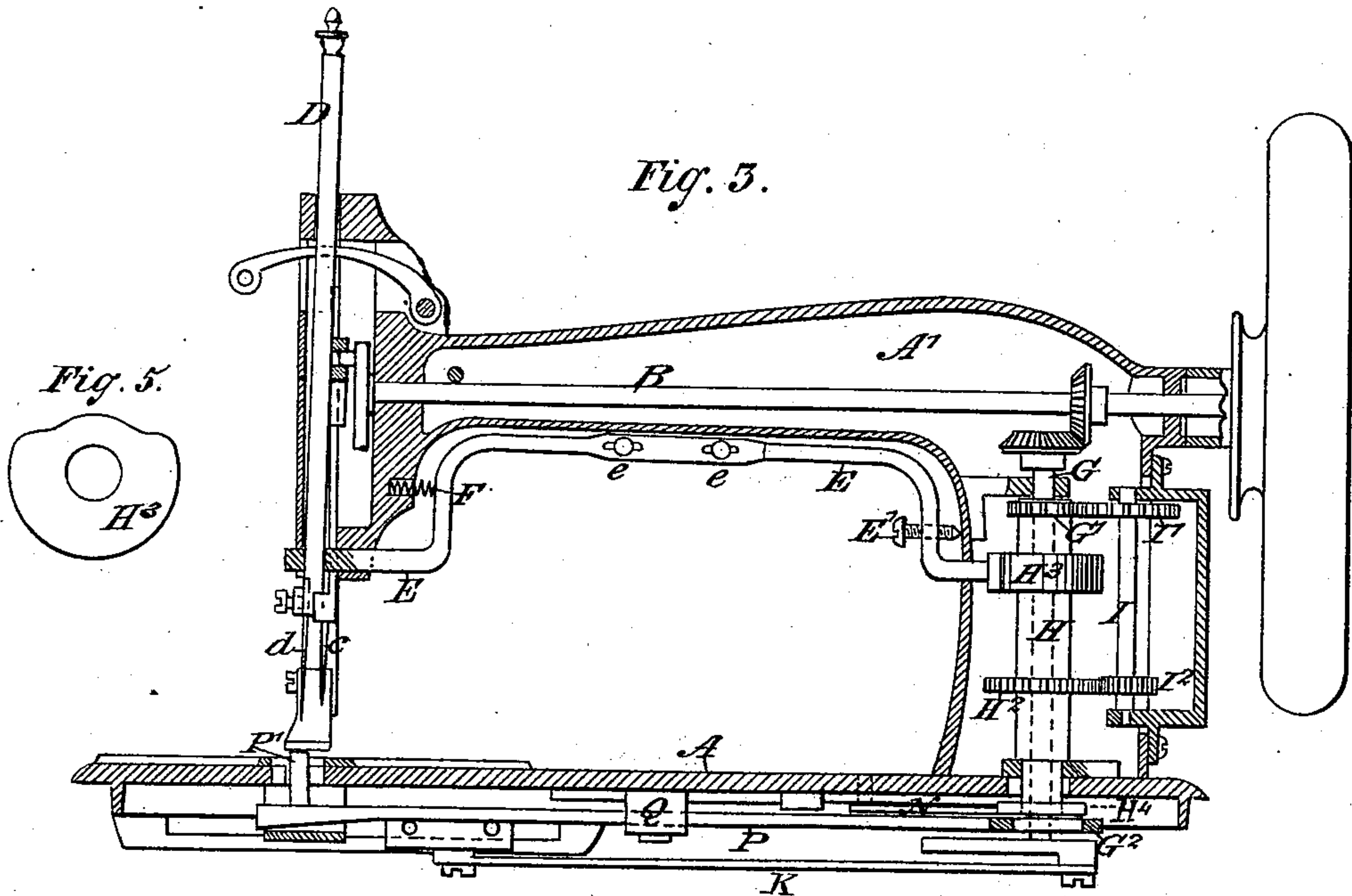
John H. Brown
Louis Mayer.
BY *Thomas D. Stetson*

ATTORNEY.

J. H. BROWN & L. MAYER.
Hem-Stitch Sewing-Machine.

No. 227,375.

Patented May 11, 1880.



WITNESSES:

Charles C. Stetson
E. B. Bolton

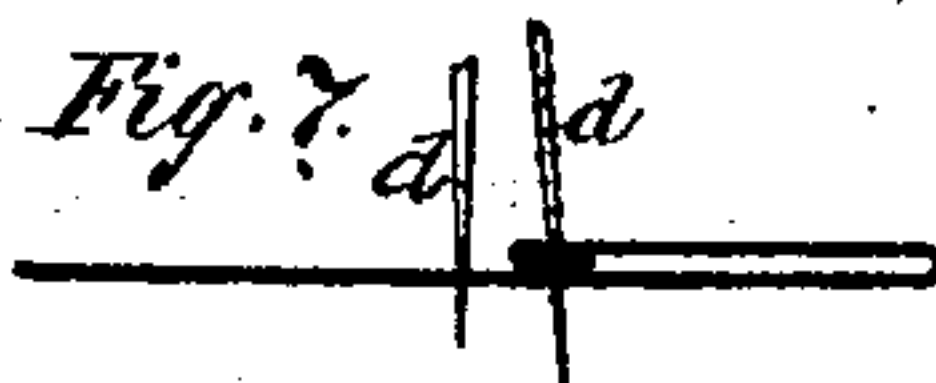


Fig. 8.

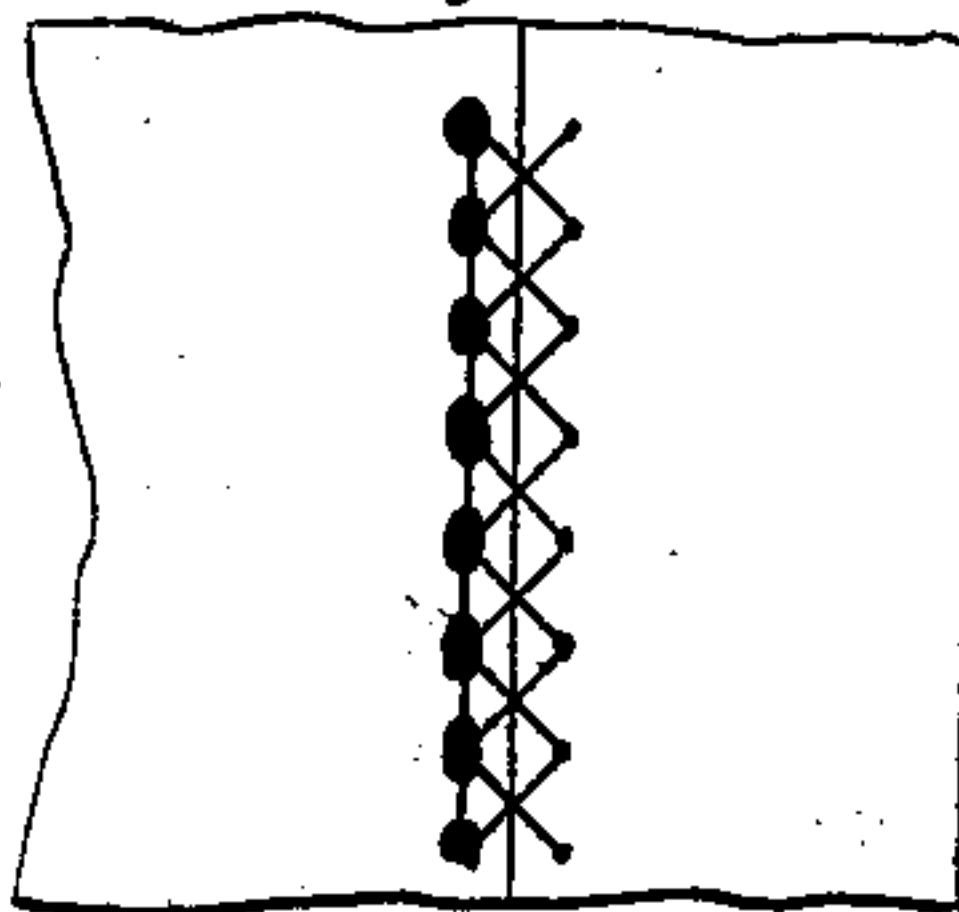
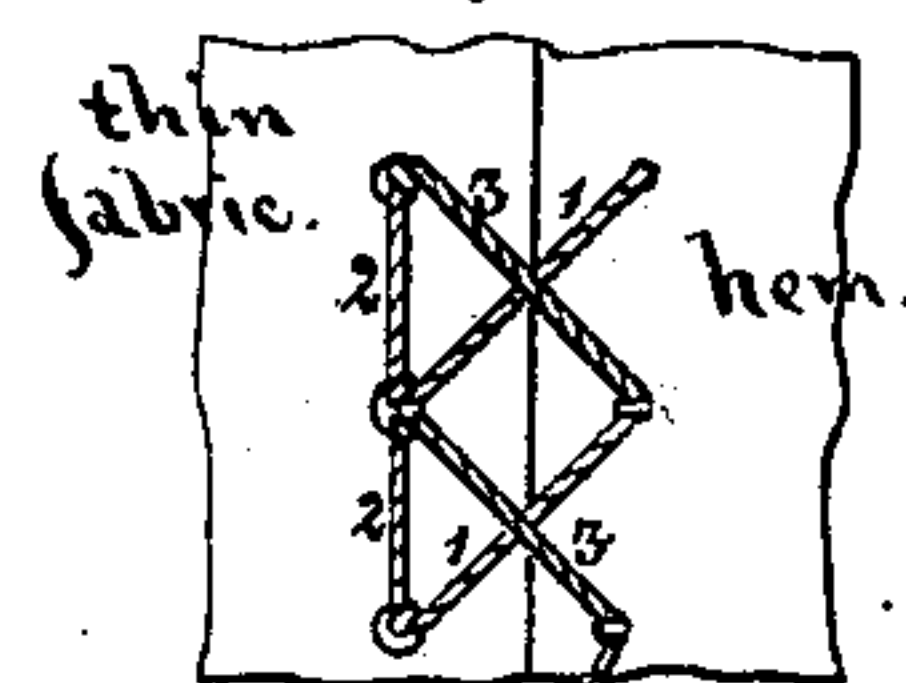


Fig. 9.



INVENTOR:

John H. Brown,
Louis Mayer.
BY Thomas S. Stetson

ATTORNEY.

UNITED STATES PATENT OFFICE.

JOHN H. BROWN, OF BROOKLYN, AND LOUIS MAYER, OF NEW YORK; SAID
BROWN ASSIGNOR TO WILLIAM KAYTON, OF NEW YORK, N. Y.

HEMSTITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 227,375, dated May 11, 1880.

Application filed July 17, 1879.

To all whom it may concern:

Be it known that we, JOHN H. BROWN, of Brooklyn, Kings county, in the State of New York, and LOUIS MAYER, of New York city, in the State of New York, have invented certain new and useful Improvements relating to Hemstitch Sewing-Machines; and we do hereby declare that the following is a full and exact description thereof.

There is a variety of hand-made sewing, known as "hemstitching," which is justly admired for its utility in securing hems, and particularly for its ornamental appearance. The stitches are so taken that the tension of the threads tends to produce ornamental openings, which, being regularly spaced by the stitching, conduces much to ornament the goods without increasing the cost.

Our machine produces a very similar stitch with great perfection, and may be operated with rapidity.

By our mechanism the fabric is fed forward two steps, and then fed backward one step. Thus three steps are taken to one step of actual progress. The work is proportionally slower than straightforward sewing; but the threads are crossed on both faces of the fabric, and all the strength and ornamental effect of the hemstitch is obtained, with the increased perfection and beauty due to the invariable regularity of machine-work.

The threads are caused to draw with a proper amount of tension, the holes being also enlarged by other special devices, so as to produce ornamental openings in the fabric without the necessity for drawing out yarns, ordinarily practiced in hand-work.

We so adjust the tension and so conduct the operation that the openings shall when first made be a little larger than necessary. The laundering causes them to partially fill up and be left exactly right.

The following is a description of what we consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a general side elevation of the machine. The succeeding figures represent certain parts detached, on a larger scale. Fig.

2 is a front elevation, showing the lower end of the presser-foot, needle-bar, and certain accompanying parts. Fig. 3 is a side elevation, showing the parts which shift the position of the needle-bar toward and from the operator at certain times. This shows also some of the mechanism which gives the peculiar feed motion. Fig. 4 is a reverse plan view of some of the parts actuating the feed. Fig. 5 shows the form of the slowly-rotating cam which induces the required movement of the needle to right and left. Fig. 6 is an enlarged view of the cam, which also, making only one revolution for every three stitches, gives to the feed the required two motions forward and one motion backward. Fig. 7 is a cross-section through the fabric, showing the diverse positions of the needle for the two lines of stitches. Fig. 8 is a top view of the fabric. Fig. 9 is a diagram, showing the succession of the stitches. Similar letters of reference indicate like parts in all the figures.

A A' is the fixed frame-work, and B the main shaft, receiving constant revolving motion in the ordinary manner. (Not represented.) These parts, as also the fly-wheel, tension-regulating and take-up devices, the shuttle, and the means for operating and guiding the same, may be all of the ordinary character.

D is the needle-bar. It carries a needle, *d*, of any ordinary or suitable character for sewing-machine work, and is reciprocated up and down by a cam on the main shaft B in the ordinary manner. Its lower end is controlled by a guide, which is moved outward and inward to effect the crossing of the stitches.

Two lines of punctures are entered by the needle, one line on the fabric close to the inner edge of the hem, and the other on the hem. A crossing of the threads is induced by a change of position of the lower end of the needle-bar as the several stitches are successively taken.

E is the guide for the needle-bar. It is formed in two pieces spliced together, extending along under and partly recessed into the fixed arm A'. The splice is formed by screws *e*, which, being inserted through holes slightly elongated, allow it to be lengthened and shortened, if required. The construction in two

pieces facilitates the introduction and removal of this guide. It rests on a support at each end. A spring, F, urges it always inward or in the direction to the right. The set-screw 5 E', striking against a suitable fixed surface, determines how far it is to move in that direction. That fixes the position of the line of stitches which is produced on the hem.

A cam, H³, which makes only one revolution for each three stitches, at certain times 10 throws the guide E, and consequently the needle-bar D and the needle d, outward, or to the left, to produce the line of stitches through the single fabric. We effect this, and also a peculiar movement of the feed, by the aid of the 15 sleeve H, mounted loosely upon the ordinary upright shaft G, which latter is connected to the main shaft by beveled gears, as usual, and performs its usual function of driving the 20 shuttle by ordinary means below. The proper slow motion is communicated through the medium of a back geared shaft, I, carrying two gear-wheels, I' I². The uppermost gear engages with a small gear-wheel, G', on the shaft 25 G. The lower back gear-wheel gears with a large gear-wheel, H², on the sleeve.

The uppermost cam is marked H³. At each third revolution of the shaft G said cam H³ 30 acts on the guide E and throws the needle-bar temporarily into the position required for the line of stitches through the single fabric. The return motion of the guide E and its connections is induced by spring F.

Another function is performed by the slow 35 sleeve H—that of inducing the required succession of two forward and one backward feed-movements. The feed-operating lever P has the compound endwise and vibrating motion common to what is known as the "Singer" sewing-machine. It may be briefly described as 40 sliding endwise through a rocking guide, Q, and thus, by an ordinary incline or wedge surface at the working end, being made to induce, with the aid of a spring, or, as we show 45 and prefer, two springs, O O, the proper rising-and-sinking motion of the ordinary roughened feeder P', and at the same time rocking or oscillating on the axis of this guide Q as a center of motion to induce the proper forward- 50 and-backward motion of the feed.

But the yoke p at the end which receives motion is peculiar. It receives the required right-and-left motion at each revolution of the main shaft by means of a cam, G², fixed on 55 the quick-turning shaft G. This cam works in a slot, p', in the yoke p. The cam G² never touches the yoke except on the straight faces at the right and left. The yoke is always free to be moved forward and backward by means 60 independently of the cam G².

Cam G² is mounted on the shaft G. The latter does not stand in the center, but near one of the three corners. It will be understood that the cam is the ordinary well-known 65 three-cornered cam used in parallel yokes in Mississippi steamboats and elsewhere to induce a sharp and quick thrust alternately in

opposite directions, with a period of rest after each thrust.

The terms "forward," "backward," "to the 70 right" or "left" in this description have reference to the well-understood position of the operator in relation to the machine when at work.

The movement forward and backward is imparted from the slow-turning sleeve H through 75 the medium of a lever, N, which turns on a fixed center, n, and is actuated by one or more springs, O, and the cam H⁴. This lever presents a slightly-rounded projection, N', which 80 is held by springs O in contact with the said cam H⁴, so as to receive a motion therefrom according to the form of the cam.

It will now be seen that the lever N is actuated in one direction by the cam H⁴, and in 85 the other direction by the springs O, and that it engages the yoke by its projection N² in the slot p, and compels a corresponding lateral movement of that end of the bar P, and a corresponding movement in the opposite direction 90 at the other end of said bar, without interfering with the longitudinal motion of said bar.

The form of the cam H⁴ is clearly shown in 95 Fig. 6. Its circumference is represented as divided into three equal parts by the marks "rise." These indicate points in the cam which are successively in contact with the lever N at the periods when the feed-surface is 100 elevated by the feed-operating lever P. The intermediate dots indicate the parts of the cam which are in contact with the lever at the times when the feed-surface is lowered. By following the periphery of the cam it will be 105 seen that the swell "one" comes immediately after the rise. It induces a forward movement of the feeder, and consequently of the fabric being sewed. The succeeding sink of the feed-surface occurs while the feeder is in 110 the extreme forward position. The result is a feed forward. The next swell, "two," acts on the lever N immediately after the next rise of the feed-surface. This position of the feed-surface, and consequently of the goods, holds 115 through the next sinking motion of the feed-surface. The consequence is a second feed forward. But, now, instead of, as before, presenting to the lever N a contraction of the cam, the cam remains of the full diameter, and consequently the feed-surface is held at its extreme 120 forward position until after its next rise. It follows that the feed-surface on thus rising gets hold of the goods in its extreme forward position. Now, a contraction of the cam at h becomes effective, and, instead of a push of 125 the feed-surface in such a direction as to feed forward the goods previous to the next sinking motion, there is a movement in the opposite direction or backward toward the operator. It follows that the feed-surface and the 130 fabric to be sewed are moved backward at this feed movement, and the succeeding sinking of the feed-surface moves the goods one step backward instead of one step forward. This pecu-

liar motion of the feed-surface is repeated indefinitely—two strokes forward and one stroke backward.

The movement of the guide E, and consequently of the needle, forward and backward being properly timed, the effective results of the three movements are as follows:

First. There is a movement of the goods from the operator, (forward) and a movement of the needle outward—that is to say, a movement to the left. This makes one oblique forward stitch across from the hem onto the thin fabric.

Second. There is a movement of the goods toward the operator (backward) and no change of line of the needle. The result is a stitch directly backward, entirely on the thin fabric.

Third. There is another movement of the goods from the operator (forward) and a movement of the needle to the right. This induces a second inclined stitch from the thin fabric onto the hem, stretching forward but inclined in the opposite direction to the first. This series is repeated indefinitely.

The mechanism, so far as now described, may be used with some success, and the threads being inserted with the proper tension will strain open the punctures produced in the thin fabric, so as to, in a good degree, produce the desired effect; but it is always preferable, and in some material is quite important, to employ the additional parts now to be described, which puncture the thin fabric in advance of the needle and open the holes to about the proper size.

C is a slide mounted alongside the needle-bar D, and caused to partake of its vertical motion by means of a pin, d' , which is set in the needle-bar and engages in a transverse slot in the slide C, as plainly shown in Fig. 2. This slide C is capable only of a vertical motion. It does not partake of the motion of the needle to the right and left. A detachable piece, C' , attached to the lower end of the slide C, reaches partially under the needle-bar and supports a series of dividers, c . They prick the fabric at the proper distances apart in advance of the needle.

The first divider is slenderer and may be somewhat shorter than the next. The third is the largest, and may be a little the longest. The first pricks a small hole in the fabric. This hole is enlarged by the action of the second divider, and the hole is still further enlarged by the action of the third divider. This action is somewhat complexed by the fact that each third feed-movement has a backward movement of the goods; but the feed-movements forward and backward being all to an equal extent, the effect is not disturbed. The general result is the puncturing of a large hole, considerably larger than is required for the needle d , but just what is required to allow for the partial filling up which results from enlarging after the threads have been put in with the proper tension. It will be understood that the needle d travels through a large

opening made by the dividers c , and that the threads are engaged together, and the entire formation of the stitch proceeds the same as if there had been no punching, except that there is no considerable tension required on the threads to draw open the fabric, because the fabric has been already opened by the positive and uniform action of the dividers c .

Our sewing-machine may have all the ordinary attachments and adjustments.

The necessity for having the dividers c the same distance apart as the extent of each feed-movement interferes with the facility for changing the feed at will. Care must be taken to correspondingly change the distances of the dividers c from each other whenever any change in the feed is made.

In working we propose to have a series of adjustable pieces, c' , each having the dividers c differently arranged, so as by changing these pieces to readily equip the machine for all the changes of feed which are ordinarily required.

The movement of the needle to the right and left obviously involves the necessity for a hole in the presser-foot and in the cloth-plate, or its equivalent, which is correspondingly elongated in the same direction; also, the dividers c involve the necessity for making corresponding holes in the presser-foot and in the cloth-plate or surface which corresponds thereto.

In our experiments we have found it desirable to make the presser-foot with a long continuous opening in the direction of the feed of the goods. This allows the same presser-foot to serve with all the positions of the dividers which may be required; but we have provided a removable piece, a , in place of the movable cloth-plate, and have provided it with holes corresponding to the position of the needles. This piece a , of course, requires to be changed with each change of the positions of the dividers c .

K is the rod moving the shuttle in the ordinary manner.

Modifications may be made. We can increase the number of the pointed dividers or cloth-openers c , or a smaller number may serve.

Although in most cases we can keep the great mass of the fabric on the outside of the line of stitches, we may, in some kinds of goods and under some circumstances, require to accumulate a considerable mass on the inside. This can be done with our machine, as with others, by gathering the fabric into a mass and passing it through under the arm.

We give the arching form represented to the guide E in order to give ample space for such an accumulation of fabric, and also to allow the guide to act at a low point on the needle-bar D, and induce the proper motions by a swinging of the needle inward and outward, while the upper portion of the needle-bar plays through a fixed guide and has no such motion.

We claim as our invention—

1. In a sewing-machine, the slide C C' and

dividers *c*, as shown, and needle-bar D, having pin *d'*, as shown, combined and arranged to serve as and for the purposes herein specified.

- 5 2. The feed-operating bar P, having yoke *p* and slot *p'*, in combination with the cams $G^2 H^4$, and with the lever N, pin N^2 , and spring O, as herein specified.

In testimony whereof we have hereunto set our hands this 1st day of July, 1879, in the presence of two subscribing witnesses.

JOHN H. BROWN.
LOUIS MAYER.

Witnesses:

CHARLES C. STETSON,
EDITH BROOKES.