

No. 644,396.

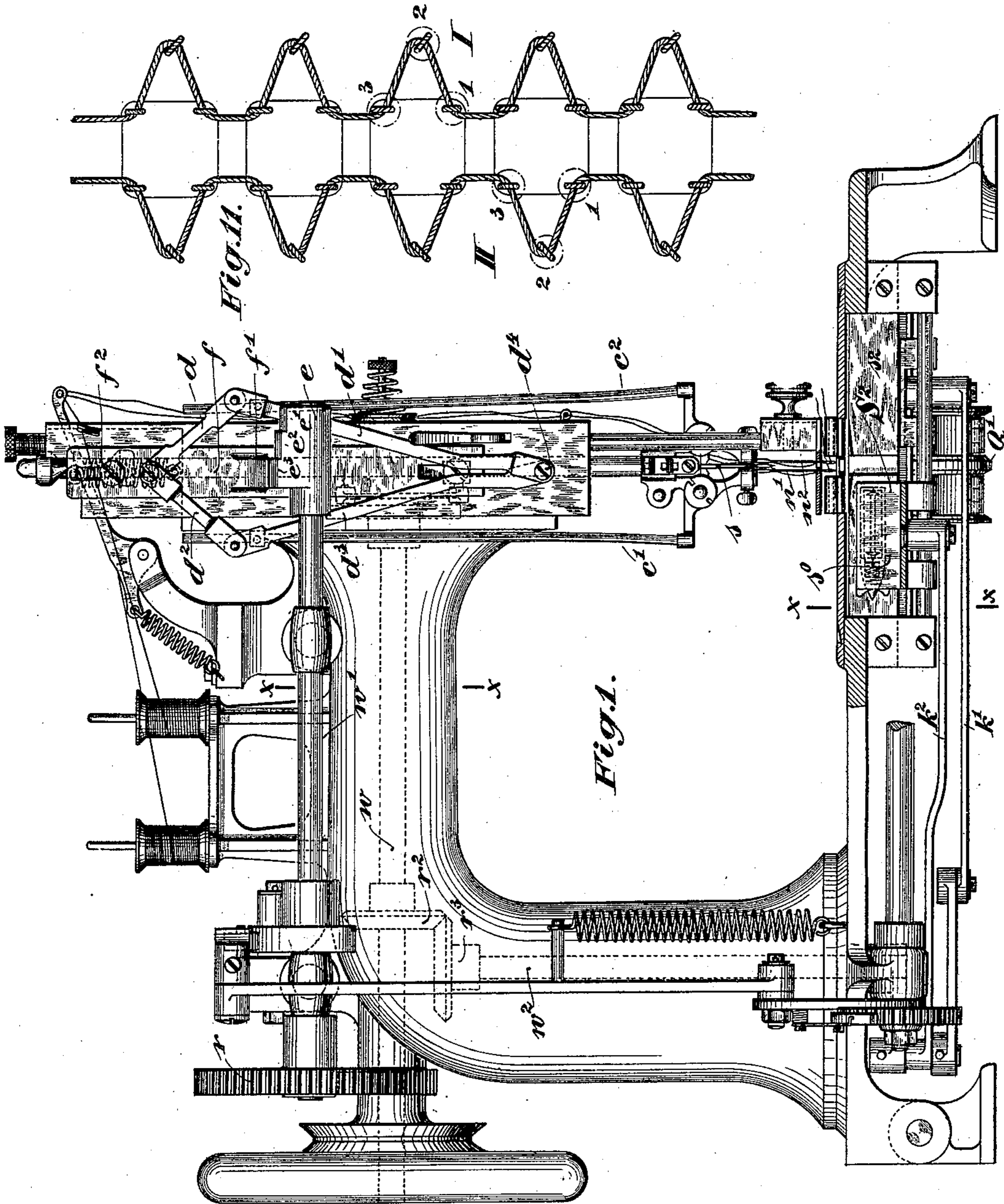
Patented Feb. 27, 1900.

G. BAUM.  
HEMSTITCH SEWING MACHINE.

(Application filed Nov. 10, 1897.)

(No Model.)

4 Sheets—Sheet 1.



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4 Sheets—Sheet 2.

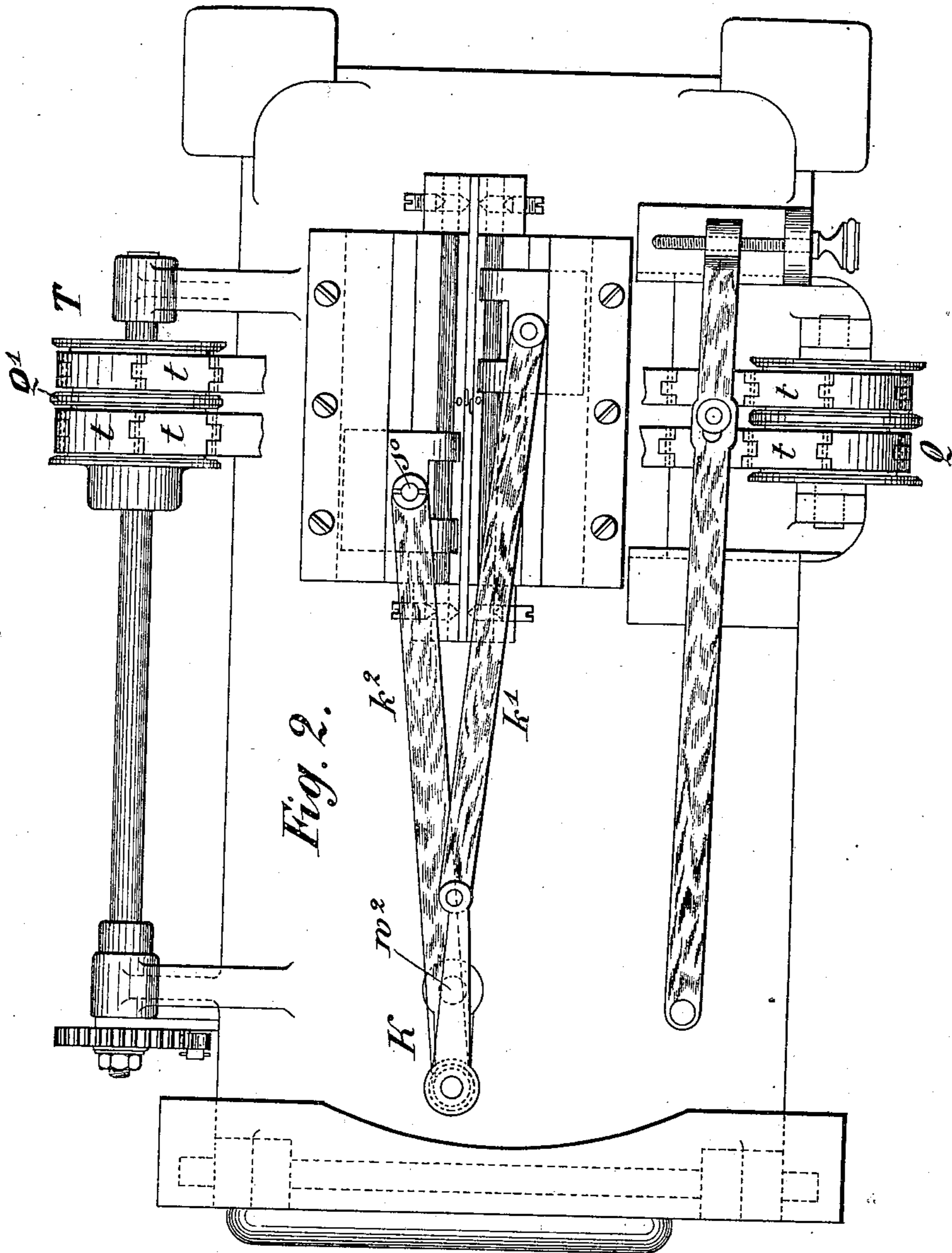


Fig. 2.

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Fig. 9.

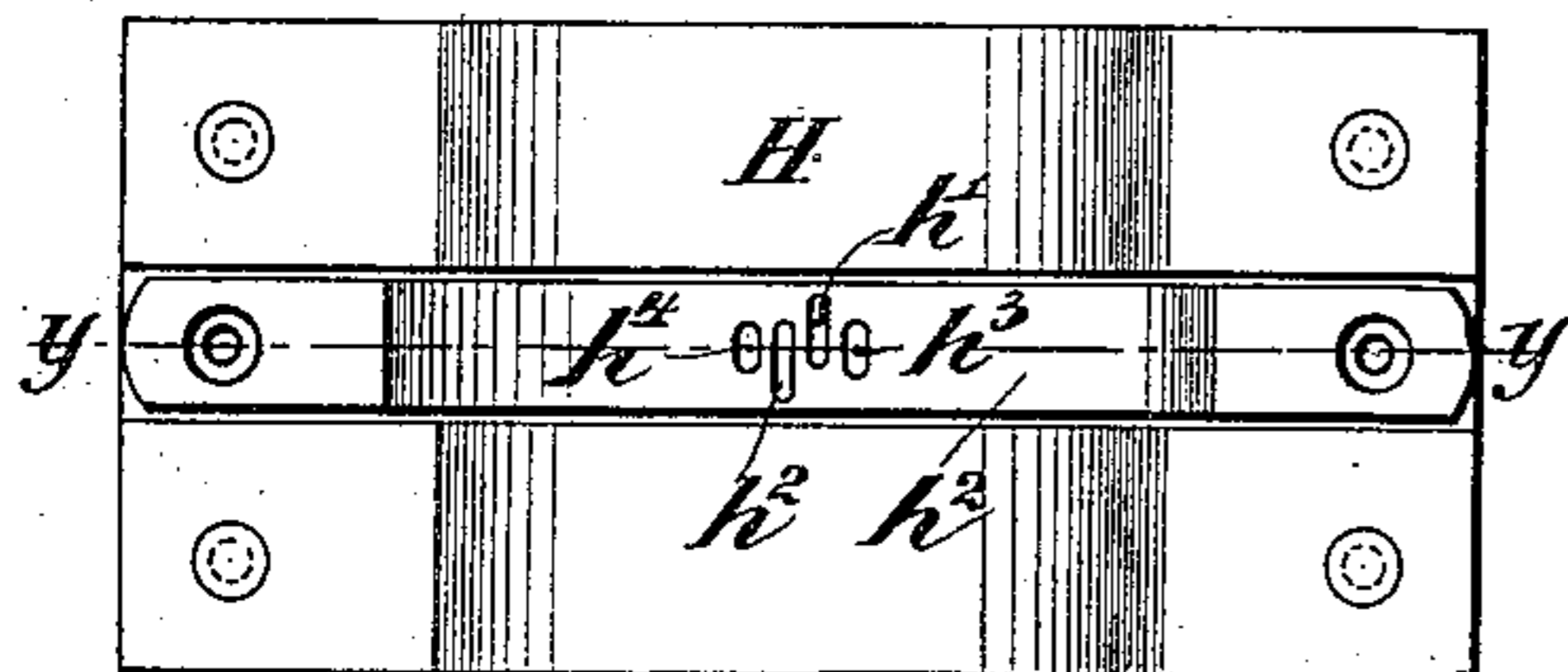


Fig. 10.

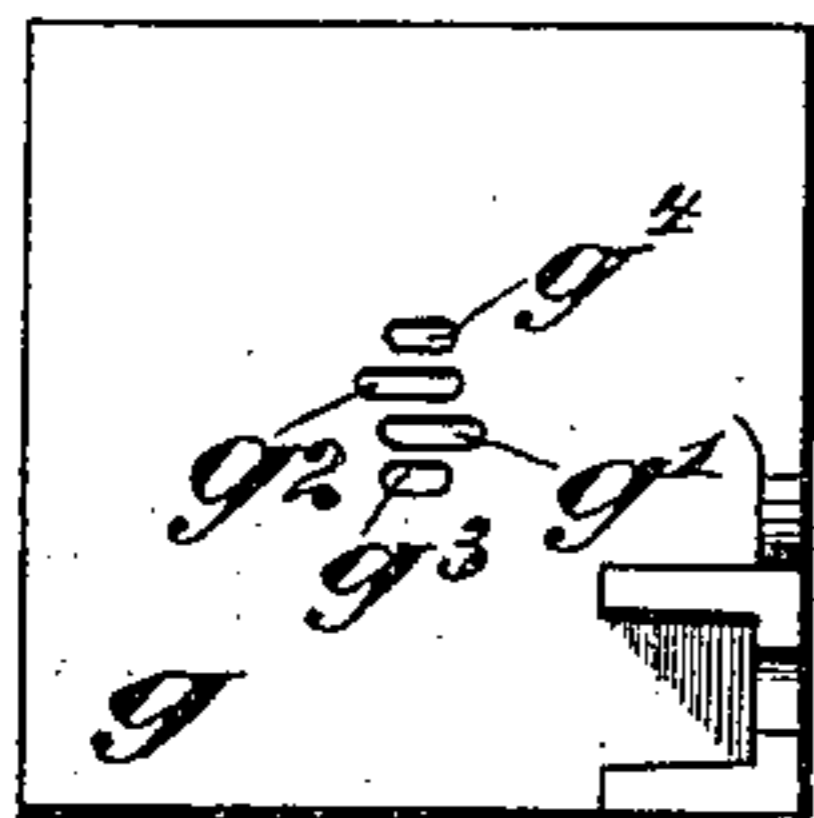


Fig. 8.

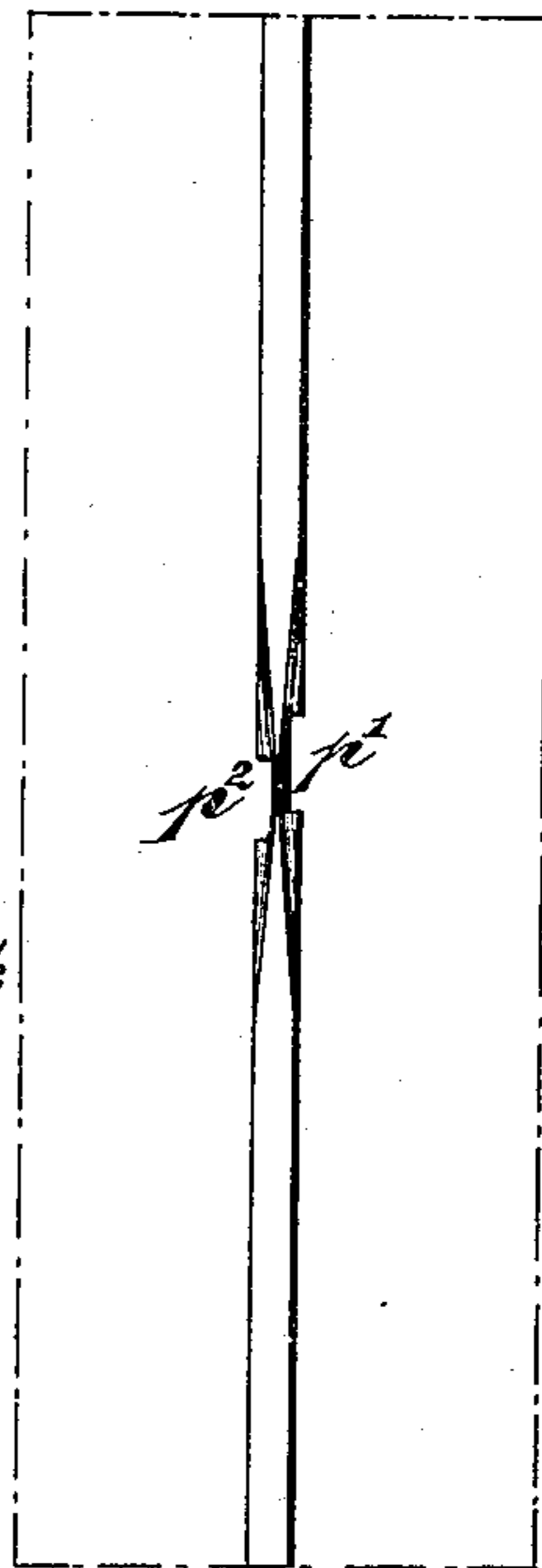


Fig. 3.

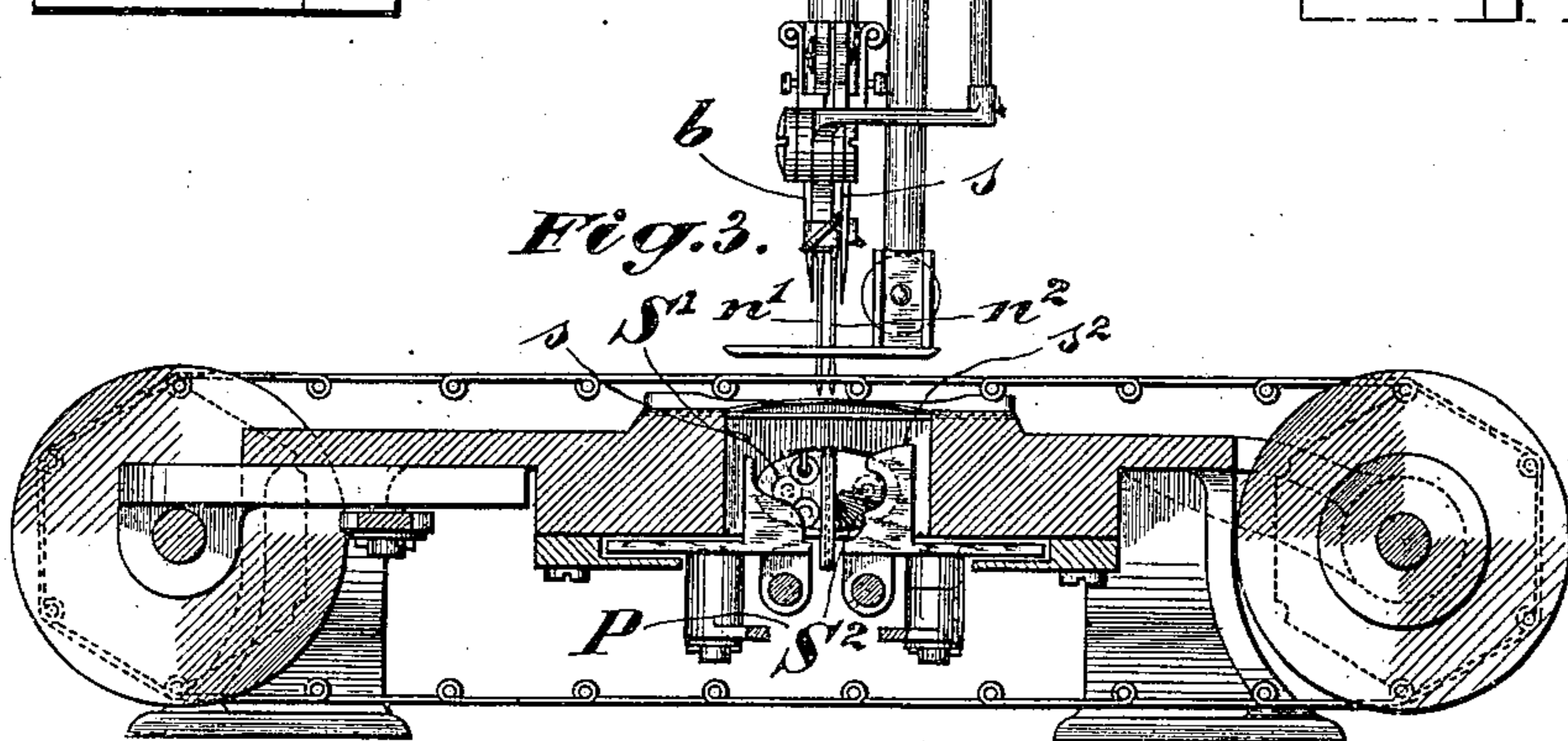
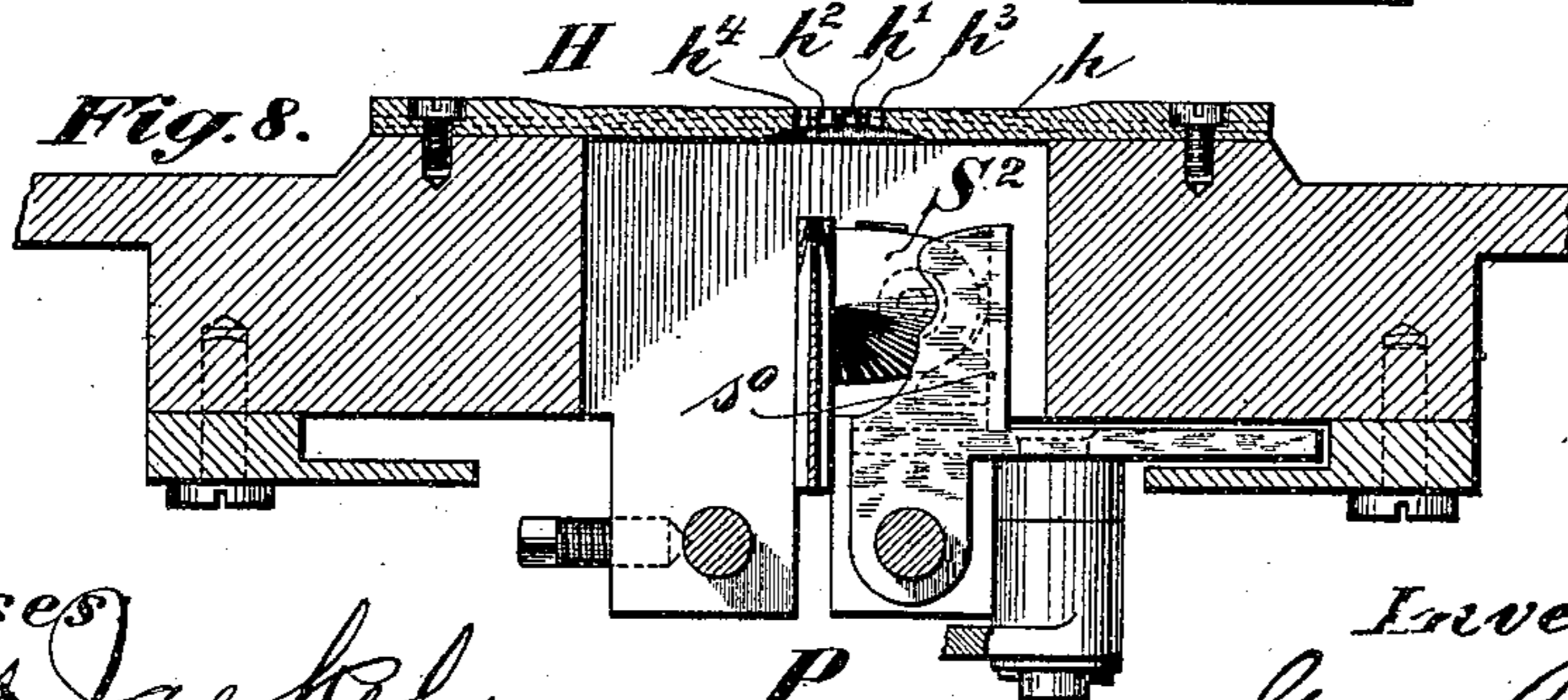


Fig. 8.



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4 Sheets—Sheet 4.

Fig. 6.

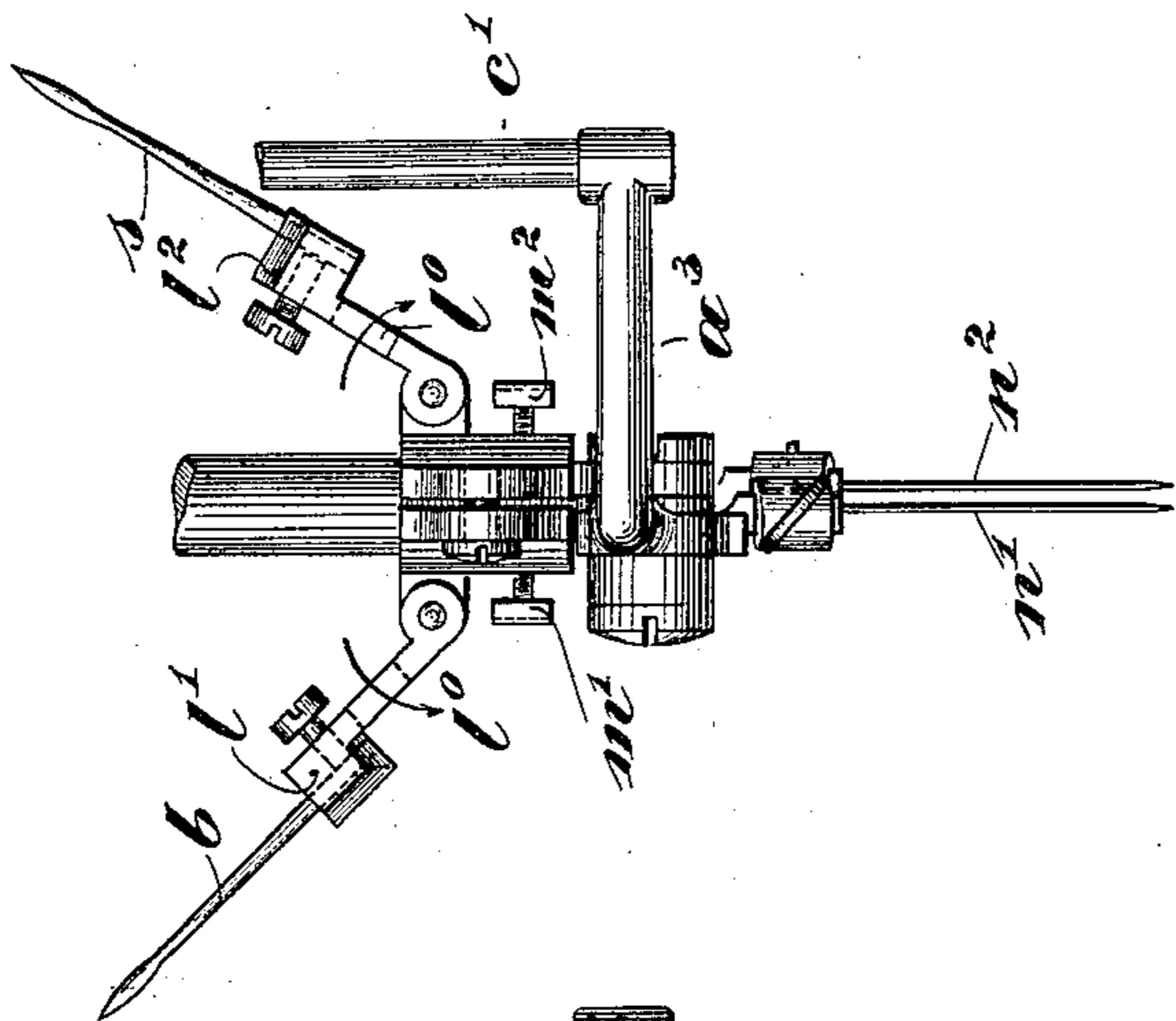


Fig. 5.

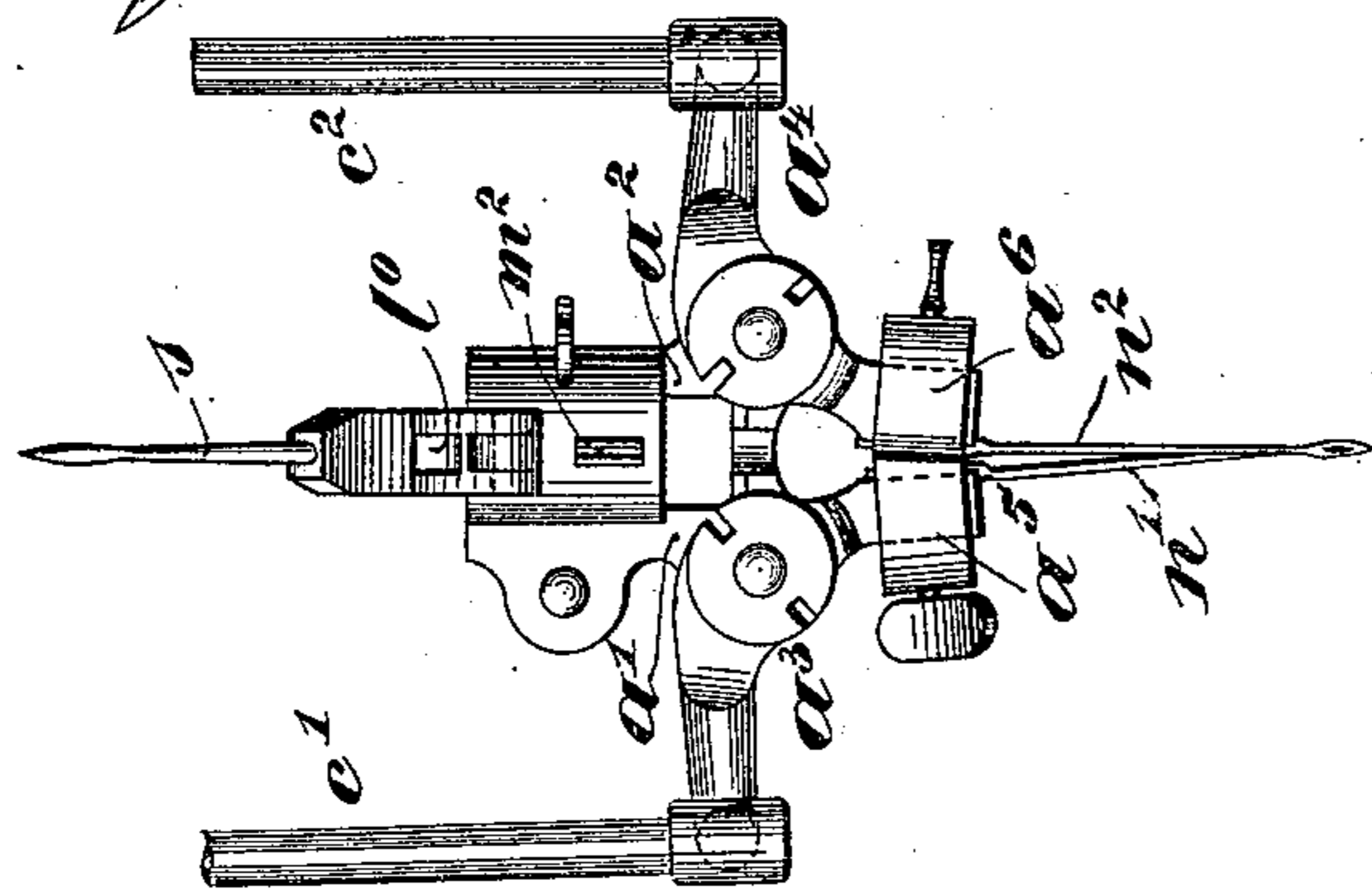
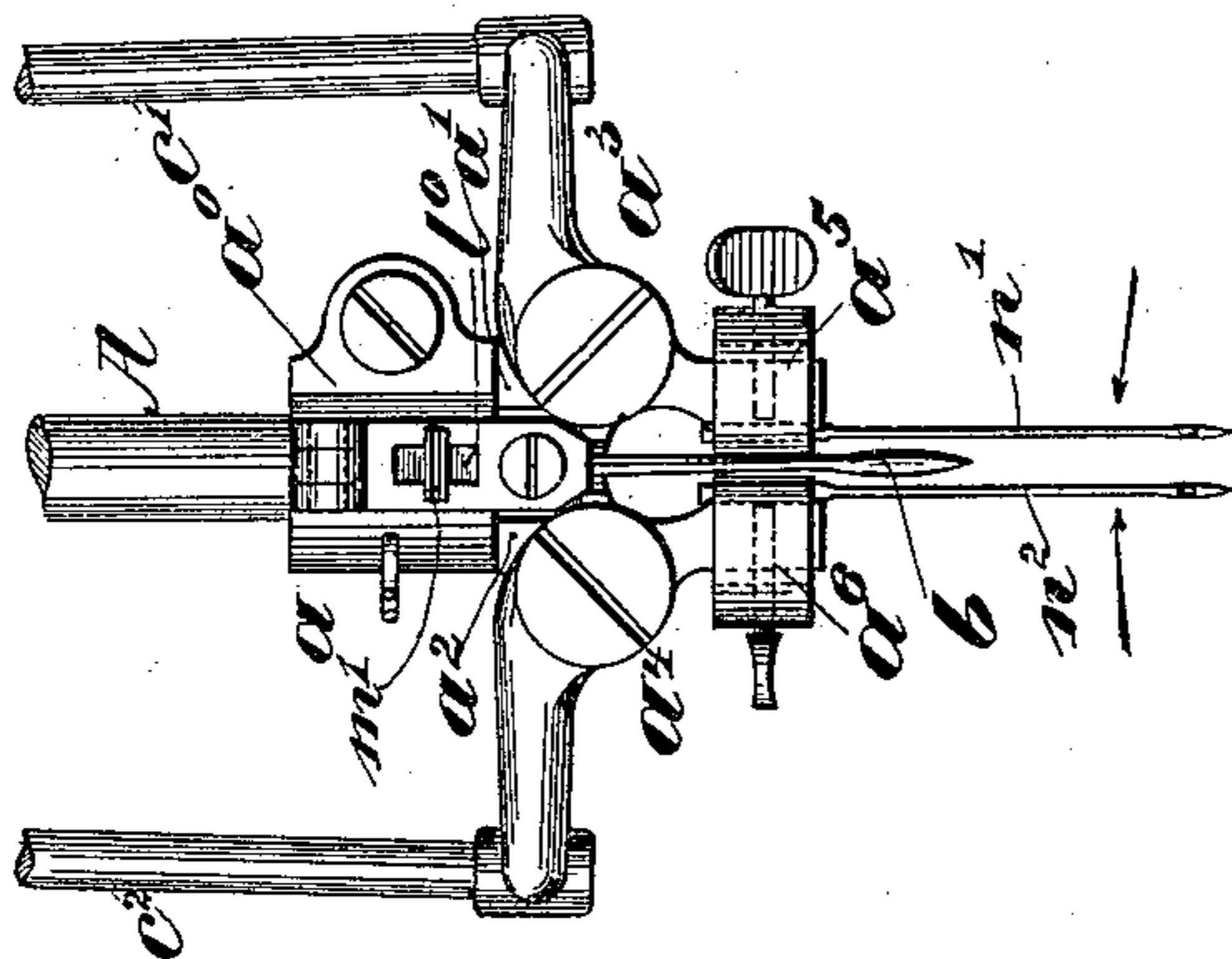


Fig. 4.



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# UNITED STATES PATENT OFFICE.

GEORG BAUM, OF RORSCHACH, SWITZERLAND.

## HEMSTITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 644,396, dated February 27, 1900.

Application filed November 10, 1897. Serial No. 657,994. (No model.)

*To all whom it may concern:*

Be it known that I, GEORG BAUM, a citizen of the Republic of Switzerland, and a resident of Rorschach, Switzerland, have invented certain new and useful Hemstitch Sewing-Machines, (for which I have obtained Letters Patent in Switzerland, No. 14,872, dated August 26, 1897; in Great Britain, No. 24,553, dated October 23, 1897, and in Austria, Act. 48,807, dated February 2, 1898,) of which the following is a specification.

This invention relates to an improved hemstitch sewing-machine which is more reliable in action and will produce more work than others hitherto in use. The same has two needles, a piercer, and a shaper, which are arranged behind each other in the direction of the feed, the needles being positioned between the piercer and the shaper. Each of the elements named—piercer, needles, and shaper—is the length of a stitch (distance of two hem-holes) apart from the adjacent one, the piercer being thus three stitch lengths apart from the shaper. In this manner four hem-holes are constantly worked, the piercer forming a hole, while the needles are stitching a second and a third hole, and the shaper finishes a fourth stitched hole. By the use of the shaper the hemstitch or each hem-hole is formed neater in appearance—i. e., more regular in form—as is the case in embroidery-machines. The needles are rendered laterally movable in such a manner that for the formation of the outer stitches of the hem-holes they can be moved outward and after having performed work back again inward into line (with the piercer and shaper) in the direction of the feed.

In order that my invention may be more fully understood, I have caused to be appended hereunto four sheets of drawings, marked with letters of reference indicating like parts in the various figures, showing one form of my improved hemstitch sewing-machine.

Figure 1 is a back view, Fig. 2 a view from below, and Fig. 3 a vertical section at line  $x x x x$  of Fig. 1; Fig. 4, a front view of the needle-bar and needle-adjustment mechanism, the needles being in their outer position out of line and the relative positions of the needles, piercer, and shaper shown diagrammatically in the plan. Fig. 5 shows the same

parts as Fig. 4; but the needles are positioned inward in line with the piercer and shaper, which in the present instance, however, are raised out of use. Fig. 6 is a side view of Fig. 5; Fig. 7, a plan of the partition between the shuttle-races. Fig. 8 is a vertical cross-section of the needle-plate on the line  $y y$  of Fig. 9 and of the underlying parts of the machine through which such section would pass when the plate is fixed in position on the machine. Fig. 9 is a plan of the needle-plate and Fig. 10 of the presser-foot; and Fig. 11 is a diagram of the stitches, showing the three various periods of work.

In carrying out this invention upon the needle-bar  $A$  is secured, by means of a split ring  $a^0$ , a support  $a$ , furnished at the front and back with a stiletto, one of which is the piercer  $b$  and the other the shaper  $s$ . To the side ears  $a' a^2$  of the support  $a$  are pivoted the angular levers  $a^3 a^4$ , the upper longer arms of which are bent back at right angles and carry rods  $c' c^2$ , pointing upward, while the lower shorter arms carry the clips  $a^5 a^6$ , which hold the needles  $n'$  and  $n^2$ , respectively. The points of the stilettos—i. e., the piercer  $b$  and the shaper  $s$ —are positioned exactly behind each other in the direction of the feed, (indicated in Fig. 5 by the arrow,) and the needles  $n' n^2$  are between the same, each needle being the distance of a stitch length apart from the other and from the adjacent stiletto. Thus the piercer and shaper are in the direction of the feed three stitch lengths apart from each other. The needles are laterally movable for the purpose of forming the outer stitches of the hem-holes when moved from the position shown in Fig. 5, in which they are in a line with the stilettos behind each other in the direction of the feed sidewise into the position shown in Fig. 4, in which they are out of line with the stilettos. After the needles have performed their work in that position they are moved back into line of their normal position.

The lateral movement of the needles is effected by the toggle-levers  $d d'$  and  $d^2 d^3$ , which have eyes  $d^0$  near their joints, to which are pivoted the rods  $c' c^2$ . As these toggle-levers are caused to move from or toward each other the shorter arms of the angular levers  $a^3 a^4$  will leave or approach each other—i. e.,

the needles will be brought out of or in line with each other. The said levers are opened by means of an eccentric  $e$ , which is fixed upon a side shaft  $w'$ , rotated by means of tooth-wheels from the main shaft  $w$ , and which acts upon a nose  $f'$ , secured to the sliding rod  $f$ , vertically guided in the head of the machine and to which the upper levers  $d$   $d^2$  of the toggle-levers are pivoted, while the lower levers  $d'$   $d^3$  are joined to a pivot  $d^4$  on the head of the machine. The rod  $f$  is raised by means of the eccentric  $e$  and the said toggle opened thereby. The descent of the rod and closing of the toggle take place self-actingly through the influence of a spring  $f^2$ , bearing against the upper end of the sliding rod  $f$  and which compresses when the rod rises. The eccentric  $e$  is rendered adjustable on the shaft  $w'$  and has several lifts—in the present instance three,  $e'$   $e^2$   $e^3$ —each of which can be brought under the nose  $f'$  of the rod  $f$  into action. It will thus be seen that the needles can be set to work at three different widths outward, as may be required, and thereby form a narrow or wide stitch. It is obvious that the lowest step  $e'$  of the eccentric  $e$  will form the smallest and the highest step  $e^3$  the relatively-widest stitch, while a stitch of medium width can be formed by the eccentric  $e^2$ . As in most hemstitch sewing-machines, the fabric is pierced thrice between two feeds—viz., in order corresponding with that of the stitches a piercing and binding with needles in their normal position in a line behind each other, (first inner stitch,) then a piercing and binding with needles in the outer position, (outer stitch of the hem,) and, finally, a piercing and binding with the needles in their inner position, (second inner stitch of the hem.) The front needle  $n'$ , in conjunction with the shuttle  $S'$ , Fig. 3, in the front race effects the stitching and binding on the right side of the hem-holes (row of stitches I) and the back needle  $n^2$ , in conjunction with the shuttle  $S^2$ , the stitching and binding on the left side (row of stitches II,) as shown in the diagram Fig. 11, the needles working always according to their relative position the distance of a hem element apart from each other. Thus between two feeds the front needle  $n'$  forms the stitches 1 2 3 in the row I, the rear needle  $n^2$  the stitches 1 2 3 in row II, while the piercer forms a hole in front of the needle  $n'$  and the shaper finishes the hem-hole behind the needle  $n^2$ , as shown in the diagram.

To prevent the threads from becoming entangled, the plate  $g$  of the presser-foot has besides the holes  $g^3$   $g^4$  for the piercer and shaper a slot-like hole  $g'$   $g^2$  for each needle. The needle-plate  $H$  over the shuttle-races has in its bridge also holes corresponding with those in the plate of the presser-foot,  $h^3$   $h^4$  being for the piercer and shaper and  $h'$   $h^2$  for the needles  $n'$   $n^2$ .

The machine is a reciprocating-shuttle sewing-machine. Between the two shuttle-races  $s'$   $s^2$  a longitudinal plate  $P$ , Figs. 7 and 8, is

arranged, serving as a partition, which is not divided in the middle, as in other machines, but forms one piece and has in the middle on each side a groove  $p'$   $p^2$ , respectively, for the reception of the needles, the upper edges of these grooves being beveled off to prevent friction on the threads. By the said construction of plate it is impossible for the threads to get entangled, as is the case with divided plates.

The shuttles are arranged in their races with their points opposing each other, and their shuttle-carriers  $s^0$  have a to-and-fro motion imparted in opposite directions by means of the differential crank  $K$  and the connecting-rods  $k'$   $k^2$ .

The differential crank  $K$  is actuated from the vertical shaft  $w^2$ , which is rotated by means of the bevel-wheels  $r^2$   $r^3$  from the main shaft  $w$ . The piercer and the shaper are attached to the support  $a$  by means of the hinges  $l'$  and  $l^2$  in such a manner that they can be brought out of use at will without removing the same. They are retained in their working positions by means of headed screws  $m'$  and  $m^2$ , which pass through the hinge-slots  $l^0$  and the heads of which are turned at right angles thereto, Fig. 4, while when turned in line with the said slots they permit of lifting the hinges, Figs. 5 and 6.

In the present machine the fabric to be sewed is fed by means of a band  $T$ , consisting of links  $t$ , which are hinged together and carried over rulers  $Q$   $Q'$ , formed on their periphery with corresponding support-surfaces and actuated by suitable mechanism, groove-like recesses being formed between the said support-surfaces for the reception of the hinges of the links.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a hemstitch sewing-machine, the combination, with the shuttle, two needles, each coöperating with the shuttle, and mechanism for feeding the fabric forward one step for each stitch, of a piercer and a shaper, said needles, piercer and shaper being arranged one behind the other in a line in the direction of the feed, the needles being arranged between the piercer and the shaper and each of the said elements being one or more stitch lengths apart from the adjacent element, substantially as set forth.

2. In a hemstitch sewing-machine, the combination, with the shuttle, two needles each coöperating with the shuttle, mechanism for feeding the fabric forward one step for each stitch, a piercer and a shaper, said needles, piercer and shaper being arranged one behind the other in a line in the direction of the feed, the needles being arranged between the piercer and the shaper and each of the said elements being one or more stitch lengths apart from the adjacent element, of means for laterally vibrating said needles whereby they may be set out of line so as to form the

outer stitches of the hem-holes, substantially as set forth.

3. In a hemstitch sewing-machine, the combination, with the shuttle, two needles each  
5 coöperating with the shuttle, mechanism for feeding the fabric forward one step for each stitch, a piercer and a shaper, said needles, piercer and shaper being arranged one behind the other in a line in the direction of the feed,  
10 the needles being arranged between the piercer and the shaper and each of the said elements being one or more stitch lengths apart from the adjacent element, of the presser-foot and stitch-plate, each provided  
15 with a separate hole for the piercer, shaper and needles, substantially as set forth.

4. In a hemstitch sewing-machine, the combination with the needle-bar, two needles, each  
20 coöperating with a shuttle, a shaper, and mechanism for feeding the fabric forward one step for each stitch, of a piercer hinged to the needle-bar, said needles, shaper and piercer being arranged one behind the other in a line  
25 in the direction of the feed, one or more stitch lengths apart from each other and the needles being arranged between the piercer and shaper, substantially as set forth.

5. In a hemstitch sewing-machine, the combination with the needle-bar, two needles, each  
30 coöperating with a shuttle, a piercer, and mechanism for feeding the fabric forward one step for each stitch, of a shaper hinged to the needle-bar, said needles, piercer and shaper being arranged one behind the other in a line  
35 in the direction of the feed, one or more stitch lengths apart from each other, and the needles being arranged between the piercer and shaper, substantially as set forth.

6. In a hemstitch sewing-machine, the combination, with a piercer, a shaper, two needles  
40 each coöperating with a shuttle, and mechanism for feeding the fabric one step for each stitch, said needles, shaper and piercer being arranged one behind the other in a line in the direction of the feed, one or more stitch  
45 lengths apart from each other, and the needles being arranged between the piercer and the shaper, of a shifting mechanism connected with the needles whereby they may be laterally vibrated, an adjustable eccentric pro-  
50 vided with a number of lifts for acting on said shifting mechanism, and means for adjusting or shifting said eccentric, substantially as set forth.

7. In a hemstitch sewing-machine, the combination with a piercer, a shaper, two needles  
55 each coöperating with a shuttle and mechanism for feeding the fabric one step for each stitch, said needles, shaper and piercer being arranged one behind the other in a line in the  
60 direction of the feed, one or more stitch lengths apart from each other, and the needles being arranged between the piercer and the shaper, of toggle-levers connected with the needles, and a vertical movable rod act-  
65 ing on said toggle-levers, whereby the needles may be laterally vibrated, substantially as set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing wit-  
70 nesses, this 22d day of October, 1897.

GEORG BAUM.

Witnesses:

MORITZ VEITH,  
H. LABHART.