

C. M. BANKS.
Sewing-Machine.

No. 225,784.

Patented Mar. 23, 1880.

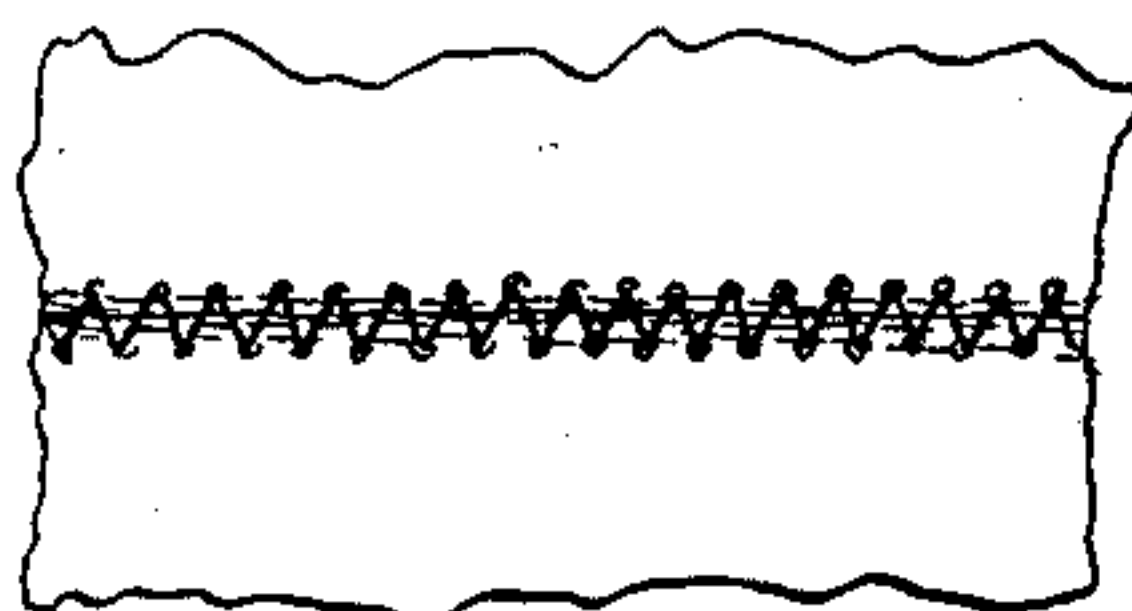
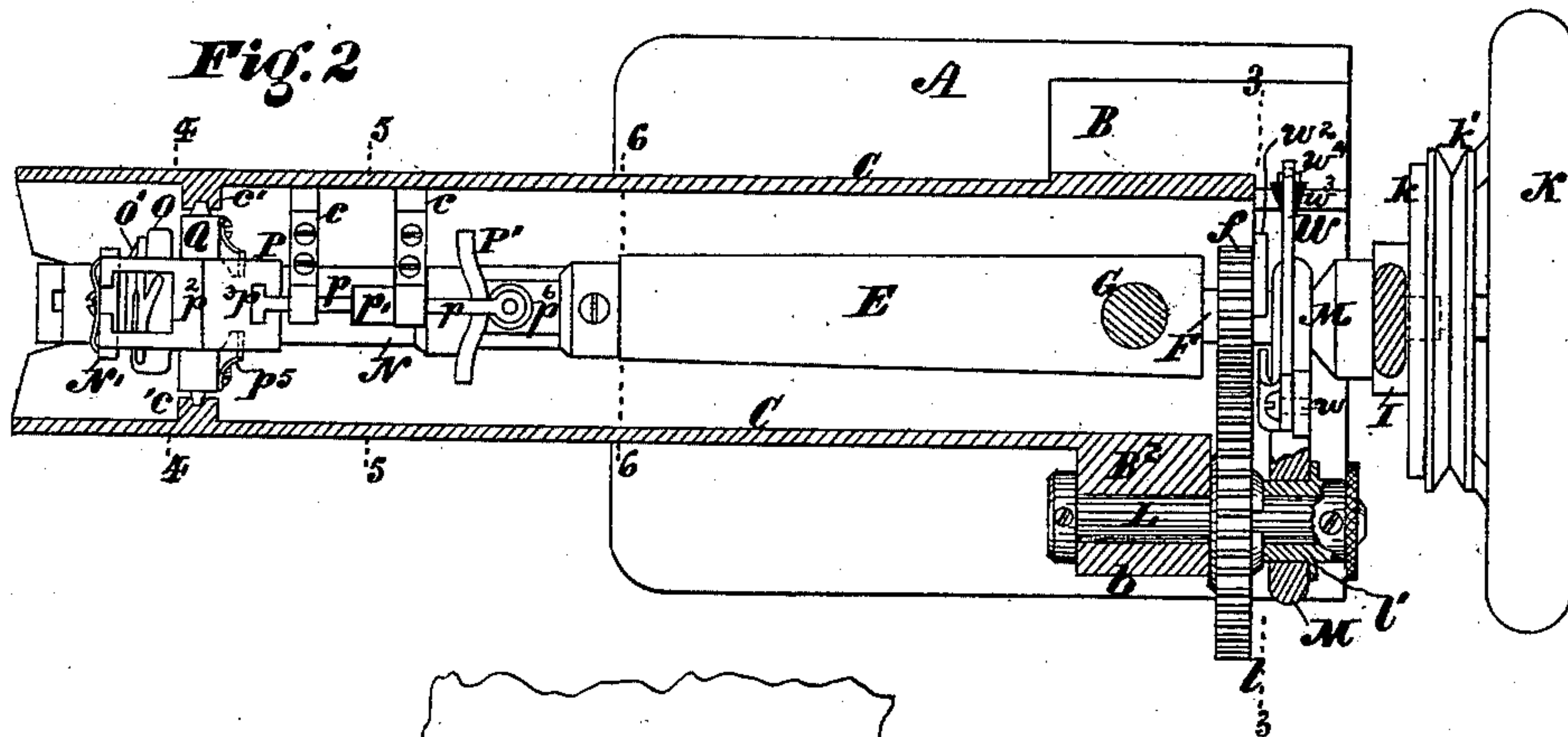
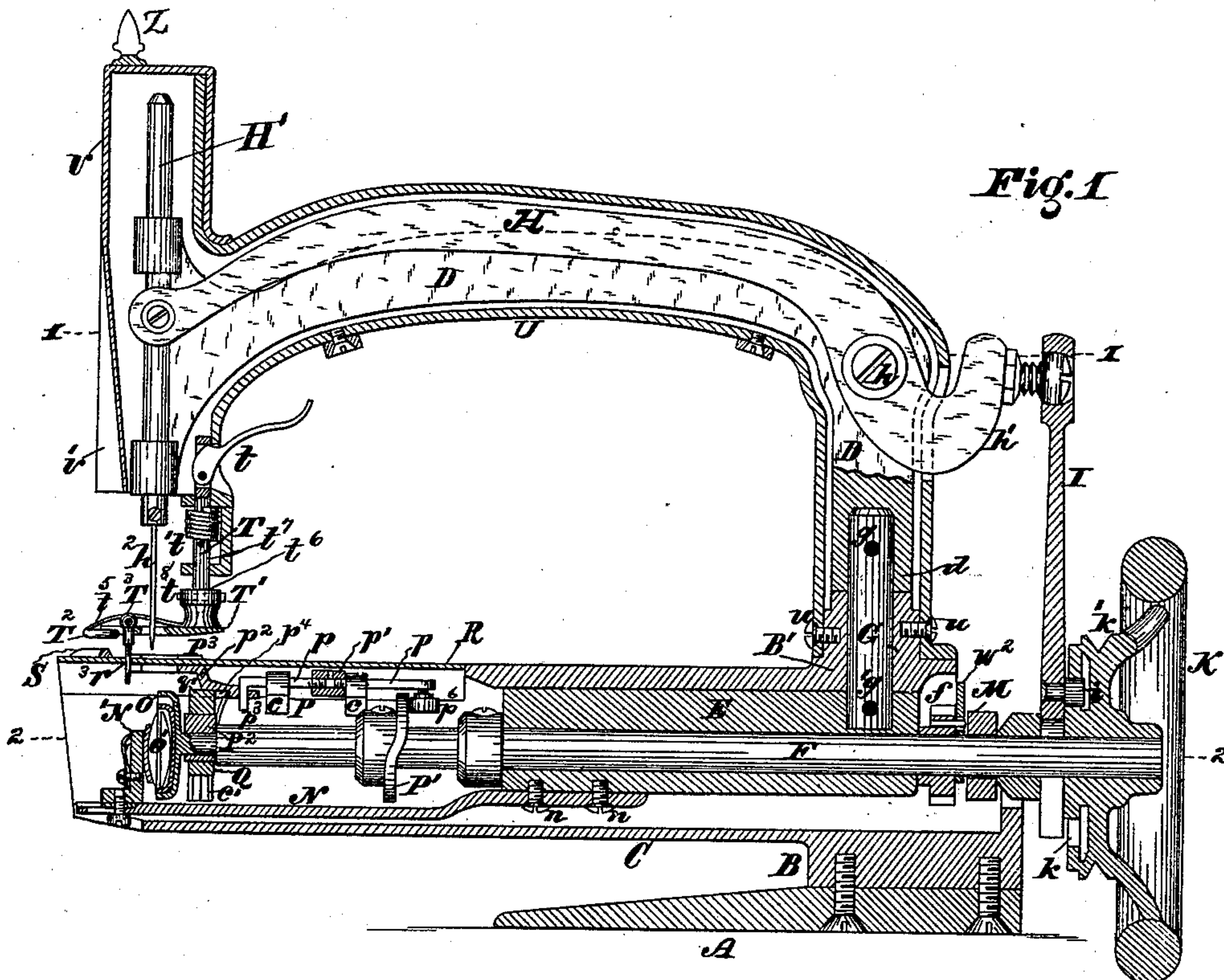


Fig. 11

WITNESSES:

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CHARLES M. BANKS, OF PHILADELPHIA, PENNSYLVANIA.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 225,784, dated March 23, 1880.

Application filed June 23, 1879.

To all whom it may concern:

Be it known that I, CHARLES M. BANKS, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain
5 new and useful Improvements in Sewing-Machines, particularly designed and adapted for sewing hosiery and tubular knitted fabrics; and I do hereby declare the following to be a full, clear, and exact description of the invention,
10 such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

15 Figure 1 is a longitudinal vertical section of a machine embodying my improvements. Fig. 2 is a horizontal section of the sleeve and standard on line 2 2 of Fig. 1, and plan of the contained mechanism. Fig. 3 is a horizontal
20 section of the shell or casing on line 1 1 of Fig. 1, and plan of the contained mechanism. Fig. 4 is a front elevation. Fig. 5 is a transverse section on line 3 3 of Fig. 2. Figs. 6, 7, and 8 are detail transverse sections on the lines 4 4, 5 5,
25 and 6 6 of Fig. 2. Fig. 9 is detail perspective of cloth-plate, and Fig. 10 a like view of the presser-foot. Fig. 11 is a representation of the stitch uniting the edges of a piece of fabric.

My invention has for its object to provide
30 a machine for sewing together or uniting by stitching the edges of hosiery or knit fabrics.

My invention consists in the peculiar construction and combination of parts hereinafter fully described and claimed.

35 By "lateral vibration" in the following detail description and claims is meant swinging or otherwise reciprocating across the central line of direction of the feed, or across the longitudinal axis of the main shaft, when such shaft
40 is centrally located in its surrounding sleeve.

Referring to the accompanying drawings, A indicates a base-plate designed to be fastened to a table or support, and B is an upright or standard secured thereon. From this standard,
45 and integral with it, projects a tubular extension or sleeve, C.

B' is the head of the standard B, and upon it rests the rear end, *d*, of the needle-arm D.

E represents a cylindrical collar located

within the sleeve C, and extending also into 50 the standard B, being bored longitudinally to form a bearing for the main shaft F.

G is a pintle or spindle connecting the needle-arm D and collar E, being made fast to said parts respectively by pins *g* and *g'*. Said spin- 55 dle is free to rotate on its vertical longitudinal axis, the arm D and collar E moving with it when it is moved, so that said parts D and E are in effect swiveled in or upon the standard B.

H is the needle-operating lever, fulcrumed 60 on the arm D at *h*, its short arm *h'* being connected by a pitman or link, I, with an eccentric or cam, *k*, on the main shaft F, so as to obtain the usual vertical reciprocating movement for the needle-bar H'. Said cam *k* is integral with 65 the driving-pulley *k'* and fly-wheel K, or cast in one piece therewith, and communicates a vertical reciprocating movement to the pitman I through the medium of an anti-friction roller, *i*, journaled on said pitman. 70

L is an eccentric shaft, having its bearings in a boss or box, B², cast on the standard B, said standard having a cap, *b*. Said shaft is caused to revolve through the medium of gear- 75 wheels *f* and *l*, which are of such relative sizes that the main shaft F, on which the wheel *f* is made fast, will make two revolutions while the shaft L, on which the wheel *l* is fastened, is making one revolution.

M is an eccentric strap or yoke embracing 80 the eccentric *l'* on shaft L, and encircling the main shaft F, as shown. The result of this gear and eccentric connection is that, the main shaft being caused to revolve by means of a belt running on the pulley *k'*, the shaft L will 85 revolve in the opposite direction, and will cause said main shaft to swing with the collar E and arm D from side to side, or to vibrate laterally on the pintle G. At the same time that this vibration is being effected the 90 needle-operating lever H is vibrating vertically by virtue of the means already described, the movements being so timed that at the limit of each lateral vibration of the needle-arm and main shaft the operating-lever will 95 be vertically reciprocated, or, in other words, that when said arm and shaft have swung in one direction to their farthest limit the needle-

bar will descend and ascend, and when said arm and shaft have swung in the opposite direction to a like limit said needle-bar will again descend and ascend, said arm and shaft dwelling during the descent and ascent of the needle-bar H'.

N represents a shelf securely fastened by screws *n n* to the collar E, or it may be formed in one piece therewith, and is adapted and designed to swing with said collar. O is a rotary hook fastened on the outer end of the main shaft F, so as to revolve and swing therewith, and O' is a bobbin, which fits in the side of said hook, and is held in place by a gate, N', secured to and adapted to move with the shelf N. By this arrangement, it will be observed, the rotary hook swings with the main shaft, so that upon the descent of the needle after each lateral vibration said hook will be in position to and will engage with the loop of the needle to form a stitch.

P represents a feed-bar sustained in two lugs, *c c*, which project inwardly from the shell C. Said bar is formed with a rod in two parts, *p p*, having adjacent right and left threaded ends united by an adjusting-nut, *p'*, and a block, *p''*, which slides up and down on the head *p³* of said rod *p*. Said feed-bar has liberty of longitudinal movement in the lugs *c c*, and is given the customary "four-motion" by means of a cam, *P'*, and eccentric *P²* on the shaft F, said eccentric moving in the slot *q* of a yoke, Q, which has a vertical movement in guides *c' c'*, formed or secured to the sleeve C. On the upper side of the yoke Q is a dove-tailed tongue, *q'*, which fits in a corresponding groove, *p⁴*, on the under side of the feed-bar block *p²*. *p⁵ p⁵* are springs fastened to the yoke Q and bearing against the bar P, so as to retract it after its movement in one direction by means of cam *P'*, and *p⁶* is an anti-friction roller on end of rod *p*, bearing against said cam. By this arrangement it will be observed that the feed-bar does not follow the swinging motion of the main shaft, but is rigid with respect thereto, having the ordinary four-motion without the lateral vibration of said shaft. To the upper surface of said bar P are affixed pads, of leather, rubber, or textile material, *P³*, capable of producing traction by friction, so as to dispense with the teeth usually employed in sewing-machine feeds, and which are unsuited to knitted fabrics.

R represents the cloth-plate, consisting of a slide fitted in grooves in the sleeve C and formed with openings *r r*, through which the feed-pads *P³* move in contact with the material requiring to be stitched. Said openings are separated by a + -shaped bar, *r'*, having a transverse slot, *r²*, through which the needle *h²* works, and an opening, *r³*, for the reception of a dividing-pin, hereinafter described.

S is a V-shaped rib on the cloth-plate R, having its apex at the beginning of the bar *r'*, or in line with the end of the feed-openings *r r*.

T is the presser-bar, raised and lowered, in

the customary manner, by means of lever *t* and spring *t'*.

T' is the foot of said presser-bar, the outer extremity of which has a flaring notch, *t²*, terminating in a circular opening, *t³*. Said plate has also a transverse slot, *t⁴*, corresponding to and adapted to register with the slot *r²* in the bar *r'*.

T² is a V-shaped wire fastened to the presser-foot T' by springs *t⁵ t⁵*. Said springs permit said wire to be raised, while their tendency is to press it down upon the rib S, over and upon which it normally rests.

T³ is a dividing-pin, which rests in the opening *t³* and enters the opening *r³* in the bar *r'*. The presser-foot T' has a socket, *t⁶*, which receives the end of the presser-bar *t'*, said socket being of slightly greater diameter than said bar, and the parts being fastened by a swivel-pin, *t³*, so that said foot can rock slightly to accommodate itself to any lump or imperfection in the fabric being sewed, in order to prevent one side or edge of said fabric from being fed while the other is not. Such rocking will not, however, owing to the length of the springs *t⁵ t⁵*, disturb the position of the wire T².

The presser-bar T is secured to a shell, U, which is formed in two vertical sections, U' and U², fastened at *u* to the standard B, said shell surrounding and concealing nearly all of the needle-arm and lever, so as practically to prevent the lateral vibration of said parts from being observed by or distracting the attention of the operator. Said shell also subserves the purpose of presenting a rigid fixture for the attachment of the presser-foot, thereby preventing the latter from swinging with the needle-arm, the lateral vibration of the latter not being desired for the foot.

The sections U' and U² are united in front by a plate, V, fastened by screws *v v*, and having a central inclined depression, *v'*, which forms a thread-guide.

W is the take-up, consisting of a curved lever fulcrumed at *w* on the eccentric strap M, its short arm *w'* being tripped by a cam, *w²*, on the main shaft F, and retracted by a spring, *w³*, fastened to the standard B at *w⁴*.

X is the spool-holder, Y the tension, and Z Z thread-guides.

The operation is as follows: To unite the two edges of a piece of knitted fabric to produce a stocking-leg or other tubular article, the material to be stitched is placed upon the cloth-plate R, with its two edges parallel, as close together as possible, and on either side of the dividing-pin T³, in line with the bar *r'*, and beneath the presser-foot T', the curl of said edges being on the under sides and next to the cloth-plate. Motion being duly communicated to the main shaft F, the material will be fed inwardly upon the sleeve C, the edges being united by zigzag stitching as the feed progresses. Before the stitch is made, however, and to prevent the formation of a ridge or rubbed seam, the curls are taken out of the

edges by means of the rib S and wire T², which flatten out said curls, the presser-foot T' holding the edges in their flattened-out position and the dividing-pin T³ preventing said edges from lapping upon one another. The needle first enters one edge of the fabric and then ascends therefrom, forming a stitch by the aid of the hook. On the ascent of the needle the needle-arm and needle-operating lever, together with the main shaft and hook, are vibrated laterally across the middle line of feed, so as to come into position for forming a stitch in the other edge of the fabric, the threads trailing across the line of division between the separate edges of said fabric and uniting the same. While the needle bar and arm and main shaft and hook are thus vibrating laterally the presser-foot remains stationary, preventing lateral movement of the fabric, while the feed moves said fabric forward or inward. The needle then again descends and forms a stitch with the hook, and so the work progresses until finished, the curls being taken out of the fabric and the edges united by zigzag stitching.

I am aware that zigzag stitching by various means—such, for example, as shown in Letters Patent, dated February 6, 1877, granted to me—is not at this day new; also, that a projecting sleeve, over which a boot-leg, for example, may be drawn, and around which it may be rotated, is known and used in conjunction with a sewing-machine.

What I claim as my invention is—

1. In a sewing-machine, a laterally-vibrating needle-arm, D, in combination with a vertically-vibrating needle-operating lever, H, and suitable means for operating the same, substantially as shown and described.

2. In a sewing-machine, the combination of a laterally-vibrating shaft, F, a rotary hook, and mechanism, substantially as described, for imparting such vibratory motion to said shaft, as set forth.

3. The combination, in a sewing-machine, of a laterally-vibrating needle-operating lever, a laterally-vibrating shaft carrying a rotary hook, and suitable means for operating the same, substantially as shown and described.

4. The combination, with a sleeve or tubular extension, C, adapted and designed to have drawn over it a tubular article being sewed, of a laterally-vibrating shaft, F, carrying a rotary hook, O, and a laterally-vibrating needle-operating lever, with suitable means for operating said needle-operating lever and shaft, substantially as and for the purpose set forth.

5. The combination of needle-arm D and collar E with pintle G and standard B, substantially as shown and described.

6. The combination of standard B, needle-arm D, collar or bearing E, shaft F, and pintle G, substantially as shown.

7. The combination of standard B' and sleeve E, shafts F and L, with gears f' l, ec-

centric l', and strap m, substantially as shown and described.

8. The combination, with standard B, of needle-arm D, needle-operating lever H, main shaft F, and connecting mechanism, operating substantially as described, whereby the rotary motion of said shaft will cause it and said arm and bar to be vibrated laterally and the latter to be vertically reciprocated, as and for the purpose set forth.

9. The combination, with a laterally-vibrating shaft, F, carrying a rotary hook, O, of a laterally-vibrating needle-operating lever and vertically-reciprocating needle-bar, with mechanism for operating said parts, substantially as described, whereby said bar and hook will be carried by alternating movements to opposite sides of a central line of feed, and when the limit of lateral vibration is reached in either direction a stitch will be formed by the needle and hook, as set forth.

10. The combination, with a laterally-vibrating shaft, F, carrying a rotary hook, O, a similarly-vibrating needle-operating lever, H, with vertically-reciprocating needle-bar H', and means, substantially as described, for actuating said parts, of a stationary presser-foot and a feed-motion, substantially as described, whereby said bar and hook will be carried by alternating movements to opposite sides of a central line of feed, during which motion the material to be sewed will be fed forward, and when the limit of lateral vibration is reached in either direction the stitch will be formed by the needle and hook, as set forth.

11. In combination with a tubular extension or sleeve, C, adapted to have drawn over it the fabric to be stitched, a feed-movement located therein, and having its direction of feed motion lengthwise thereof, a vibrating needle-operating lever, H, and needle-bar H', a vibrating main shaft, F, and hook O, and means, substantially as described, for operating said parts, as set forth.

12. In combination with sleeve C, having lugs c c, and shaft F, carrying cam P' and eccentric P², the feed-bar P and slotted yoke Q, substantially as shown and described.

13. The cloth-plate R, having V-shaped rib S, substantially as and for the purpose set forth.

14. The cloth-plate R, having transverse needle-slot r² and opening r³ for the reception of dividing-pin T³, in combination with said dividing-pin and with the presser-foot T², substantially as shown and described.

15. The presser-foot T', formed or provided with V-shaped wire T² and springs t⁵ t⁵, substantially as shown and described.

16. The combination, with presser-foot T', having wire T² and springs t⁵ t⁵, of cloth-plate R, having rib S, for removing the curl from the edges of the fabric, substantially as set forth.

17. The combination, with presser-bar T, of the presser-foot T' and pin t⁸, forming a rocking joint for said foot, whereby the latter will

automatically adapt itself to unevenness or inequalities of thickness in the fabric being sewed, substantially as described.

18. The combination, with main shaft F,
5 carrying cam w^2 , shaft L, eccentric V , and eccentric strap or lever M, of take-up lever W and spring w^3 , substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand this 20th day of 10 June, 1879.

CHARLES M. BANKS.

Witnesses:

AUGUST WIRTH,
S. J. W. MINTZER.