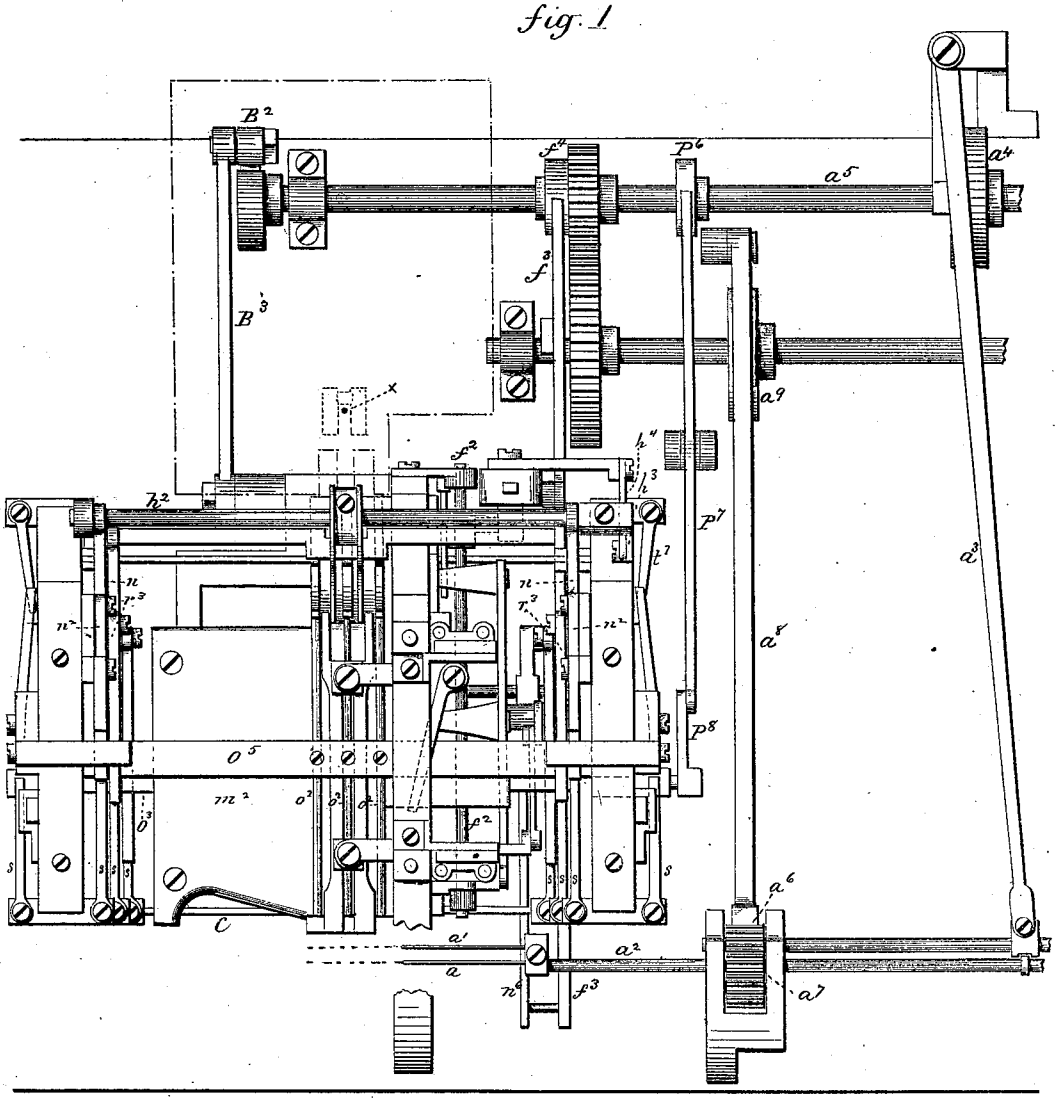
(Model.) 7 Sheets—Sheet 1.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

fig. 1



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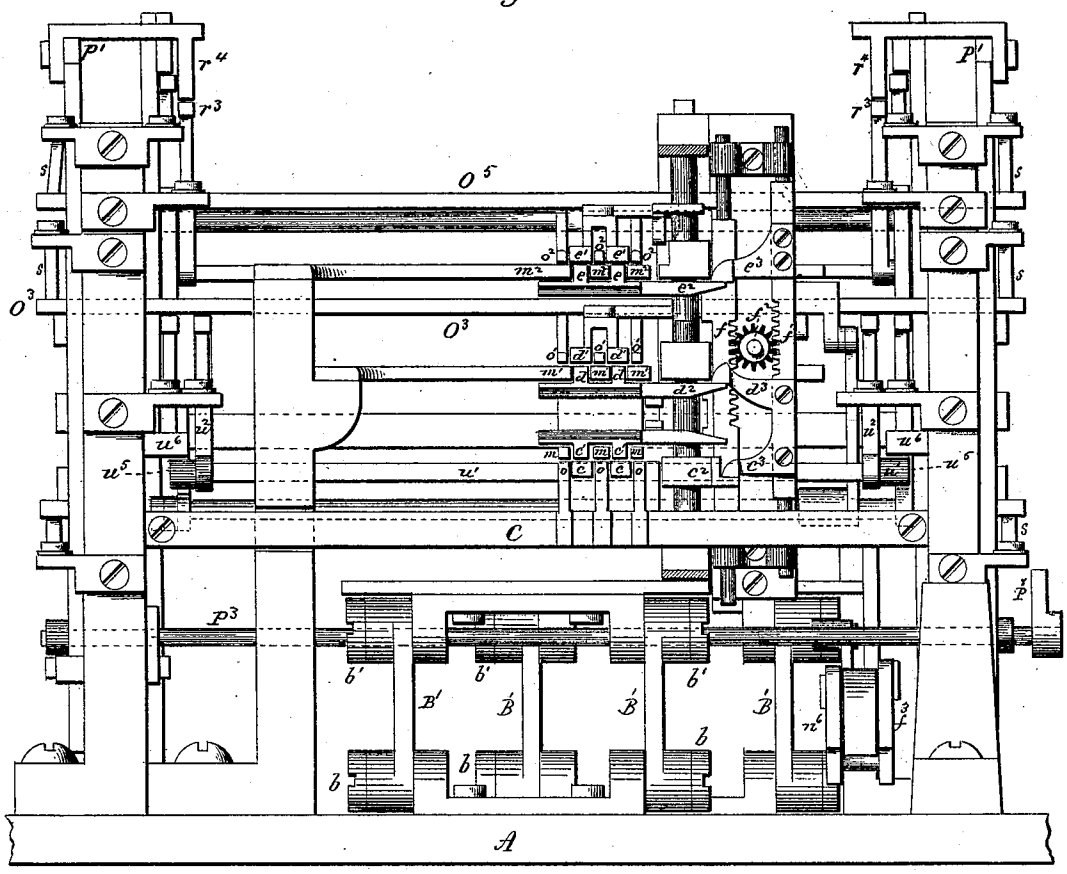
(Model.) 7 Sheets—Sheet 2.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

fig. 2



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(Model.) 7 Sheets—Sheet 3.

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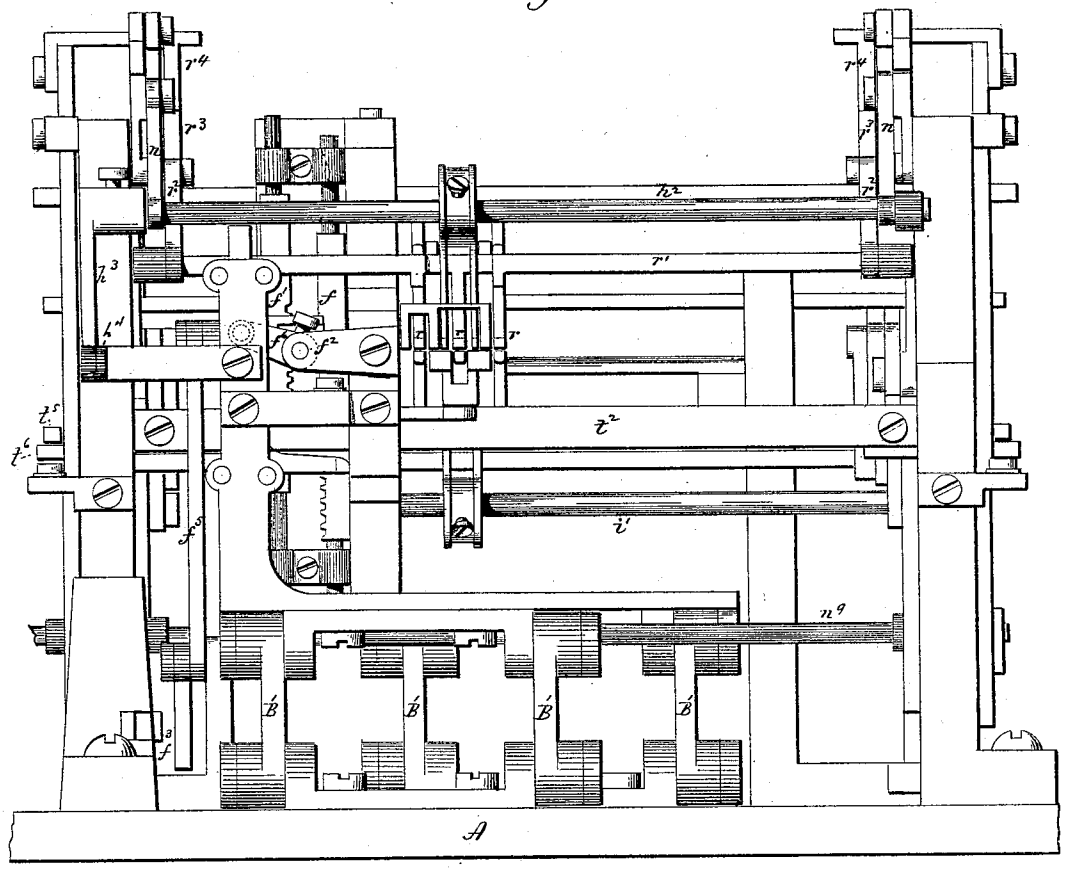
RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

Fig. 3.



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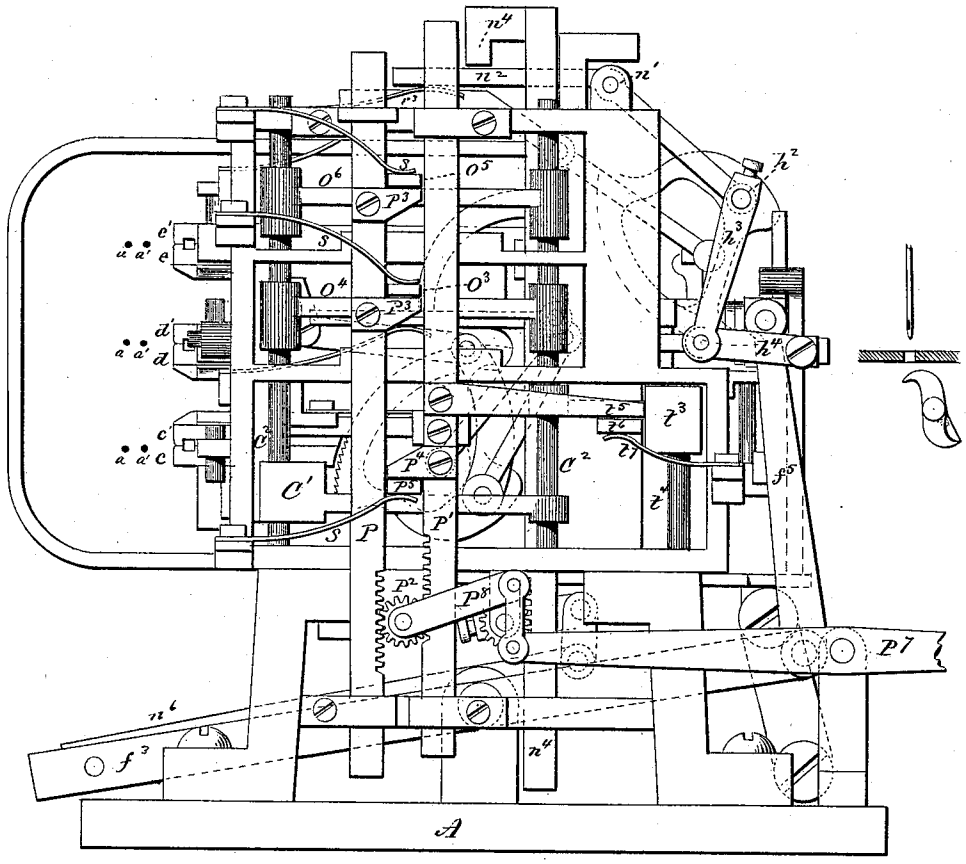
(Model.) 7 Sheets—Sheet 4.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

Fig. 4



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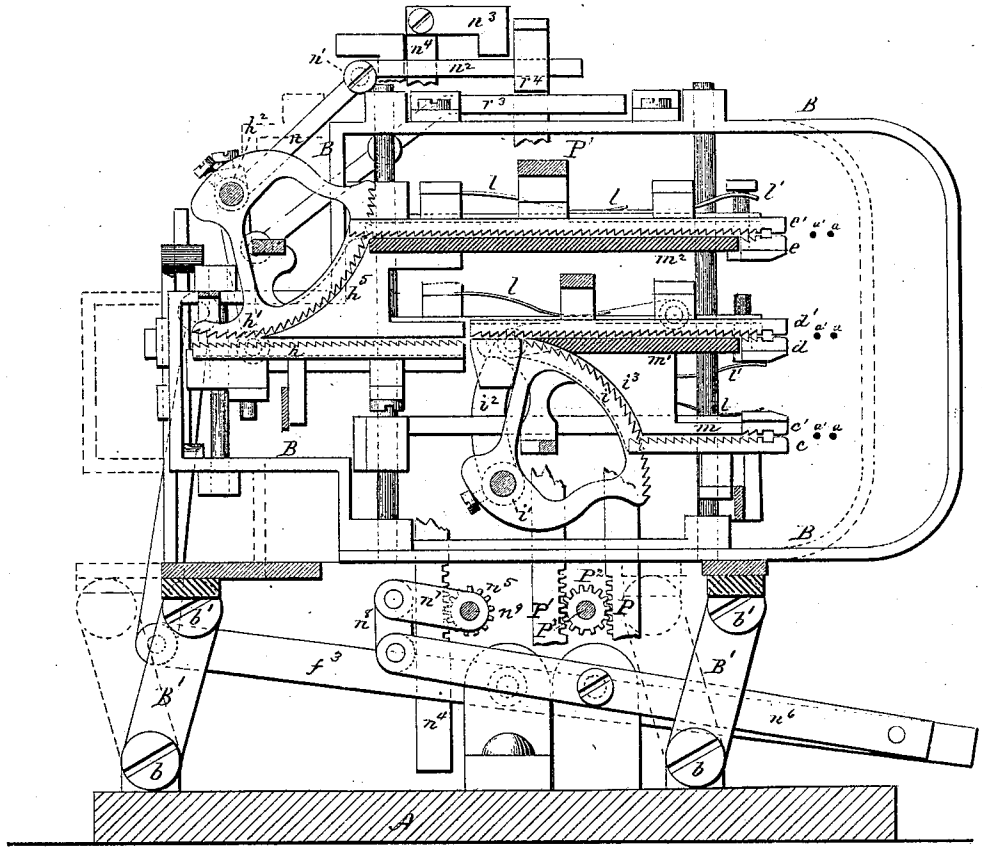
(Model.) 7 Sheets—Sheet 5.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

fig. 5



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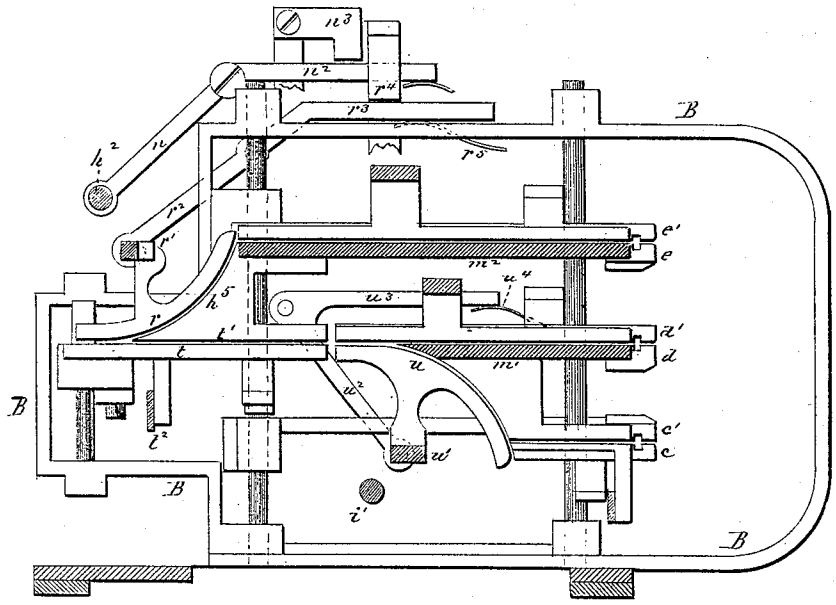
(Model.) 7 Sheets—Sheet 6.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916 Patented Apr. 4, 1882.

fig. 6.



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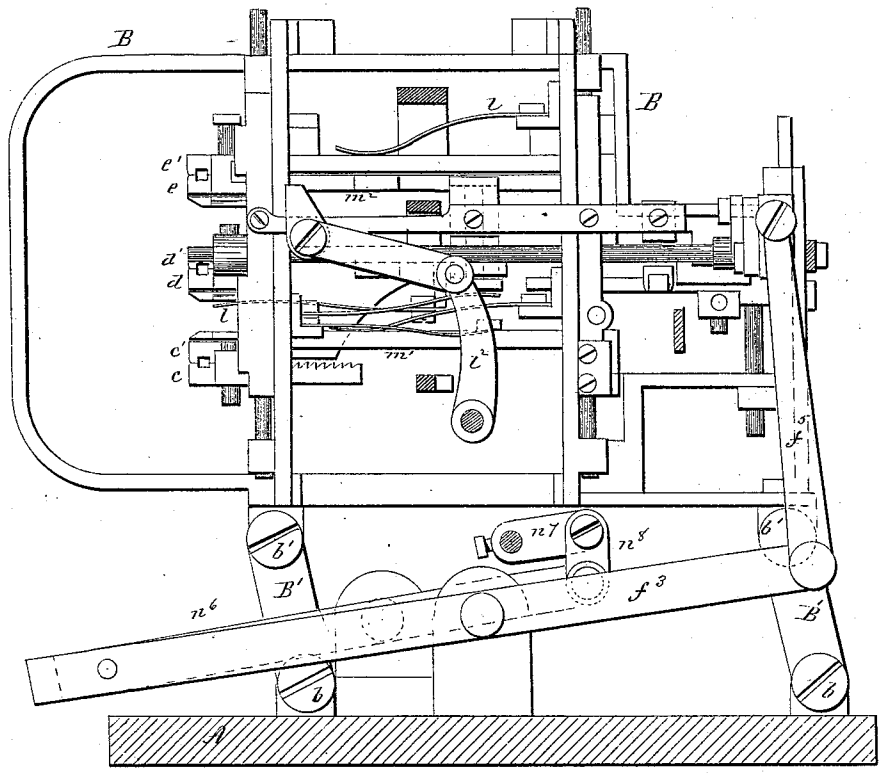
(Model.) 7 Sheets—Sheet 7.

W. BEUKLER.

RUFFLING MACHINE.

No. 255,916. Patented Apr. 4, 1882.

fig 7



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM BEUKLER, OF NEW HAVEN, CONNECTICUT.

RUFFLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 255,916, dated April 4, 1882.

Application filed October 10, 1881. (Model.)

To all whom it may concern:

Be it known that I, WM. BEUKLER, of New Haven, in the county of New Haven and State of Connecticut, have invented new Improvements in Ruffling-Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view; Fig. 2, a front side view of the feeding mechanism, the crimping devices removed; Fig. 3, a rear view, the stitching mechanism removed; Fig. 4, an end view; Fig. 5, a transverse section, showing the feeding mechanism; Fig. 6, a transverse section, showing the presser-foot; Fig. 7, same as Fig. 4, with the end of the frame removed.

This invention relates to an improvement in machines for the manufacture of what is commonly termed "ruffling"—that is to say, the article of manufacture made from a narrow strip of fabric shirred, gathered, or plaited by well-known mechanism, and the shirrs, gathers, or plaits stitched by a stitching mechanism combined with the gathering or plaiting mechanism. In some classes of this manufacture it is required to stitch together two or more of such shirred, gathered, or plaited strips, and this is usually done by first gathering, shirring, or plaiting the strips singly, then placing two or more such gathered strips together, one upon the other, and running them thus placed together through a common sewing-machine to run the stitches through the two or more strips at the gathered edge, thus making a doubled, trebled, or quadrupled ruffle, as the case may be. In thus manufacturing this class of ruffles several operations are necessary—that is to say, each strip must be made complete in itself, then other operations to unite the several strips.

The object of this invention is the construction of a machine which will receive the two or more strips to be gathered, crimped, or plaited, and perform the operation of gathering, crimping, or plaiting on each strip independently, and deliver those strips together, one upon the other, after the gathers, crimps, or plaits have been laid, so that the same mechanism which stitches the several strips together will also secure the gathers, crimps, or plaits, thereby saving several operations necessary in the present method of manufacture.

To this end the invention consists essentially in combining two or more gathering, crimping, or plaiting devices with independent feeds for each set of devices, which will take the strips, after the operation of said devices thereon, and feed them to a single-stitch making mechanism, whereby not only will the several strips be secured together, but the same line of stitches which secures them together will also secure the gathers, crimps, or plaits, as more fully hereinafter described.

In representing my invention I illustrate it in Fig. 1 as combined with the plaiting mechanism for which Letters Patent of the United States were granted to me, dated June 11, 1878, No. 204,704; but this I wish to be understood I do simply for illustration, as the mechanism between the gathering or plaiting mechanism and the stitch-making mechanism may be applied in connection with any of the known crimping, gathering, or plaiting mechanisms. I shall therefore only briefly describe the plaiting mechanism. This consists of a pair of plaiting-pins, a a', attached to an intermittently-revolving shaft, a^2, which also has a longitudinal movement imparted to it, so as to take the fingers from the position seen in Fig. 1 to the position seen in broken lines, same figure, which movement is produced by means of a lever, a^3, operated by a cam, a^4, on the driving-shaft a^5. The rotary movement is imparted to the shaft a^2 and thence to the fingers by means of a segment, a^6, working into a pinion, a^7, on the shaft a^2, the said segment being formed on the end of a lever, a^8, to which a vibratory movement is imparted by a cam, a^9, substantially as in my patent before referred to, so that when the fingers a a' are advanced they pass onto the material to be plaited, one upon one side and the other upon the other side, thus being rotated the one upon the other, forming a plait in the strip, and after having formed the plait the feed of the machine grasps the plait so formed, then the fingers are withdrawn, the plait is advanced toward the stitch-making mechanism, then a second plait is formed, and

so on; but, as before stated, any of the known crimping, gathering, or plaiting devices may be substituted for that shown and thus briefly described.

The feeding mechanism, which constitutes the essential feature of my invention, is formed between the crimping devices and the stitch-making mechanism, and is shown full size in Figs. 2, 3, 4, and 5 detached from the crimping and stitching mechanisms, and represents three feeds—that is to say, mechanism to take the strips from three independent crimping devices and deliver them to the single stitching apparatus.

A represents the bed-plate on which the mechanism is arranged.

B is a carriage hung to the bed-plate by parallel levers B′, pivoted by one end, as at *b*, to the bed-plate, and by the other end, as at *b′*, to the carriage, (see Fig. 5,) so that the said carriage may swing, as from the position in Fig. 5 to that in broken lines, same figure, caused so to move by a crank, B^2, on the driving-shaft connected to the said carriage by a pitman, B^3, (see Fig. 1,) the extent of this movement being made adjustable by changing the throw of the crank or the employment of other known expedients. This carriage B carries the three feeding devices, one above the other, *c* representing the lower and *c′* representing the upper jaw of the lower feeding device, *d* representing the lower and *d′* the upper jaw of the middle feeding device, and *e* and *e′* representing the lower and upper jaw of the upper feeding device. The meeting surfaces of these jaws are toothed substantially like the feeding devices in stitching and like mechanism, so as to grasp the material to be fed.

The feeding-jaws each consist of two parts (seen in Figs. 2 and 5) parallel with each other. The upper jaws—to wit, *c′ d′ e′*—are each attached to a vertical slide, *f*, so that as the said slide is raised, as hereinafter described, the said upper jaws are correspondingly raised. From each of the lower parts, *c d e*, an arm respectively, c^2 d^2 e^2, extends toward the slide *f* and respectively beneath arms c^3 d^3 e^3 on a vertical slide, *f′*, so that as the said slide is depressed it will correspondingly depress the lower parts of the feed, this movement of the two parts serving to open and close the feed to receive and grasp the fabric. This up-and-down movement of the slides *f f′* is produced by a rock-shaft, f^2, carrying pinions between the two slides *f f′*, working in racks in said slides, one upon one side of the pinions and the other upon the opposite side, as seen in Fig. 2. This rock-shaft has an oscillating movement imparted to it by means of a lever, f^3, operated by a cam, f^4, on the driving-shaft, from which a connecting-rod, f^5, extends into connection with an arm, f^6, so that at each operation of the cam the slide *f* is raised and the slide *f′* depressed, correspondingly opening the respective feeds to make a new grasp upon the fabric, and then permitted to close thereon. Immediately after the feed-jaws have been thus opened they are moved toward the crimping device by the crank B^2, and immediately after they have closed upon the fabric the feed is advanced from the crimping device by the opposite movement of the crank, so that a reciprocating movement is imparted to the feed first toward the crimping device when the feeds are opened, then away from the crimping device and toward the needle when the feeds are closed.

The feeds as thus far described are parallel with each other—that is to say, their respective movements are in planes parallel to each other. Hence the crimped strips introduced at a distance, one above the other, move parallel to each other; but it is necessary to bring them together at one common delivery, and, as here represented, that common delivery is in the same plane with the central feeding device, and consists of a lower feeding-jaw, *h*, attached to the same vertical slide as the lower jaw *d* of the central feeding device, and so as to move with that jaw. The upper jaw, *h′*, is segment-shaped, and hung upon a rock-shaft, h^2, said segment curving backward and upward across the path of the upper feed, as seen in Fig. 5. At the same time the reciprocating movement is imparted to the horizontal feeds a corresponding rocking movement is given to the segment *h′* through the rock-shaft h^2 by a rod, h^4, connected to an arm, h^3, on said shaft, and to the feed-carriage, so that the surface movement of the segment *h′* corresponds to the jaw *h* below. The jaws *h h′*, being in the same line as the central feeding-jaws, *d d′*, receive the material through those jaws *d d′* directly, and continue that feed in the same line; but the material which passes through between the upper jaws, *e e′*, so soon as it arrives at the segment *h′*, is turned out of its horizontal plane above the segment, and carried downward between that segment and the surface h^5, (see Fig. 5,) until it comes upon the upper side of the central material. Then the two thicknesses of strips or material are taken together between the jaws *h h′*, and thence fed together, one close upon the other.

Below the upper central feeding-jaw, *d′*, is a second segment, *i*, hung upon a rock-shaft, *i′*, engaged with the carriage by an arm, i^2, extending from the rock-shaft into connection with an arm attached to the carriage, so that the segment is moved a distance corresponding to the movement of the carriage, and with the upper central jaw, *d′*, so as to cross the path of the lower feed, the same as segment *h′* crosses the path of the upper feed. Hence so soon as the material which passes between the lower feed-jaws comes against the segment *i* it will be carried upward between that segment and the stationary feeding-surface i^3 until it comes between that segment and the upper jaw, *d′*, and below the material between the central jaws. From that point onward the central and lower material are fed together between the jaws *h h′*, thus bringing the three strips or material together, one upon the other,

and feeding all alike. If more than three strips are to be combined, other segments will be employed—as, for instance, if it be four, then the machine will be best made so that a segment shall work in connection with the fourth and upper feed, as does the segment *i* work between the lower and central feed. This feeding mechanism may be duplicated to any extent.

Springs *l* are applied to press the upper jaws downward, and springs *l'* applied to press the lower jaws upward. The pressure may, however, be otherwise applied, it only being essential that there shall be sufficient pressure to grasp the material and prevent the feed slipping on the material, substantially as in sewing-machine feeds. The jaws of each feed operate through a work-plate, substantially like the feed of sewing-machines, *m* representing the work-plate of the lower feed, *m'* the work-plate of the middle feed, and m^2 the work-plate of the upper feed.

It is necessary that the segments, or, as they may be called, "auxiliary feeds," should be moved away from the surface in conjunction with which they work immediately after the feeding movement has been made, and before the return of the segment. For this purpose the rock-shaft h^2 is arranged at each end in one arm, *n*, of a lever pivoted at *n'*, the other arm, n^2, of which extends backward beneath an arm, n^3, attached to the upper end of a vertical sliding bar, n^4. Near the lower end of the sliding bar n^4 a toothed rack is formed upon one edge of the bar, into which a pinion, n^5, works. The said pinion is turned by means of a lever, n^6, in connection with the lever f^3, the said lever linked, as at n^8, to an arm, n^7, on a rock-shaft, n^9, on which the pinion n^5 is arranged, so that as the lever f^3 is turned to open the principal parts of the feed, as before described, the vertical slide n^4 will be drawn downward and depress the arm n^2 and raise the segmental or auxiliary feed.

The rock-shaft h^2 extends across the machine, and is supported in a like lever at both ends, as seen in Figs. 1 and 3. The rock-shaft n^9, on which the pinion n^5 is hung, also extends across the machine and engages with vertical sliding rods or arms at each end, so that the power to raise the rock-shaft h^2 is applied at both ends, and a like arrangement is employed to raise and lower the segments.

Each work-plate is provided with a presser-foot, consisting, as here represented, of three bars—*o o o* for the lower feed, *o' o' o'* for the middle feed, o^2 o^2 o^2 for the upper feed. The presser-foot for the lower feed or work plate comes below the plate, while the middle and upper are above the plate. Hence the movement of the lower presser-foot to relieve the work is downward, while that of the middle and upper will be upward. These parts of the lower presser-foot are attached to a bar, C, running longitudinally across the machine, and attached at each end to a slide, C', arranged to be moved up and down on the vertical guides C^2. (See Fig. 4.) The parts of the middle presser-foot are attached to a similar bar, O^3, extending longitudinally across the machine, and attached to a vertical slide, O^4, arranged to be moved vertically on the same guides, as seen in Fig. 4. The parts of the upper presser-foot are attached to a like bar, O^5, extending longitudinally across the machine and attached to a slide, O^6, on the vertical slides C^2, as also seen in Fig. 4.

At the ends of the machine are two vertical parallel slides, P P', (see Fig. 4,) which are arranged in suitable guides, so as to be moved up and down, and they are so moved by means of pinions P^2 between the said slides, arranged on a rock-shaft, P^3, the said pinions working into toothed racks on the sides of the slides, so that as the rock-shaft is rotated in one direction the slide P will be raised and the slide P' drawn downward, and vice versa. From the slide P arms P^3 extend inward beneath the end of the horizontal bars O^3 O^5, (or the projection extending from the slides to which the bars are attached,) so that as the slide P is raised it will raise the slides O^4 O^6, correspondingly raising the presser-feet thereto attached.

From the slide P' a like arm, P^4, extends inward over a projection, P^5, on the slide C', so that as the slide P' is drawn downward it will depress the slide C', and correspondingly depress or draw down the presser-foot thereto attached.

Each of the presser-feet and bars is provided with a spring, S, the tendency of which is to hold the presser-feet to their work, and yet yield in the usual manner for the presser-feet of sewing-machines.

The presser-feet are operated by means of a cam, P^6, on the driving-shaft through a lever, P^7, in connection with an arm, P^8, extending from said rock-shaft, as seen in Figs. 1 and 4.

The presser-feet thus far described are thus worked in connection with the principal parts of the feed. Like presser-feet are required for the segmental or auxiliary feeds. These are represented at *r* in Figs. 3 and 6 for the upper segment attached to a bar, *r'*, extending longitudinally across the machine, the said bar being hung in one arm, r^2, of a lever, the other arm, r^3, of which extends backward beneath a projection, r^4, from the vertical slide P', as seen in Fig. 2, so that as the vertical slides P' are drawn downward to open the lower feed they will at the same time depress the arms r^3 of the levers to which the bar *r'* is attached, and raise that bar with the segment-shaped presser-feet thereto attached. A spring, r^5, presses upward beneath the arm r^3 to hold down the presser-foot with the requisite yielding pressure.

The parts of the lower segmental-shaped presser-feet, *u*, are attached to a longitudinal bar, *u'*, extending across the machine and supported on arms u^2 of levers, the other arms, u^3, of which are provided with springs u^4, the tendency of which is to hold the segment-shaped

presser-feet u up to their work with the requisite yielding pressure. The said arms u^2 have a stud, u^5, extending outward beneath projections u^6 on the vertical slide P′, (see Fig. 2,) so that as that slide is depressed it will correspondingly depress the lower segment-shaped presser-feet.

An auxiliary presser-foot, t, is arranged beneath the stationary part which forms the working-surface h^5 for the upper segment, as seen in Fig. 6. This stationary part extends outward to the principal feed, and forms a surface, t', in the same plane with the central feed, and so that the work delivered from the central and lower feed will pass directly in between the presser-foot t and the stationary surface t'. This presser-foot is attached to a bar, t^2, extending longitudinally across the machine, and at each end is attached to a slide, t^3, on the vertical guides t^4. From the vertical slides t' an arm, t^5, extends forward over a projection, t^6, on the said slides t^3, so that as the vertical slide t' is depressed it will correspondingly move down the auxiliary presser-foot t, the presser-foot being held up to its place with a yielding pressure by means of a spring, t^7. Thus a simultaneous opening and closing movement will be given to the principal and auxiliary presser-feet, and which occurs at the proper time—that is to say, the presser-feet move away from the work immediately before the feed begins and close immediately after the feed has been made, substantially as do the presser-feet in sewing-machines. After the several strips have been thus brought together they are delivered through the central feed, d d, to the stitching mechanism, x, Fig. 1, representing the needle-hole, and the parallel lines each side represent the feed of a common stitch-making mechanism, (here represented as that known as the "Willcox & Gibbs,") too well known to require further illustration than its location, as shown in Fig. 1, the outer broken lines representing the work-plate, which is on a plane with the central feed, as seen in Fig. 4. This stitch-making mechanism is geared with the driving-shaft, so as to work simultaneously with the other parts of the machine in the usual manner for ruffling-machines, and substantially as shown in my patent before referred to.

I have illustrated the auxiliary feeds of the upper and lower parts as segment-shaped, and this I prefer, because of the more convenient shape which it gives for the transfer of the work to the central delivering-feed; but, if preferred, they may be different shape, it only being essential to this invention that the feeds for the respective strips shall deliver the strips which they receive directly from the ruffling mechanism, one upon the other, through a common delivery, and while I prefer the auxiliary feed, as before mentioned, the principal feeds may be arranged so as to properly receive the respective strips and bring them together through a common delivery—as, for instance, instead of being parallel with each other, as shown, they may be inclined from the point where they receive other strips to one common delivery.

While I prefer that the delivery shall be from the central point shown, it will be evident to those skilled in the art that it may as well be from the lower or upper feeds, or either, if more than three be used. I therefore do not limit my invention to delivering from above and below to an intermediate or central auxiliary feed.

I represent an independent feed for sewing-machines, because in some classes of work—as in plaiting, for instance—the feeding mechanism which takes the work from the plaiting device must move sufficiently far to take in a full plait and carry it forward at each movement, which would be a considerably greater movement than would be desirable for the stitch-making mechanism. Hence the stitch-making mechanism will only feed one stitch at a time, while the delivering-feed will deliver a considerable length; but in that case the plaiting and the delivering feed work proportionately less frequent than does the feed of the stitch-making mechanism.

I have described this invention as for crimping, gathering, and plaiting, such as known under the term "ruffling." In the following claims I therefore use the term "ruffling" as embodying mechanism for crimping, gathering, shirring, and like devices.

I claim—

1. In a ruffling mechanism, the combination of the following elements: first, two or more mechanisms, substantially such as described, to ruffle the strips respectively given to the said mechanism; second, two or more feeds arranged each to receive one of the ruffled strips from the said ruffling mechanisms, and together deliver the several ruffled strips through one common delivery, laid one upon the other, to, third, a stitch-making mechanism, substantially such as described, arranged relatively to the said place of delivery to run a line or lines of stitches through the said several strips so delivered to the said stitch-making mechanism, substantially as described.

2. In ruffling mechanism, the combination of the following elements: first, two or more mechanisms, substantially such as described, to ruffle the strips respectively given to the said mechanisms; second, two or more principal feeds to receive the strips, respectively, from the said ruffling mechanisms; third, auxiliary feeds acting in conjunction with the said principal feeds to bring the several strips passing through said principal feed to one common delivery, one upon the other, to, fourth, a stitch-making mechanism, substantially such as described, to run a line or lines of stitches through the said several strips so delivered to the said stitch-making mechanism, substantially as described.

3. In a ruffling mechanism, the combination of the following elements: first, two or more mechanisms, substantially such as described, to ruffle the strips respectively given to the said mechanisms; second, two or more principal feeds to receive the strips, respectively, from the said ruffling mechanisms; third, auxiliary feeds acting in conjunction with the said principal feeds to bring the several strips passing through said principal feeds to one common delivery, one upon the other, to, fourth, a stitch-making mechanism, substantially such as described, to run a line or lines of stitches through the said several strips so delivered to the said stitch-making mechanism; and, fifth, a feed in connection with said stitch-making mechanism independent of the principal and auxiliary feeds which deliver the strips, substantially as described.

4. In a ruffling mechanism, the combination of the following elements: first, two or more mechanisms, substantially such as described, to ruffle the strips respectively delivered to the said mechanisms; second, two or more feeds arranged to respectively take the ruffled strip from said ruffling mechanisms arranged upon a carriage common to all, to which an intermittently-reciprocating movement is imparted; third, mechanism, substantially such as described, to simultaneously open and close said feeds, the said feeds being arranged to deliver their respective strips together, one upon the other, through one common delivery, to, fourth, a stitch-making mechanism, substantially such as described, arranged to run a line of stitches through the said several strips as they are delivered one upon the other to the stitch-making mechanism, substantially as described.

5. In a ruffling mechanism, the combination of the following elements: first, two or more mechanisms, substantially such as described, to ruffle the strips respectively delivered to the said mechanisms; second, two or more feeds arranged to respectively take the ruffled strip from said ruffling mechanisms arranged upon a carriage common to all, to which an intermittently-reciprocating movement is imparted; third, mechanism, substantially such as described, to simultaneously open and close said feeds, the said feeds being arranged to deliver their respective strips together, one upon the other, through one common delivery, to, fourth, a stitch-making mechanism, substantially such as described, arranged to run a line of stitches through the said several strips as they are delivered one upon the other to the said stitch-making mechanism; and, fifth, a presser-foot for said feeds, arranged to be simultaneously raised from and lowered upon the work, substantially as described.

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