

No. 828,589.

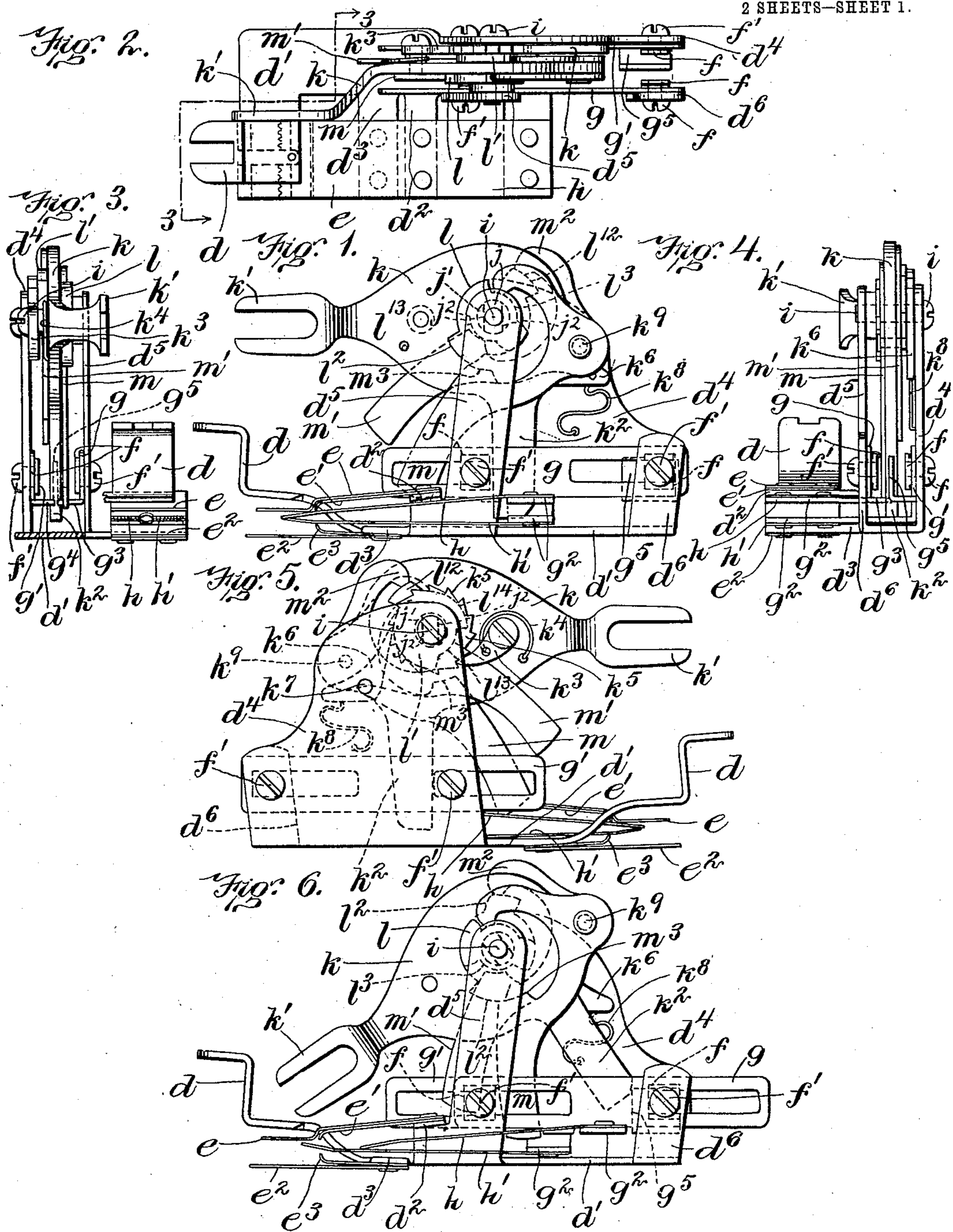
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J. F. WILKINSON.

# BOX PLAITING ATTACHMENT FOR SEWING MACHINES.

APPLICATION FILED AUG. 9, 1905.

2 SHEETS—SHEET 1.



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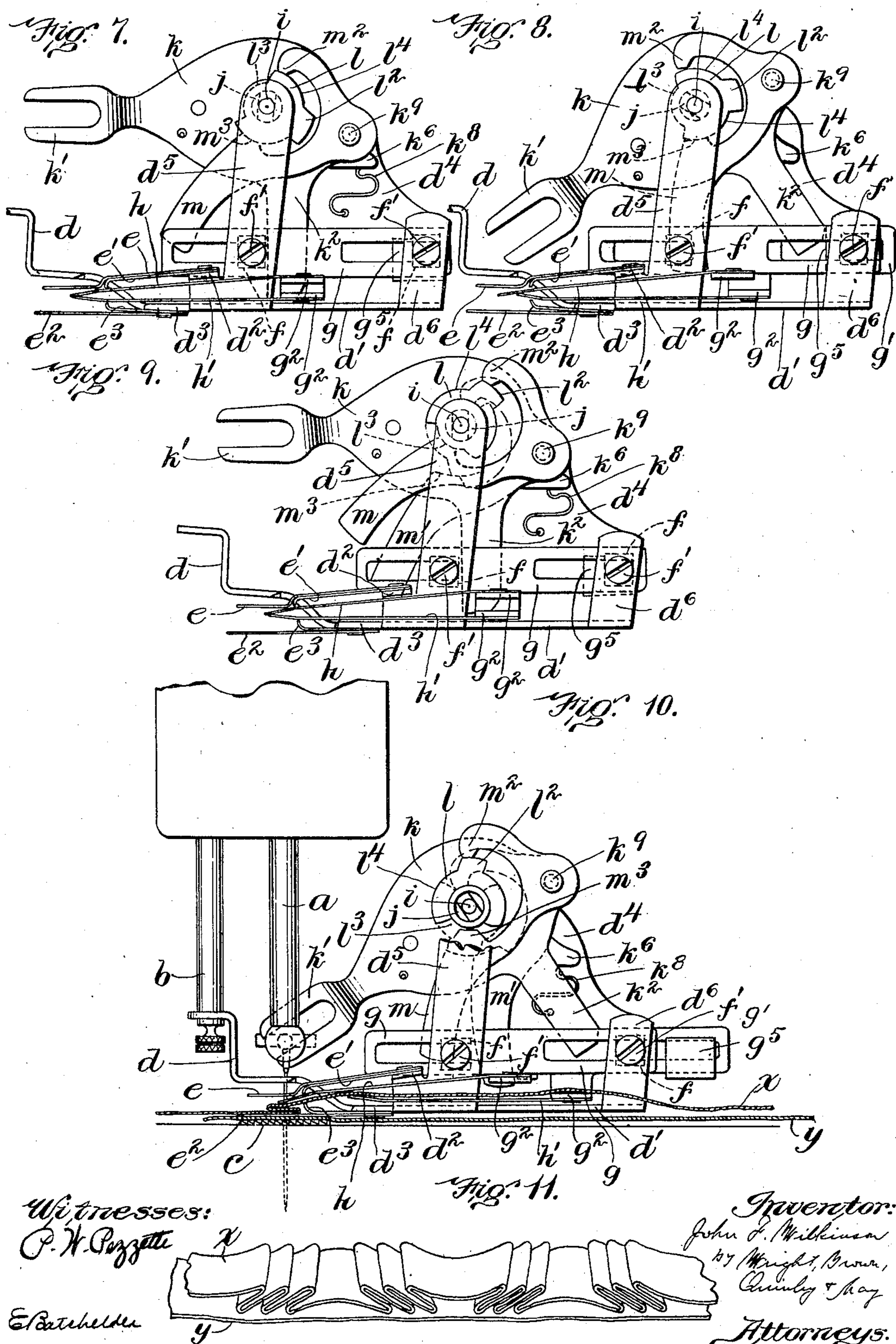
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# UNITED STATES PATENT OFFICE.

JOHN F. WILKINSON, OF GLOUCESTER, MASSACHUSETTS.

## BOX-PLAITING ATTACHMENT FOR SEWING-MACHINES.

No. 828,589.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed August 9, 1905. Serial No. 273,371.

*To all whom it may concern:*

Be it known that I, JOHN F. WILKINSON, of Gloucester, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Box-Plaiting Attachments for Sewing-Machines, of which the following is a specification.

This invention relates to sewing-machine attachments of the type known as "rufflers" and "gatherers," and particularly to devices of such character which gather the cloth into what are known as "box-plaits," the device being attachable to and operable by any well-known make of sewing-machine.

One of the objects of my present invention is to provide an attachment which is supported entirely by the presser-foot bar and in which the motions of the moving parts are imparted solely by the needle-bar, similar to an ordinary ruffler and gatherer, and in which all motions of the crimping-blades, which form the plaits, are positive, thereby dispensing with the use of springs.

A farther object of the invention is to provide a device of this type in which the lower slide assists the operation of the feed-dog of the sewing-machine.

A further object of the invention is to provide means whereby the upper spring-jaws assist in holding the goods in place during the operation of stitching.

A further object is to provide means whereby the device may be caused to produce a varying number of folds by substituting different forms of cams for each other.

A further object is to provide an attachment having a bottom plate or jaw forming a yielding presser-foot.

Further objects of the invention are to provide improvements in various details or features hereinafter described.

To these ends the invention consists in the construction and combination of parts, substantially as hereinafter described and claimed.

Of the accompanying drawings, Figure 1 is a side elevation of a complete attachment embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation from the left of Fig. 1, partly in section, on the line 3 3 of Fig. 1. Fig. 4 is an end elevation looking from the right of Fig. 1. Fig. 5 is a side elevation from a point of view opposite that taken in Fig. 1. Figs. 6, 7, 8, and 9 are views similar to Fig. 1, but representing the movable parts in different positions. Fig.

10 is an elevation, partly broken out and showing portions of a sewing-machine to which the attachment is applied. Fig. 11 is a perspective view of a piece of work plaited by the attachment, but omitting the stitches.

Similar reference characters indicate the same or similar parts throughout the several views.

In Fig. 10 the needle-bar *a*, presser-foot *b*, and feed-dog *c* are represented as of an ordinary kind, the needle-bar having, as usual, a clamping-screw for the needle, which clamping-screw engages the actuating-lever device hereinafter described. The fabric operated upon is indicated at *x*, and the base fabric, to which the folded or plaited fabric is sewed, is represented at *y*.

The frame-piece of the attachment, preferably consisting of a single piece of sheet metal bent to form the portions hereinafter described, comprises the attachment-arm *d*, which is secured to the presser-foot bar of the sewing-machine, and the base-plate *d'*. Said base-plate is formed with an upper lateral arm *d*<sup>2</sup>, a lower lateral arm *d*<sup>3</sup>, side plate *d*<sup>4</sup>, and the uprights *d*<sup>5</sup> and *d*<sup>6</sup>. The upright *d*<sup>5</sup> is of a greater height than the upright *d*<sup>6</sup> in order to form a support for the bearing pin or screw hereinafter described.

Secured to the upper lateral arm *d*<sup>2</sup> is a spring-presser comprising plate *e*, which extends forward under the path of the needle, and a spring detent or holder *e'*, having its extreme edge bent downward, so as to bear upon the upper crimping-blade when the latter is projected forward and to bear upon the goods when the crimping-blade is retracted, thereby holding the goods in place during the operation of stitching. Secured to the lower lateral arm *d*<sup>3</sup> is a presser comprising the member *e*<sup>3</sup>, projecting forward under the path of the movement of the needle, and the detent or holder *e*<sup>3</sup>, the extreme end of which is bent upward to act upon the under side of the goods in the same manner that the detent *e'* serves in connection with the upper surface of the goods. It will be understood, of course, that since these two pressers are stationary they will serve to hold the goods firmly during the rearward movement of the crimping-blades; also, the forward end of the presser *e*<sup>2</sup> by bearing upon the base fabric *y* acts as a yielding presser-foot against which the feed-dog *c* presses said fabric during the advance movement of the feed-dog. Guide blocks or ways *f* are secured to the in-

ner faces of the side plate  $d^4$  and the uprights  $d^5$  and  $d^6$  by means of screws  $f'$ , said guide blocks or ways fitting suitable slots formed in the slides  $g$  and  $g'$ . Each slide  $g$  and  $g'$  is formed with a lateral arm  $g^2$ , to which the crimping-blades  $h$  and  $h'$  are secured. The slide  $g$  is formed with a toe  $g^3$ , projecting toward the slide  $g'$ , and the slide  $g'$  is formed with a toe  $g^4$ , projecting toward the slide  $g$ . In other words, the toes  $g^3$  and  $g^4$  project toward each other, and they are in the same plane or at the same height above the base-plate  $d'$ , as clearly shown in Fig. 3. The slide  $g'$  is also formed with a lug  $g^5$  turned upward from the lower edge of its rear end, as will be best understood by comparing Figs. 4 and 10. The toes  $g^3$  and  $g^4$  and the lug  $g^5$  constitute the portions of the slides which are engaged by the actuating-arms hereinafter described, so as to reciprocate the slides in certain varying manners, as will be more apparent presently.

The crimping-blades  $h$  and  $h'$  are secured to the lateral arms  $g^2$  of the slides  $g$  and  $g'$ , so as to partake of the reciprocating movements of said slides.

A screw or pin  $i$ , mounted in the side plate  $d^4$  and the long upright  $d^5$  and extending across the space between said plate and upright, forms the bearing for a sleeve  $j$ . (See dotted lines in Figs. 1, 7, and 8.) The actuating-lever  $k$  is mounted to oscillate on the sleeve  $j$  and is formed with a slotted end  $k'$  to engage the usual screw of the needle-bar of a sewing-machine. Said lever is formed with an arm  $k^2$  integral therewith or rigidly connected thereto, and said arm  $k^2$  extends down to a point where it will engage the toes  $g^3$  and  $g^4$  to actuate the slides and the crimping-blades in the forward direction of movement. Said arm  $k^2$  also at certain times engages the lug  $g^5$  of the slide  $g'$ , as will be hereinafter described. Since the lever  $k$  also has a definite range of oscillation, according to the vertical movements of the needle-bar, and since the arm  $k^2$  also has a definite range of movement, the crimping-blades  $h$  and  $h'$  must always be advanced to the exact and proper point to place a fold in position to be engaged by the needle of the sewing-machine.

As shown in Fig. 5, an actuating-pawl  $k^3$  is pivotally connected with the rear side of the lever  $k$ , and a spring  $k^4$  is so connected with the lever and pawl as to normally press the point or toe of the pawl into engagement with the teeth of the ratchet  $k^5$ , which is so connected with the sleeve  $j$  as to actuate or rotate said sleeve with a step-by-step movement as the lever  $k$  is oscillated. A detent-pawl  $k^6$  (see dotted lines in Fig. 5) is pivoted at  $k^7$  to the plate  $d^4$  and is provided with the spring  $k^8$  to cause said detent to engage the ratchet  $k^5$ . The lever  $k$  also carries a fulcrum or pivot  $k^9$ , on which the adjustable arms that will be presently described are mounted.

Two cams  $l$  and  $l'$  are connected with the sleeve  $j$ , so as to rotate with said sleeve as the latter is actuated by the lever  $k$  and its pawl  $k^3$ . These two cams are identical with each other; but in practice I make them interchangeable for other cams of somewhat different shape in order that the device may be caused to produce folds or plaits differing in number or shape.

As has been stated, the pin  $i$  is mounted in the side plate  $d^4$  and the long upright  $d^5$ , and said pin forms a bearing for the sleeve  $j$ . Said sleeve is circular at that portion of its length which supports the oscillating lever  $k$ , as indicated by the dotted circle  $j'$  in Figs. 1 and 6, and on each side of the said cylindrical portion is flattened, as indicated by the dotted chords  $j^2$ . The cams  $l$  and  $l'$  and the ratchet  $k^5$  are formed with central openings to fit the said flattened portions  $j^2$  of the sleeve, and therefore rotate all together. One cam is on one side of the lever  $k$  and the other cam and the ratchet  $k^5$  on the other side. It will therefore be understood that the cams may be readily interchanged for others differently shaped. Each cam is formed with a shoulder or tip, a recess opposite said shoulder or tip, and intermediate concentric portions. The shape of each cam is best illustrated in Figs. 7, 8, and 9, in which figures, however, only the cam  $l$  appears, because the cam  $l'$  is on the opposite side of and is concealed by the lever  $k$ . As shown in said figures, the cam is formed with a shoulder or tip  $l^2$ , a recess  $l^3$  in its opposite edge, and the intermediate portions  $l^4$ , the surfaces of which are equidistant from the center of movement of the cam. In Fig. 5, which is a view from the side of the device opposite that shown in Figs. 7, 8, and 9, the cam  $l'$  is shown partly in dotted lines as having a shoulder or tip  $l'^2$ , a recess  $l'^3$  opposite said tip, and the intermediate portions  $l'^4$ . The two cams  $l$  and  $l'$  are so secured or connected with the sleeve  $j$  that their shoulders or tips extend in opposite directions radially from the sleeve, so that as they are carried around with a step-by-step movement by the operation of the lever  $k$  they will cause the adjustable arms hereinafter described to be alternately shifted to and from a forward position.

Pivoted at  $k^9$  on opposite sides of the lever  $k$  are the arms  $m$  and  $m'$ , each having an upper toe  $m^2$  and a lower toe  $m^3$ . In other words, each arm  $m$  or  $m'$  is formed with a yoke which partially embraces a cam, so that the toes  $m^2$  and  $m^3$  will be alternately engaged by the shoulder or tip  $l^2$  or  $l'^2$  of the cam, and thereby swing the arm on the pivot or fulcrum  $k^9$  and vary the distance which the end of said adjustable arm will bear relatively to the fixed arm  $k^2$  of the actuating-lever. The ends of the arms  $m$  or  $m'$  are designed to engage, as hereinafter described, the sides of the toes  $g^3$  and  $g^4$  of the crimping-

blade slides on the sides opposite the point of engagement of the fixed arm  $k^2$  of the actuating-lever. It may be stated here, however, that the arms  $m$  and  $m'$  are of such length that when either of them is swung forward because of the engagement of a cam tip with the upper toe  $m^2$  the extreme end of such arm will be at a lesser distance from the pivotal point  $i$  of the actuating-lever, and therefore will be so shortened relatively to such axis of movement that it will not engage the toe of a slide and will allow that slide to remain stationary. This apparent shortening effect of the arm  $m$  or  $m'$  is due to its being pivoted to the actuating-lever  $k$  at the point  $k^1$ , some distance away from the pivotal point of the actuating-lever itself.

By referring to Figs. 1 and 3 it will be seen that the arm  $k^2$  of the actuating-lever has advanced both slides  $g$  and  $g'$  (and of course their crimping-blades  $h$  and  $h'$ ) by engaging the toes  $g^3$  and  $g^4$  of the slides. The cam which swings the arm  $m'$  has lifted the arm, so that its extreme end is at a lesser distance from the bearing  $i$  than the distance from said bearing to the toes  $g^3$  and  $g^4$ . Therefore when the actuating-lever is thrown down to the position shown in Fig. 6 by the downward movement of the needle-bar only the arm  $m$  engages a toe of a slide, the other arm  $m'$  passing over the toe of the other slide. The part which is engaged by the arm  $m$  is the toe  $g^3$  of the slide  $g$ , said slide  $g$  carrying the upper crimping-blade  $h$ . Therefore only the upper crimping-blade will be retracted, as shown in Fig. 6, the other or lower crimping-blade remaining stationary. On the next upward movement of the needle-bar the arm  $k^2$  of the actuating-lever engages the toe of the slide that has just been retracted and advances it its full distance, therefore gathering up a wide fold or plait of the fabric  $x$  and advancing it under the needle. Continued movements of the actuating-lever will cause the upper blade to make a succession of such gathers or plaits until the rotation of the sleeve and the cams changes the position of the arm  $m$ . With the form of cams as shown there will be three of these wide plaits formed before the cams change the positions of the arms  $m$  and  $m'$  relatively to the arm  $k^2$ . The first change brings the two arms  $m$  and  $m'$  parallel with each other, as indicated in Fig. 7, and during several succeeding oscillations of the actuating-lever the said arms  $m$  and  $m'$  do not act at all, the fixed arm  $k^2$  simply engaging the lug  $g^5$  of the slide  $g'$ , so as to carry it back slightly, as shown in Fig. 8, and then on the return or advance movement said arm  $k^2$  engages the toe  $g^4$  of the slide  $g'$ , that has been slightly retracted, then advancing the said slide. This slide carries the lower crimping-blade, and the movement at this time is only just sufficient to cause the said lower blade to

coact with the feed-dog of the sewing-machine and advance the work without producing any folds or plaits in the fabric  $x$ . At this time the sewing-machine simply unites the two pieces of fabric along either the upper or the lower box-plait until the ratchet has been rotated so as to cause the cams to shift the arms  $m$  and  $m'$  to the positions shown in Fig. 9. When the arms are in this position, the arm  $m$  is thrown up, so that it will not engage the toe of the slide of the upper crimping-blade, but the arm  $m'$  will engage the toe of the slide of the lower crimping-blade and retract said blade to such a distance that the fixed arm  $k^2$  of the actuating-lever will cause said lower blade to gather a wide fold of the fabric that will oppose the last fold made by the other blade, and therefore produce the box-plait. The next few movements of the actuating-lever cause the lower blade to gather up a succession of wide plaits or folds until finally the said arm  $m'$  is shifted back, so that it will not engage a slide, both arms returning to the position shown in Fig. 7, where there will be no operation of the blades sufficient to gather up any folds.

It will now be seen that I have provided a sewing-machine attachment of the ruffling or gathering type, adapted to form box-plaits, in which a positively-operated actuating-lever moves the blade-carrying slides in one direction and carries automatically-adjustable arms which move said slides in the other direction positively. At the same time the attachment is supported entirely by the presser-foot bar, and the positive movements of the blade-carrying slides are imparted solely by the needle-bar.

Having now described my invention, what I claim is—

1. A box-plaiting attachment for sewing-machines comprising a frame having an arm for attachment to the presser-foot bar of a sewing-machine, a lever supported by said frame and adapted to be actuated by the needle-bar of said sewing-machine, a pair of independently-movable cloth-gathering blades slidably supported by said frame, and means operated by said lever for automatically and positively actuating first one blade a plurality of times forward and back while the other blade remains stationary and then the said other blade a plurality of times forward and back.

2. A sewing-machine attachment of the character described comprising a frame-piece adapted to be supported entirely above the work-table of a sewing-machine, said frame-piece having a pair of independently-movable cloth-gathering blades, a lever adapted to be actuated by the needle-bar of a sewing-machine, and connections between said lever and blades for automatically and positively actuating first one blade a plurality of times

forward and back while the other blade remains stationary and then the said other blade a plurality of times forward and back.

3. A sewing-machine attachment of the character described comprising blade-carrying slides, an actuating-lever for moving the slides in one direction, and automatically-adjustable arms carried by said lever for moving the slides in the other direction.

4. A sewing-machine attachment of the character described comprising blade-carrying slides, an actuating-lever for advancing the slides, and automatically-adjustable arms carried by said lever for retracting the slides.

5. A sewing-machine attachment of the character described comprising a lever having arms adjustable relatively thereto, cloth-gathering blades adapted to be actuated by said lever and arms, and means for automatically swinging the said arms relatively to the lever to vary their positions relatively to the slides.

6. A sewing-machine attachment of the character described comprising a frame-piece having upper and lower lateral arms, spring-pressers and detents secured to said arms, plait-forming blades movable between said arms and pressers, and means for automatically and positively actuating first one blade a plurality of times forward and back while the other blade remains stationary and then the said other blade a plurality of times forward and back.

7. A sewing-machine attachment of the character described comprising a frame having guides or ways, a pair of slides mounted on said guides or ways, each slide having a cloth-gathering blade, means for alternately actuating said slides positively, and means

for automatically varying the amount of reciprocation imparted to one of said slides.

8. A sewing-machine attachment of the character described comprising blade-carrying slides each having a toe or projection, a lever adapted to be actuated by the needle-bar of a sewing-machine and having an arm adapted to engage said toes, arms adjustably connected with said lever and adapted to engage the other side of said toes, and means for varying the position of said arms relatively to the lever.

9. A sewing-machine attachment of the character described comprising blade-carrying slides, each having a toe or projection, an actuating-lever for engaging said toes or projections to advance the slides, arms pivotally connected with said lever and each adapted to engage the toe of a slide, cams for engaging said arms to vary their positions relatively to the lever, and means for actuating said cams by the movements of the lever.

10. A sewing-machine attachment of the character described comprising blade-carrying slides, each having a toe or projection, an actuating-lever for engaging said toes or projections to advance the slides, arms pivotally connected with said lever and each adapted to engage the toe of a slide, cams for engaging said arms to vary their positions relatively to the lever, and means for actuating said cams by the movements of the lever, said cams being removable whereby differently-shaped cams may be substituted therefor.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN F. WILKINSON.

Witnesses:

A. W. HARRISON,  
ARTHUR H. BROWN.