March 31, 1942. C. SEAMAN 2,277,720

MACHINE FOR MAKING PLEATINGS

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Fig. 1.

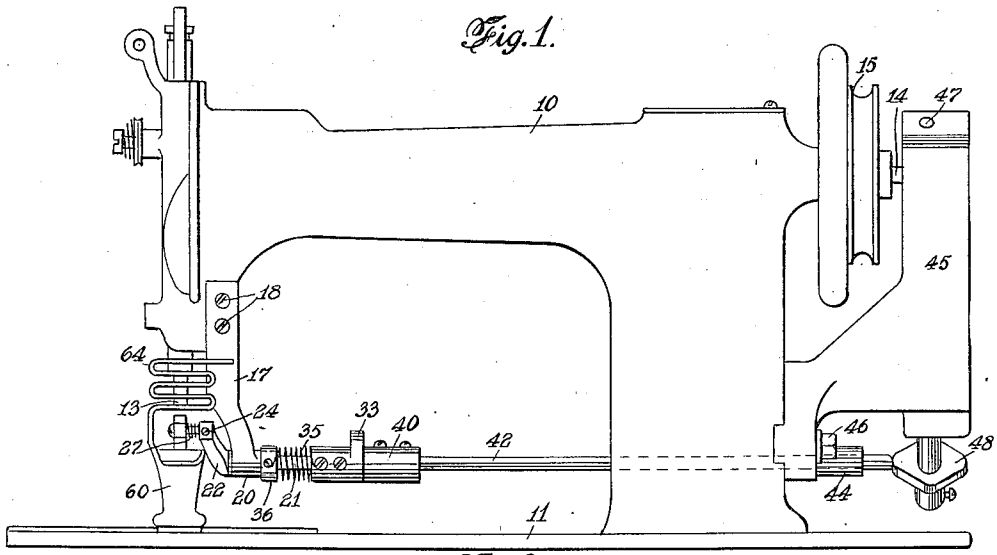


Fig. 2.

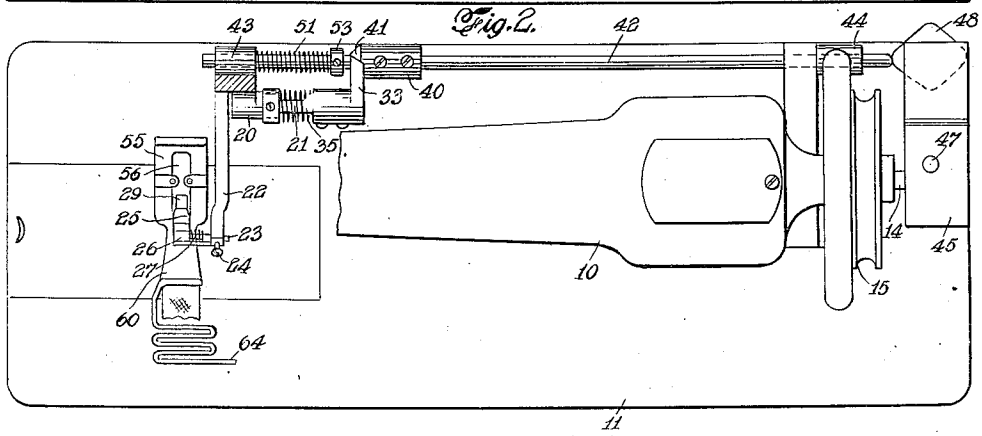
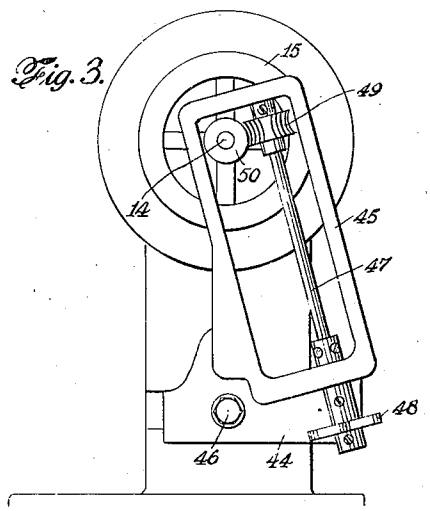


Fig. 3.



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MACHINE FOR MAKING PLEATINGS

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Fig. 4.

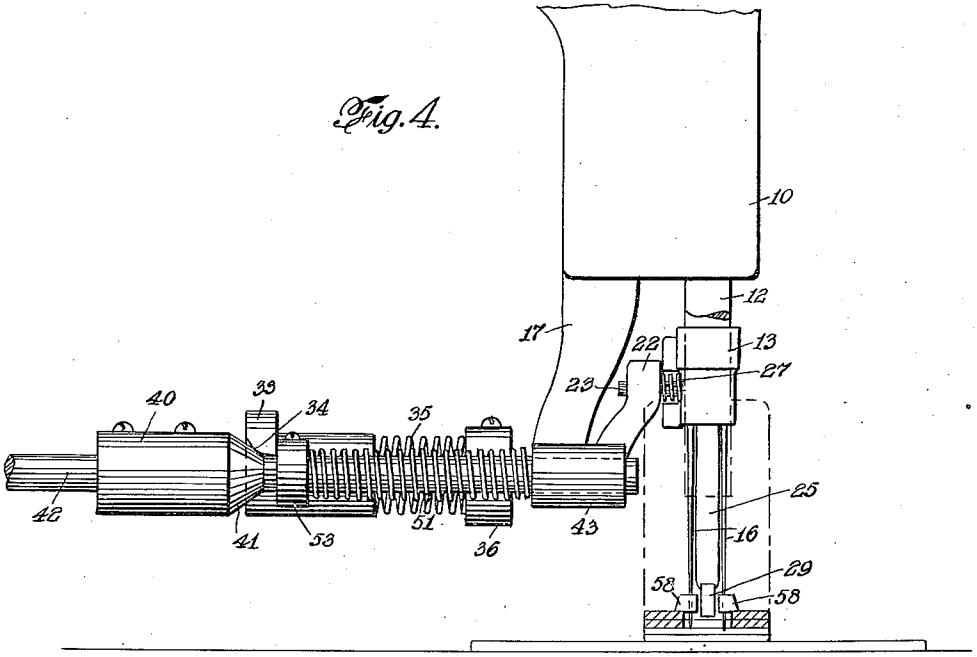


Fig. 6.

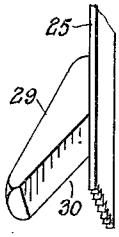


Fig. 5.

Fig. 7.

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MACHINE FOR MAKING PLEATINGS

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Fig. 8.

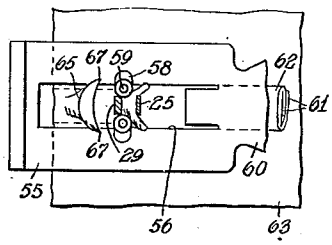


Fig. 9.

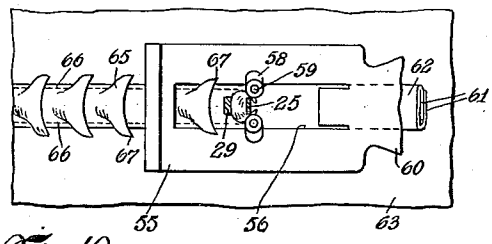


Fig. 10.

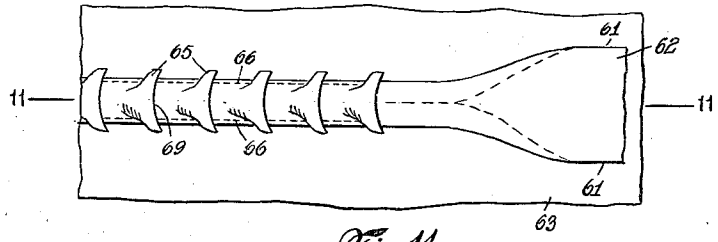


Fig. 11.

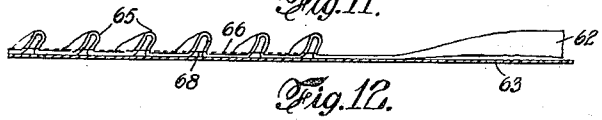


Fig. 12.

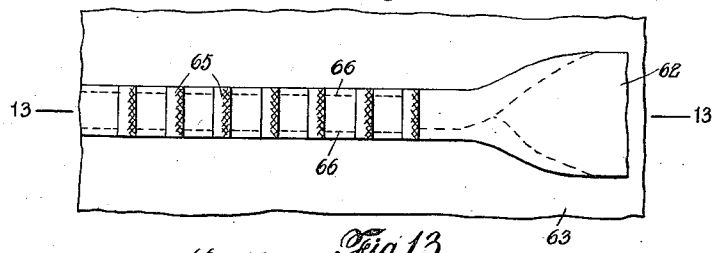


Fig. 13.



Fig. 14.

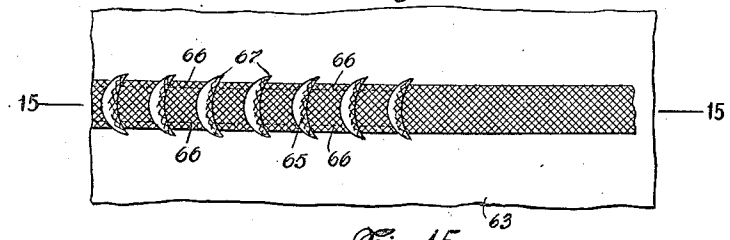
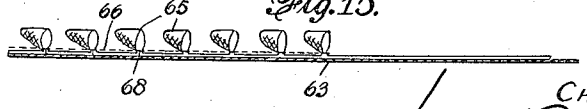


Fig. 15.



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UNITED STATES PATENT OFFICE

2,277,720

MACHINE FOR MAKING PLAITINGS

Charles Seaman, Jamaica Estates, N. Y.

Application October 4, 1939, Serial No. 297,843

23 Claims. (Cl. 112—134)

This invention relates to a machine for making plaitings.

An object of the invention is to provide a machine for making plaiting having a novel and pleasing appearance.

Another object is to provide an attachment for a standard sewing machine to adapt the same to make plaitings.

Various other objects and advantages will become apparent as the nature of the invention is more fully disclosed.

Although the novel features which are believed to be characteristic of this invention are pointed out more particularly in the claims appended hereto, the invention itself may be better understood by referring to the following description, taken in connection with the accompanying drawings, in which a specific embodiment thereof has been set forth for purposes of illustration.

In the drawings:

Figure 1 is a front elevation of a sewing machine embodying the present invention;

Figure 2 is a top plan view thereof with parts broken away to show the plaiting mechanism;

Figure 3 is an end elevation of the sewing machine taken from the right-hand side of Figures 1 and 2, showing the driving mechanism;

Figure 4 is a detail view showing the cam mechanism and the means for supporting the same;

Figure 5 is a detail view showing the needle, plaiting blade and folder;

Figure 6 is a detail view of the plaiting blade;

Figure 7 is a detail view of the presser foot;

Figure 8 is a section taken on the line 8—8 of Figure 5 showing the relative position of the plaiting blade and presser foot prior to stitching the plait;

Figure 9 is a similar sectional view showing the relative position of the plaiting blade and presser foot after the plait has received a stitch;

Figure 10 is a plan view of the folded plaiting produced by the machine of Figures 1 to 9;

Figure 11 is a section taken on the line 11—11 of Figure 10;

Figure 12 is a plan view of a different product which may be made on the machine of Figures 1 to 9;

Figure 13 is a section taken on the line 13—13 of Figure 12;

Figure 14 is a top plan view illustrating a further embodiment of the invention; and

Figure 15 is a section taken on the line 15—15 of Figure 14.

Referring to the drawings more in detail, the invention is shown as applied to a sewing machine head 10 mounted upon a base 11. The head 10 carries the usual presser foot bar 12 and needle bar 13 and is provided with suitable driving mechanism therefor actuated by a rotating drive shaft 14 driven by a pulley 15. The needle bar 13 carries a pair of needles 16 adapted to produce a pair of parallel rows of stitches. A two-needle sewing machine of the above type, including the feed dogs 70, is of standard construction, and only so much thereof is shown and described herein as is necessary to an understanding of the present invention.

In accordance with the present invention, a bracket 17 is attached to the sewing machine head 10 by suitable means, shown as screws 18 (Figures 4 and 5). This bracket 17 is provided with a bearing 20, in which is journaled a rock shaft 21 carrying an oscillating arm 22. A pin 23 (Figures 2 and 5) is secured to the arm 22 by a set screw 24. A plaiting blade 25 is attached to a bracket 26 which is pivoted on the pin 23. The blade 25 is held in contact with the plaiting material by a spring 27 as it is reciprocated by the arm 22. The plaiting blade carries at its free end a finger 29 (Figures 5 and 6) which forms therewith a pocket 30, in which the fold of material extends when the blade is actuated, as will be described.

The rock shaft 21 also carries a cam follower 33 having an inclined cam surface 34 (Figure 4). A spring 35 (Figure 2) may be positioned between a collar 36 attached to the bracket 17 and the cam follower 33 for holding the cam follower in engagement with a cam 40, to be described.

The cam follower 33 is actuated by axial movement of a cam 40 having a beveled cam surface 41. The cam 40 is shown as mounted on a push-rod 42, one end of which is journaled in a bearing 43 in the bracket 17. The other end of the push-rod 42 is slidably held in a bracket 44 which is attached to the sewing machine head 10 by screws 46 (Figures 1–3).

The bracket 44 carries a frame 45 in which is journaled a shaft 47 having a cam 48 at one end thereof and having at its other end a worm gear 49 meshing with a worm 50 attached to the drive shaft 14. The cam 48 is positioned to engage the end of the push-rod 42 for causing axial movement thereof. The rod 42 may be held in contact with the cam 48 by means of a spring 51 which may extend between the bracket 17 and a collar 53 attached to said rod 42. The above-described drive mechanism is described and claimed in my copending application for "Ma-

chine for making plaiting", Serial No. 297,842, filed on even date herewith. The present invention is a special embodiment of the invention set forth in said copending application applied to a two-needle sewing machine for making a novel type of plaiting. It is to be understood that an adjustable stop may be attached to the push-rod 42, as shown in said application, to permit adjustment of the throw of said push-rod.

In accordance with this invention, the presser foot bar 12 carries a presser foot 55 having a longitudinal opening 56 (Figures 7, 8 and 9) formed between inner walls 57. The opening 56 is of a width corresponding to that of the plaiting material and serves as a guide therefor during stitching. The presser foot 55 is also provided with a pair of bosses 58 which extend inwardly from the walls 57 above the surface of the presser foot and have needle apertures 59 through which the needles 16 pass in stitching. The bosses 58 serve to hold the ends of the plaits out of the path of the needles as will be described.

The presser foot 55 also carries a guide and folder 60 which may be adapted to fold under the side edges 61 of a strip of plaiting material 62 so as to form a two-ply ribbon with the raw edges abutting in the lower ply. The folder 60 may, however, take other forms. It may, for example, be designed to merely fold under the raw side edges to form hems along the sides of the strip of material, or, if the edges are already finished, the folder may constitute a guide only to guide the material without folding. In any case, the folder 60 is positioned to guide the material 62 to the opening 56 in the presser foot 55. A tensioning gate 64 may be provided to hold the plaiting material 62 under the required tension. A layer of fabrics 63, to which the plaiting material 62 is to be stitched, is fed to the path of the needles 16, beneath the presser foot 55, by suitable guides (not shown) and feed dogs 70.

The arrangement is such that the plaiting material is fed with the fabric 63 to the needles for stitching. The reciprocating plaiting blade advances the plaiting material 62 to the needles in a plurality of successive folds 65 which form in the pocket 30 beneath the finger 29 of the plaiting blade. These folds 65 are held out of the path of the needles 16 by the bosses 58 on the presser foot so that the rows of stitches 66 pass thereunder along the side edges of the plaiting material 62, as will be later described.

In the operation of this device, the rotation of the cam 48 causes the rod 42 to reciprocate. The beveled surface 41 of the cam 40, engaging the cam follower 33, actuates the rock shaft 21, thereby oscillating the arm 22 and causing the blade 25 to reciprocate in a direction to engage and advance the plaiting material 62 to the needle in successive folds. When the blade 25 engages the material in its feeding stroke, the material puffs up into the pocket 30 between the blade and the finger 29 so as to form the folds 65. The blade 25 is made narrower than the spacing between the bosses 58 so that it can advance the folds 65 past the stitching position. As the blade and fold approach the stitching position, the needles 16 penetrate the plaiting material 62 to form stitches at the base of the fold 65, as shown in Figure 8. The blade 25 then advances the fold past the stitching position while the bosses 58 hold the ends 67 of the folds out of the path of the needles to permit the next stitch to span the base of the fold, as indicated at 68 (Figures 11, 13 and 15), without penetrating the fold itself. When the fold passes the bosses 58, the ends 67 are released and extend laterally over the two rows of stitches 66, as shown in Figures 10, 12 and 14.

In the embodiment shown in Figures 10 and 11, the material 62 is somewhat soft and loose so that it is deformed by the action of the blade as it engages and advances the central portion thereof. This results in the formation of spaced plaits or folds having a puffed effect, the ends of which are inclined rearwardly, so that the front 69 of the plait is concave or has a re-entrant angle.

If the folded material is made of a relatively stiff fabric, the plaiting blade 25 will advance the material uniformly across its entire width. In that event, the folds may take the form of a series of upstanding tubular rolls extending across the material, as shown in Figures 12 and 13.

In accordance with another embodiment of the invention, a flat braid of a width corresponding to the spacing of the needles 16 may be fed to the machine in a position to be actuated by the blade 25. The blade then folds and stretches the braid at each actuation thereof so as to form a puffed fold or plait having characteristics shown in Figures 14 and 15. In this embodiment, the folds extend beyond the side edges of the stitched braid and have a re-entrant angle at the front thereof.

In a further embodiment, the material may be folded at one edge only or one needle may be removed to form a puffed plaiting having one side folded and secured, as shown in Figure 10, but with the other side unstitched.

In the embodiments above described, the folds have been shown as evenly spaced. The folds may, however, be variedly spaced as desired by changing the shape of the cam 48. The cam has been shown as a four-face cam. It may, however, be replaced by a two-face cam, the spacing between plaits being determined by the number of faces on the cam and the gear ratio of the driving means therefor. An irregular spacing may be obtained by providing a cam having an irregular surface, such, for example, as a cam having two cam faces adapted to actuate the rod 42, and separated by a circular segment adapted to provide a period of dwell. Various other embodiments in cam design will be evident to a person skilled in the art.

Though a single plaiting mechanism has been described and illustrated, it is to be understood that a plurality of plaiting mechanisms actuated by the mechanism herein described may be utilized, it being further understood that each plaiting mechanism will cooperate with different needles. For example, in a 4, 6, 8, 10 or more needle machine, 2, 3, 4, 5 or more, respectively, plaiting attachments will be used.

It is obvious that, by changing the manner of folding the material and by changing the condition of the material itself, various effects may be obtained. In certain instances, the fabric 63 may be replaced by paper, which may be subsequently removed from the stitched material to provide strip plaiting.

Although certain embodiments of the invention have been shown for purposes of illustration, it is to be understood that the invention is capable of various uses and that changes and modifications may be made therein as will be apparent to a person skilled in the art. Certain specific terms are used herein for convenience in

referring to certain details of the invention. The invention, however, is not to be limited thereby, but is only to be limited in accordance with the scope of the following claims.

I claim:

1. A sewing machine having at least one needle, means to feed a strip material in position for stitching adjacent one edge thereof by said needle, reciprocating means to form successive spaced folds in said material, means to advance the folded material into the path of the needle, and means holding said folds out of the path of the needle, to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

2. A sewing machine having at least one needle, means to feed a strip material in position for stitching adjacent one edge thereof by said needle, reciprocating means to form successive spaced folds in said material and simultaneously advance the folded material into the path of the needle, and means holding said folds out of the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

3. A sewing machine having at least one needle, means to feed a strip material in position for stitching by said needle; a reciprocating blade forming successive spaced folds in said material and simultaneously advancing the folded material into the path of the needle, means cooperating with said blade to receive and impart a puffed effect to said folds, and means holding said folds out of the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

4. A sewing machine having at least one needle, means to feed a strip material in position for stitching by said needle, reciprocating means to form successive spaced folds in said material and simultaneously advancing the folded material into the path of the needle, said fold and advancing means comprising a plaiting blade formed with a pocket to receive and impart a puffed effect to said folds, and means holding said folds out of the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

5. A sewing machine comprising a needle bar carrying a needle, means to feed strip material thereto in a position for receiving a row of stitches at the side edge thereof, means advancing said material to the needle for stitching in a plurality of spaced folds, and means holding said folds out of the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself, whereby the row of stitches extends along the side of the material but does not penetrate the folds.

6. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, means to feed strip material thereto in a position for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade engaging said strip material to advance the material to the needles for stitching in a plurality of spaced folds, and means holding the ends of said folds out of the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

7. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, means to feed strip material thereto for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade narrower than the spacing between said needles positioned to engage said strip material and to advance the same to the needles for stitching in a plurality of spaced folds, and guide means engaging the ends of said folds to retract the same from the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

8. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, means to feed strip material thereto for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade narrower than the spacing between said needles positioned to engage said strip material and to advance the same to the needles for stitching in a plurality of spaced folds, and guide means engaging the ends of said folds to retract the same from the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds, said plaiting blade having a finger thereon forming with said blade a pocket to receive and impart a puffed effect to said folds as the material is advanced for stitching.

9. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, a presser foot having a longitudinal opening to guide strip material to the path of the needles for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having means to retract the ends of said folds from the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

10. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, a presser foot having a longitudinal opening to guide strip material to the path of the needles for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having bosses formed thereon, said bosses extending inwardly over said

longitudinal opening and having needle openings through which the needles pass for stitching, said bosses being positioned to retract the ends of said folds from the paths of the needles, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

11. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, a presser foot having a longitudinal opening to guide strip material to the path of the needles for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having means to retract the ends of said folds from the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds, and a folder attached to said presser foot to fold in the side edges of said material and to guide the same to said longitudinal opening.

12. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches and drive means therefor including a drive shaft, means to feed strip material to said needles for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade positioned to engage said strip material between the paths of said rows of stitches and to advance said material to the needles for stitching in a plurality of spaced folds, an oscillating arm carrying said blade for imparting feeding movement thereto, a rock shaft carrying said arm, cam means actuating said rock shaft, a reciprocating rod actuating said cam means, and a rotating cam actuated by said drive shaft to impart reciprocating movement to said rod.

13. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches and means to feed strip material thereto for receiving said rows of stitches at the side edges thereof, said attachment comprising a blade for advancing said material to the needles for stitching in a plurality of spaced folds, and means holding the ends of said folds out of the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate said folds.

14. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches and means to feed strip material thereto for receiving said rows of stitches at the side edges thereof, said attachment comprising a blade for advancing said material to the needles for stitching in a plurality of spaced folds, and means holding the ends of said folds out of the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate said folds, said blade having a finger thereon forming with said blade a pocket to receive and impart a puffed effect to said folds as the material is advanced for stitching.

15. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches and means to feed strip material thereto for receiving said rows of stitches at the side edges thereof, said attachment comprising a blade for advancing said material to the needles for stitching in a plurality of spaced folds, and means holding the ends of said folds out of the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate said folds, said blade being narrower than the spacing between said needles and adapted to advance said folds past the stitching position.

16. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches, said attachment comprising a presser foot having a longitudinal opening to guide strip material to the paths of the needles for receiving said rows of stitches at the side edges thereof, and a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having means to retract the ends of said folds from the paths of the needles to permit each needle to penetrate the material at one side edge thereof and at the base of each fold to form stitches which span said fold without penetrating the fold itself, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

17. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches, said attachment comprising a presser foot having a longitudinal opening to guide strip material to the paths of the needles for receiving said rows of stitches at the side edges thereof, and a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having bosses formed thereon, said bosses extending inwardly over said longitudinal opening and having needle openings through which the needles pass for stitching, said bosses being positioned to retract the ends of said folds from the paths of the needles, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds.

18. A plaiting blade for a sewing machine comprising a blade adapted to engage material for feeding the same in a plurality of spaced folds, and a finger attached to said blade and forming therewith a pocket to receive and impart a puffed effect to said folds.

19. A sewing machine having at least one needle, means to feed a strip material in position for stitching adjacent one edge thereof by said needle, reciprocating means to form successive spaced folds having puffed effects in said material, means to advance the folded material into the path of the needle, and means to successively retract the ends of each of said folds from

the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

20. A sewing machine having at least one needle, means to feed a strip material in position for stitching adjacent one edge thereof by said needle, reciprocating means to form successive spaced folds having puffed effects in said material, said reciprocating means comprising a plaiting blade provided with a pocket to receive and impart the puffed effects to said folds, means to advance the folded material into the path of the needle, and means to successively retract the ends of each of said folds from the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

21. A sewing machine comprising a needle bar carrying two needles adapted to make parallel rows of stitches, a presser foot having a longitudinal opening to guide strip material to the path of the needles for receiving said rows of stitches at the side edges thereof, a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having bosses formed thereon, said bosses extending inwardly over said longitudinal opening and having needle openings through which the needles pass for stitching, said bosses being positioned to retract the ends of said folds from the paths of the needles, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds, said reciprocating plaiting blade being provided with a pocket to receive and impart puffed effects to said folds.

22. An attachment for a two-needle sewing machine having a needle bar carrying two needles adapted to make parallel rows of stitches, said attachment comprising a presser foot having a longitudinal opening to guide strip material to the paths of the needles for receiving said rows of stitches at the side edges thereof, and a reciprocating plaiting blade engaging said strip material in said opening to advance the material to the needles for stitching in a plurality of spaced folds, said presser foot having bosses formed thereon, said bosses extending inwardly over said longitudinal opening and having needle openings through which the needles pass for stitching, said bosses being positioned to retract the ends of said folds from the paths of the needles, whereby the rows of stitches extend along the two sides of the material but do not penetrate the folds, said reciprocating plaiting blade being provided with a pocket to receive and impart puffed effects to said folds.

23. A sewing machine having at least one needle, a presser foot having a longitudinal opening to guide strip material in position for stitching adjacent one edge thereof by said needle, a reciprocating plaiting blade engaging said strip material in said opening to form successive spaced folds having puffed effects in said material and to advance the folded material into the path of the needle, said plaiting blade being provided with a pocket to receive the folds and impart puffed effects thereto, and means cooperating with said longitudinal opening to retract the ends of each of said folds from the path of the needle to permit the needle to penetrate the material at the base of each fold to form stitches which span said fold at the base thereof without penetrating the fold itself.

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