Aug. 12, 1941. C. SEAMAN 2,252,356

SEWING MACHINE

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Fig. 1.

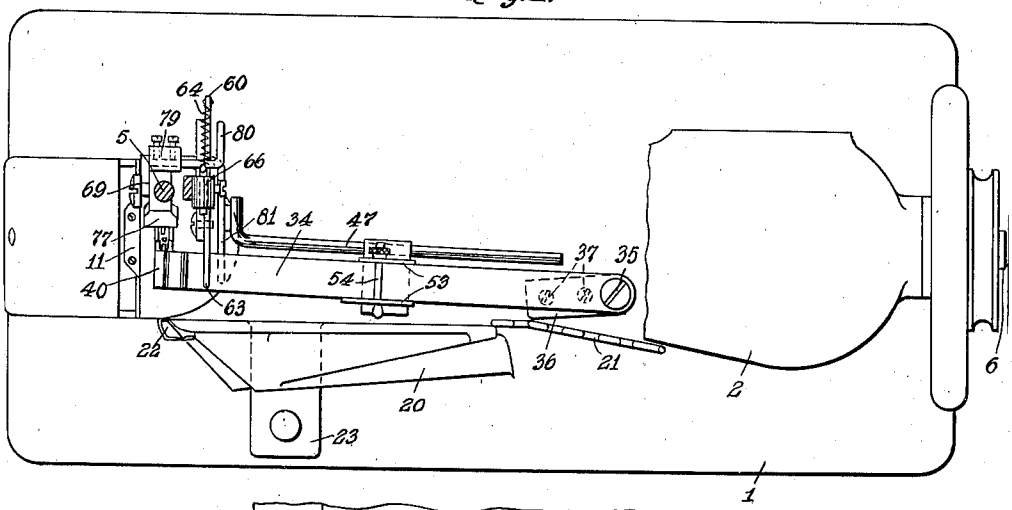
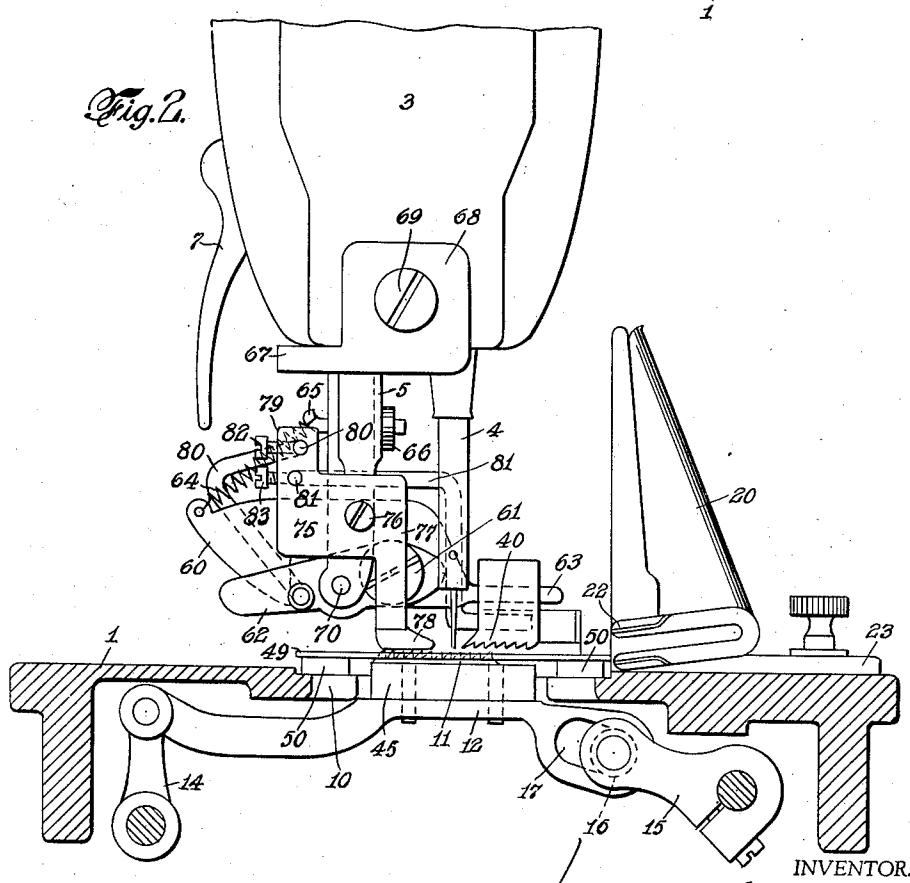


Fig. 2.



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Fig. 3.

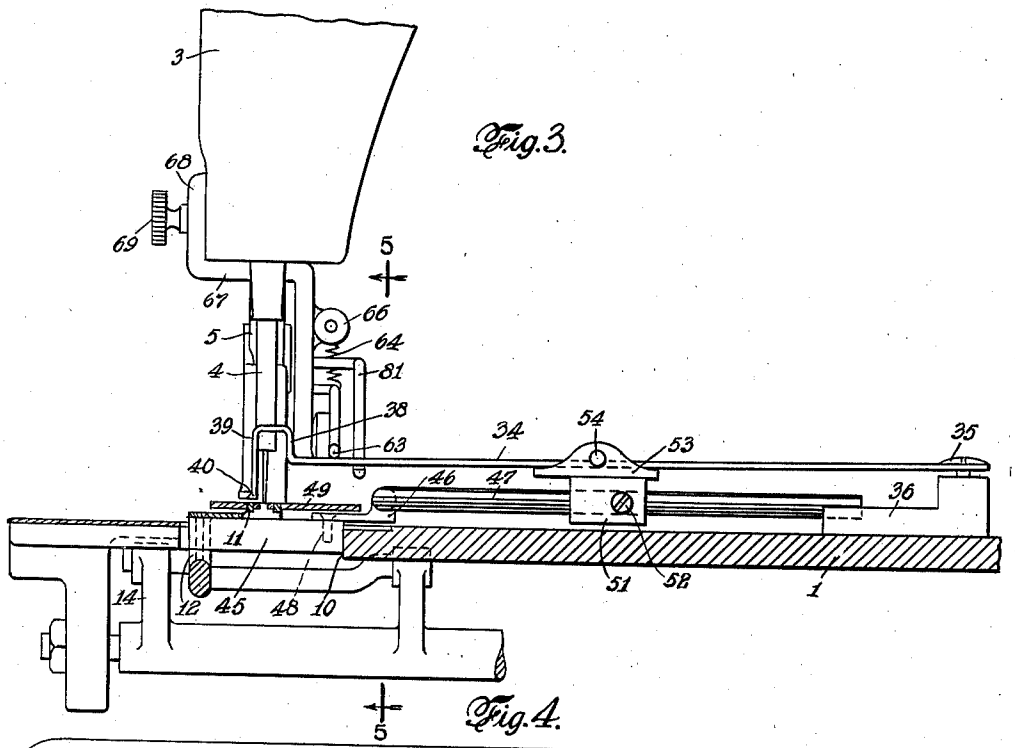
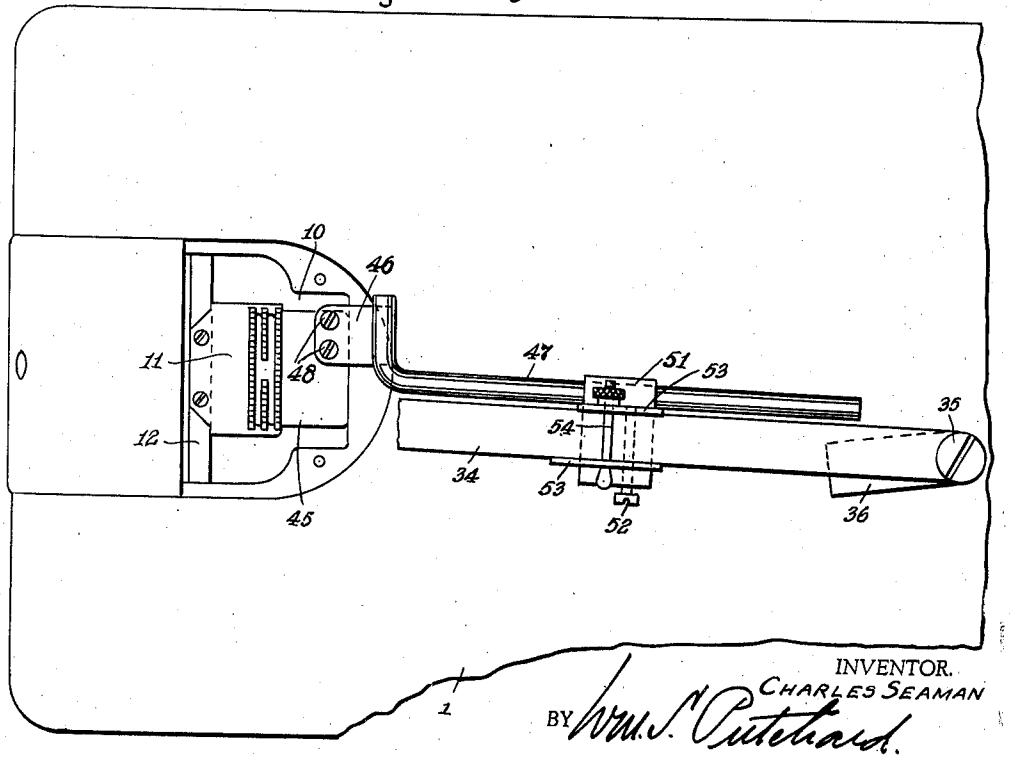


Fig. 4.



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SEWING MACHINE

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Fig. 5.

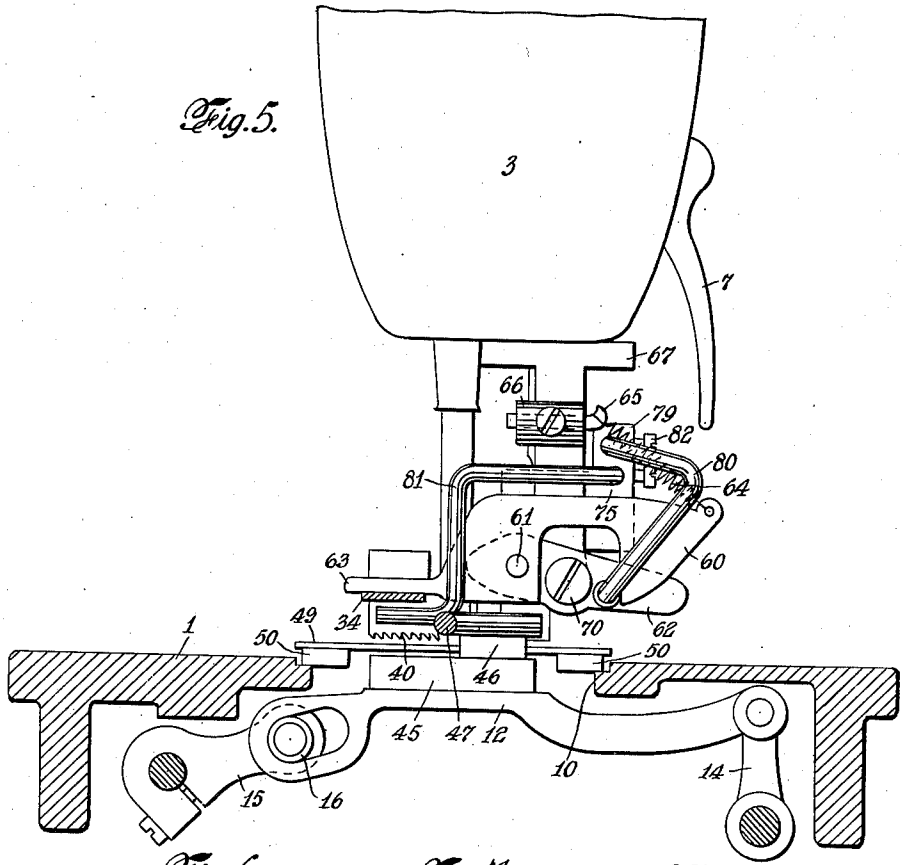


Fig. 6.

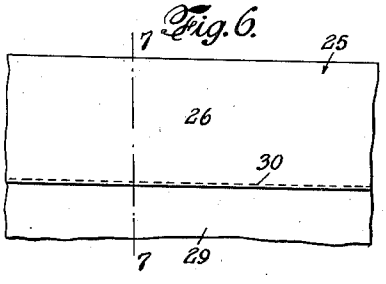


Fig. 7.

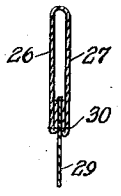


Fig. 8.

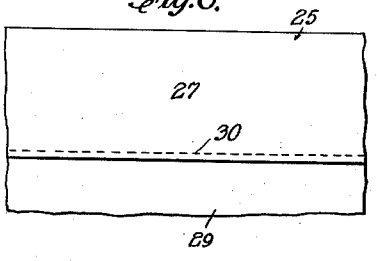
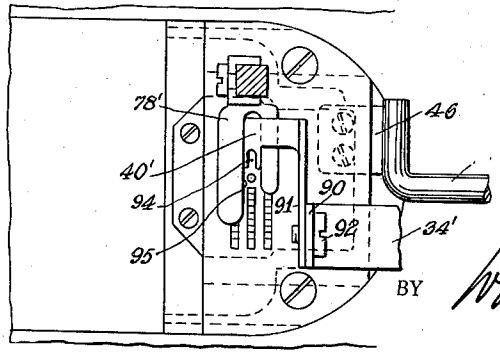


Fig. 9.



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Patented Aug. 12, 1941 2,252,356

UNITED STATES PATENT OFFICE

2,252,356

SEWING MACHINE

Charles Seaman, Jamaica Estates, N. Y.

Application January 26, 1940, Serial No. 315,657

9 Claims. (Cl. 112—207)

This invention relates to a sewing machine, or to an attachment, for feeding material having two or more plies, such as hems, seams, binding, trimming or the like.

It has been found that in sewing material of the above character there is a tendency for the upper plies to puff up and produce a non-uniform or irregular effect due to the drag of the presser foot and the action of the feed dog which engages and feeds only the lowermost ply. It is accordingly an object of the present invention to provide a device of the type indicated in which the tendency of the upper plies to puff up or to feed irregularly is eliminated.

Another object is to provide a positive feed mechanism suited to feed uniformly a material, such as a hem, binding, trimming or the like having two or more plies.

Another object is to provide a device of the type above indicated which may be attached to a standard sewing machine.

Another object is to provide a dependable, convenient and commercially practical device for the purpose specified.

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

In accordance with the present invention, an upper feed dog is provided which engages the top ply of the material and operates in synchronism with the lower feed dog to feed both the upper and lower plies uniformly and simultaneously. In this way, a positive feed is obtained and irregularities in the upper plies are avoided.

The invention also provides mechanism for causing the upper feed dog to successively engage and release the material in synchronism with the reciprocation of the presser foot during stitching.

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

In the drawings,

Figure 1 is a top plan view of a sewing machine head embodying the present invention with parts broken away to show the details of construction;

Figure 2 is an end elevation thereof and partly in section for clarity;

Figure 3 is a front elevation of the upper feed dog and associated mechanism partly in section for clarity;

Figure 4 is a plan view of the upper feed dog mechanism;

Figure 5 is a section taken on the line 5—5 of Figure 3;

Figure 6 is a front elevation of a product made by the present machine;

Figure 7 is a section taken on the line 7—7 of Figure 6;

Figure 8 is a rear elevation of the product; and

Figure 9 is a detail view of a further embodiment of the invention.

Referring to the drawings more in detail, the invention is shown as applied to a sewing machine head having a base or work plate 1 (Figures 1 and 2) carrying an overhanging arm 2 and needle head 3. The needle head carries the usual needle bar 4 which is actuated by suitable mechanism from a rotating drive shaft 6. A lever 7 is provided for elevating the presser foot bar 5 when desired, as, for example, to release the material for adjustment, insertion, or removal thereof.

The base 1 is provided with an aperture 10 through which a lower feed dog 11 extends. The feed dog 11 is mounted upon an oscillating link 12 which is actuated by the usual four-motion drive, including, for example, an oscillating arm 14 connected to cause horizontal reciprocating movement of said link 12 and an oscillating arm 15 connected to cause vertical reciprocating movement thereof. The arm 15 is shown as connected to the link 12 by a roller 16 engaging an elongated slot 17 in said link.

The presser foot bar 5 is actuated in synchronism with the feed dog 11 so that the presser foot engages the material for holding the same stationary during the stitching operation and is elevated during the feeding by the feed dog 11 after each stitching operation.

It is to be understood that the mechanism thus far referred to is of standard construction and only so much thereof has been set forth herein as is necessary to an understanding of the present invention.

In one embodiment of the present invention, a folder 20 is provided for folding a binding or piping material into, for example, a U-shaped cross-section for attachment as a binding to the edge of a base material. The binding material may be guided to the folder 20 by means of a gate 21 and may be discharged through a throat 22. The folder may be attached to the base 1 by suitable means, such as a clip 23. It is to be understood that the folder 20 may be of any desired form, depending upon the character of

the binding or piping material. It may be, for example, adapted to fold a binding material 25, as shown in Figures 6, 7 and 8, into a U-shaped section having an upper ply 26 and a lower ply 27. The edges of the upper and lower plies may be infolded to conceal the same and the folded binding may be attached to a base material 29 by means of a row of stitches 30. It is to be understood, of course, that one or both edges of the binding material may be folded in, or the binding may be folded to form a plurality of upper and lower plies, as desired. The invention is not restricted to the particular configuration shown.

For feeding the top ply of the binding material, an upper feed dog is provided which comprises a spring arm 34 pivoted at 35 to a plate 36 which may be attached to the base 1 by screws 37. The spring arm is positioned above and extends parallel to the base of the machine, as shown in Figure 3, and is bent upwardly as at 38 to provide clearance for the material and then downwardly as at 39 to form an upper feed dog 40. The lower edge of the upper feed dog 40 may be provided with the usual serrations to assist the feeding operation.

For actuating the arm 34 in synchronism with the lower feed dog 11, the latter is elevated from the link 12 by means of a block 45 which is positioned within the aperture 10. A bracket 46 carrying a rod 47 is attached to the block 45, as by means of screws 48, the arrangement being such that the rod 47 is driven by the link 12 and executes a movement similar to that of the lower feed dog 11. A standard feed plate 49 is elevated by means of blocks 50 to a position to cooperate with the lower feed dog 11.

The spring arm 34 is shown as attached to the rod 47 by means of a slide 51 which is adjustably mounted on the rod 47 and may be held in adjusted position by a set screw 52. The slide 51 is provided with a pair of upstanding flanges 53 between which the spring arm 34 may be clamped, as by means of a screw 54. The horizontal stroke of the upper feed dog 40, produced by movement of the rod 47, may be adjusted by varying the distance of the slide 51 from the pivot point 35 of said arm.

For controlling the vertical movement of the upper feed dog 40, a lever 60 is provided, as shown in detail in Figures 2, 3 and 5. This lever 60 is pivoted by a screw 61 to an arm 62 and is provided at its end with a pin 63 adapted to bear against the top of the spring arm 34. A spring 64 is secured between the free end of the lever 60 and a hook 65 adjustably held in a boss 66 formed on a bracket 67. The arm 62 is also attached to the bracket 67 by means of a screw 70. The bracket 67 is provided with a flange 68 which is attached to the needle head 3 by means of a screw 69.

A block 75 is shown as attached to the presser foot bar 5 by means of a screw 76 (Figure 2). This block has a downwardly extending leg 77 carrying a presser foot 78 and an upwardly extending arm 79 in which wires 80 and 81 are secured by means of set screws 82 and 83 respectively. The wire 80 is pivotally connected to the arm 62 in a position to elevate the free end of said arm and to thereby lower the pin 63 and the lever 60 associated therewith when the presser foot bar 5 is raised. The wire 81 extends beneath the spring arm 34 with sufficient clearance so that the wire only engages the arm when the presser foot bar is elevated by means of the lever 7.

In the operation of the above-described mechanism, the binding or piping material is folded by means of the folder 20 and is fed to the path of the needle for stitching in the usual manner. The lower feed dog 11 executes the usual four-motion feeding movement in synchronism with the operation of the needle bar 4 and the presser foot bar 5. The movement of the lower feed dog 11 causes a corresponding movement of the rod 47 and thereby causes the spring arm 34 to oscillate in a horizontal direction. In this way, the upper feed dog 40 is reciprocated in a horizontal direction in synchronism with the horizontal reciprocation of the lower feed dog 11.

When the presser foot bar 5 is elevated during the feeding stroke of the lower feed dog 11, the wire 80, engaging the arm 62, causes pivotal movement thereof to depress the pin 63 and to cause the same to correspondingly depress the spring arm 34 and to bring the upper feed dog 40 into feeding engagement with the top ply of the material. When the presser foot bar 5 is lowered to engage the material during the stitching operation, the reverse operation takes place and the pin 63 is elevated to permit the upper feed dog 40 to be raised by the action of the spring arm 34 and to release the material. In this way, a four-motion feed movement is imparted to the upper feed dog 40 in synchronism with the corresponding movement of the lower feed dog 11 so that the upper feed dog is moved downwardly into engagement with the top ply of material simultaneously with the upward movement of the lower feed dog 11 into engagement with the lower ply of material. At the completion of the feed stroke, both feed dogs are retracted, the lower feed dog downwardly and the upper feed dog upwardly.

When the presser foot bar 5 is raised a substantial distance by actuation of the lever 7, the wire 81 engages the under side of the spring arm 34 and raises the upper feed dog against the tension of the spring 64, out of contact with the material, thereby releasing the material for insertion, removal or adjustment thereof.

The tension of the upper feed dog may be varied by adjusting the tension on the spring 64, as, for example, by adjusting the position of the hook 65 in the boss 66.

By means of the above construction, the upper and lower plies of material are fed in synchronism by the upper and lower feed dogs, so that any tendency of the upper ply to puff due to irregular feeding is avoided. The mechanism may be used to feed material having any desired number of plies and assures a uniform and positive feed regardless of the thickness of the material. The folder 20 may be modified or omitted depending upon the requirements in any particular case. For joining two pieces of material, for example, the folder may not be required, or the folder may be adapted to form various types of hems, binding or piping.

In the embodiment shown in Figure 9, the mechanism is identical with that above described with the exception of the shape of the spring arm 34, the upper feed dog and the presser foot. In this embodiment, the spring arm 34' is provided with a lip 90 to which a bracket 91 is secured by means of a screw 92. The bracket 91 carries the upper feed dog 40', which is positioned beyond the needle path in the direction of feed of the material, and is shown as provided with a slot 94 to provide clearance for the needle as the feed dog reciprocates. The presser

foot 78' in this embodiment is provided with a slot 95 adapted to receive the feed dog 40' and to permit the same to engage the material at a point closely adjacent the needle path. It will be noted that in this embodiment, the upper feed dog 40 does not conceal the material in advance of the needle.

This embodiment may be desirable in certain instances where the manual guiding or feeding of the material to the needle requires an unobstructed view thereof. This embodiment is also useful in instances where a folder or other guide means is positioned directly in front of the needle path, as for example, in making blind stitched piping as set forth in my Patent No. 2,125,652, dated August 2, 1938.

It is to be understood that the presser foot 78' may be made in any convenient form depending upon the nature of the stitching operation and the shape of the upper feed dog. If desired, the upper feed dog may be positioned at the rear of the presser foot so as to engage the material after passage thereunder, in which event the presser foot may be made in the usual form.

Though the invention has been described in connection with applying a binder to a material so that both the top and bottom plies of the binder are substantially flat and uniform, it is to be understood that the invention is not restricted thereto. For example, by lengthening the stroke of the spring arm 34, by adjustment of the slide 51, the speed of travel of the upper feed dog 40 may, though still synchronized with the lower feed dog 11, be at a faster rate than that of the said lower feed dog. This is of advantage when it is desired to unite two materials and when it is desired to shir material which constitutes the top layer as the two materials pass through the machine. It is apparent that in this embodiment the folder 20 is omitted.

While certain specific embodiments of the invention have been set forth for purposes of illustration, it is to be understood that the invention is not to be restricted thereto, but that various changes and modifications may be made therein as will readily appear to a person skilled in the art. The invention is only to be limited in accordance with the following claims.

I claim:

1. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, an upper feed dog to engage the upper surface of said material, a spring arm carrying said upper feed dog, means pivoting said arm for oscillating movement in the direction of feed of the material, a rod attached to said actuating means and extending substantially parallel to said spring arm, adjustable means connecting said rod to said arm to cause said arm to oscillate in synchronism with the movement of said lower feed dog and to vary the stroke of said arm, and means actuated by reciprocation of said presser foot bar to depress said upper feed dog into engagement with said material during the feed stroke thereof, said last means and said rod being adapted to impart a four-motion feed movement to said upper feed dog in synchronism with the corresponding movement of said lower feed dog.

2. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar, a lower feed dog and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, an upper feed dog, a spring arm positioned above and extending substantially parallel to the work plate carrying said upper feed dog, means associated with said actuating means to cause said spring arm to oscillate in the direction of feed of said material, means actuated by said presser foot bar to depress said upper feed dog into engagement with the material during the feed stroke thereof, whereby the upper feed dog is caused to execute a four-motion feed movement in synchronism with said lower feed dog, and means associated with said presser foot bar to engage and elevate said spring arm so as to cause said upper feed dog to release the material when said presser foot bar is elevated.

3. An attachment for a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar, a lower feed dog and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, said attachment comprising an upper feed dog to engage the upper surface of said material, a spring arm carrying said upper feed dog, means pivoting said arm for oscillating movement in the direction of feed of the material, a rod to be attached to said actuating means and extending substantially parallel to said spring arm, adjustable means connecting said rod to said arm to cause said arm to oscillate in synchronism with the movement of said lower feed dog and to vary the stroke of said arm, and means to be actuated by said presser foot bar to depress said upper feed dog into engagement with said material during the feed stroke thereof, said last means and said rod being adapted to impart a four-motion feed movement to said upper feed dog in synchronism with the corresponding movement of said lower feed dog.

4. An attachment for a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar, a lower feed dog and actuating means for said lower feed dog adapted to produce a four-motion feeding movement thereof, said attachment comprising an upper feed dog, a spring arm carrying said upper feed dog, means to be connected to said actuating means to cause said spring arm to oscillate in the direction of feed of said material, means to be actuated by said presser foot bar to depress said upper feed dog into engagement with the material during the feed stroke thereof, whereby the upper feed dog is caused to execute a four-motion feed movement in synchronism with said lower feed dog, and means to be actuated by said presser foot bar to engage and elevate said spring arm so as to cause said upper feed dog to release the material when said presser foot bar is elevated.

5. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar adapted to reciprocate during the stitching operation, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, an upper feed dog to engage the upper surface of said material, a spring arm carrying said upper feed dog, means pivoting said arm for oscillating movement in the direction of feed of the material, a rod attached to said actuating means and extending substantially parallel to said spring arm, means connecting said rod to said arm to cause said arm to oscillate in synchronism with the movement of said lower feed dog, and means ac-

tuated by reciprocation of said presser foot bar to depress said upper feed dog into engagement with said material during the feed stroke thereof, said last means and said rod being adapted to impart a four-motion feed movement to said upper feed dog in synchronism with the corresponding movement of said lower feed dog.

6. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar adapted to reciprocate during the stitching operation, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed thereof, an upper feed dog to engage the upper surface of a material, a spring arm carrying said upper feed dog, means associated with said actuating means to cause said arm to oscillate in the direction of feed of said material, a pin adapted to bear against the top of said arm, and means actuated during the reciprocation of the presser foot bar to cause said pin to depress said arm to cause said upper feed dog to engage said material during the feed stroke of said upper feed dog.

7. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar adapted to reciprocate during the stitching operation, a manually actuated lever adapted to elevate said presser foot bar, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed thereof, an upper feed dog to engage the upper surface of a material, a spring arm carrying said upper feed dog, means associated with said actuating means to cause said arm to oscillate in the direction of feed of said material, a pin adapted to bear against the top of said arm, means actuated during the reciprocation of the presser foot bar to cause said pin to depress said arm to cause said upper feed dog to engage said material during the feed stroke of said upper feed dog, and means adapted to engage said spring arm at the bottom thereof and elevate the same when said manually actuated lever is actuated to raise said presser foot bar.

8. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar adapted to reciprocate during the stitching operation, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, an upper feed dog to engage the upper surface of said material, a spring arm carrying said upper feed dog, means associated with said actuating means to cause said spring arm to oscillate in the direction of the feed of said material, a pivoted lever having on one end thereof a pin adapted to bear against the top of said spring arm, and means cooperating with said lever and actuated by said presser foot bar to actuate said lever to cause said pin to depress said arm and thereby lower said upper feed dog into engagement with said material during the feed stroke of said upper feed dog.

9. In a sewing machine having a head carrying a reciprocating needle bar, a presser foot bar adapted to reciprocate during the stitching operation, a manually actuated lever adapted to elevate said presser foot bar, a lower feed dog to engage the under surface of a material and actuating means for said lower feed dog adapted to produce a four-motion feed movement thereof, an upper feed dog to engage the upper surface of said material, a spring arm carrying said upper feed dog, means associated with said actuating means to cause said spring arm to oscillate in the direction of the feed of said material, a pivoted lever having on one end thereof a pin adapted to bear against the top of said spring arm, means cooperating with said lever and actuated by said presser foot bar to actuate said lever to cause said pin to depress said arm and thereby lower said upper feed dog into engagement with said material during the feed stroke of said upper feed dog, and means actuated by said presser foot bar and adapted to engage said spring arm at the bottom thereof and elevate the same when said manually actuated lever is actuated to raise said presser foot bar.

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