W. H. STEDMAN.

FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED JAN. 21, 1909.

1,071,818. Patented Sept. 2, 1913.

Fig. 1.

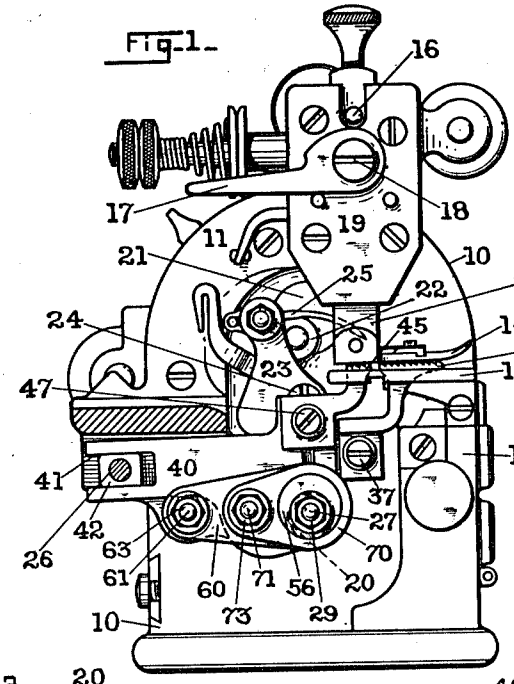


Fig. 7.

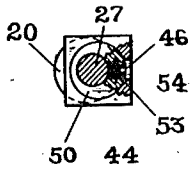


Fig. 6.

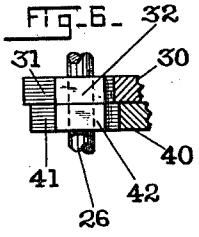


Fig. 3.

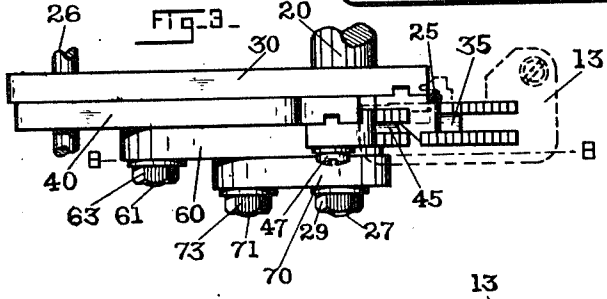


Fig. 5.

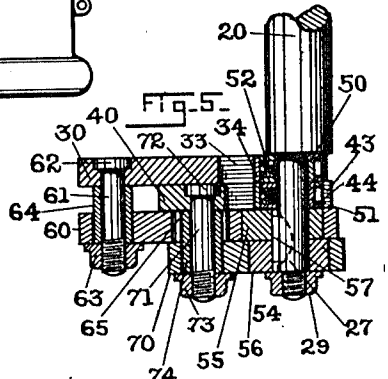


Fig. 2.

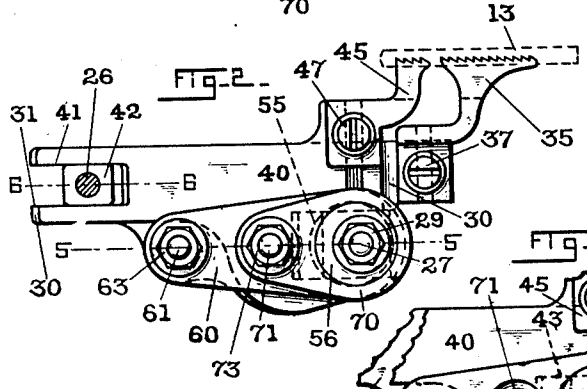


Fig. 4.

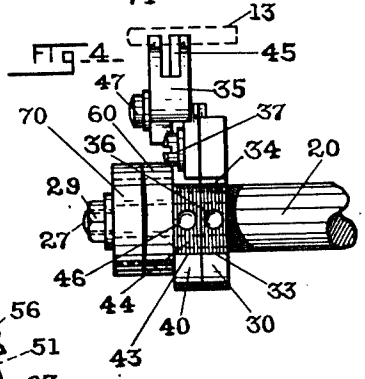
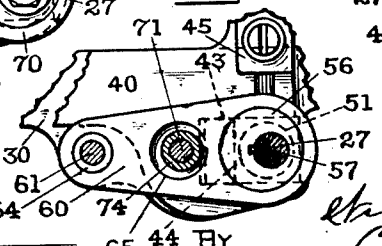


Fig. 8.



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FEEDING MECHANISM FOR SEWING-MACHINES.

1,071,818. Specification of Letters Patent. Patented Sept. 2, 1913.

Application filed January 21, 1909. Serial No. 473,567.

To all whom it may concern:

Be it known that I, WILLIAM H. STEDMAN, a citizen of the United States, residing in the city and county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, and to the characters of reference marked thereon.

The object of this invention is to provide for sewing machines and particularly those of the overseaming type, a feeding mechanism of double form, or two coöperative feeds or mechanisms each of which is distinctly organized that it may operate in all its movements entirely independently of its companion.

Heretofore it has been common in sewing machines provided with two feed dogs, to employ a single means for giving the vertical movements to both feed dogs, hence the feed dogs moved vertically practically in unison and the dog farthest from its center of pivotal movements therefore had the greater vertical movement. In the arrangement hereinafter described it is possible to give both feed dogs practically the same amount of vertical movement or to reverse the conditions and give the feed dog located nearest the pivotal center the greater amount of vertical motion.

As illustrated and described herein, two feed dogs are arranged to operate one in advance and one in the rear of the sewing machine needle. This construction is especially useful in a machine for overseaming knit goods in that by giving the forward feed dog a greater amount of horizontal movement than is given to the rear feed dog a gathering of the goods in advance of the point of overseaming is possible in order to offset a tendency of elongation at the edge of the goods, or the feed dog may be arranged to contract or shorten the edge of the goods; or, by giving the rear feed dog the greater amount of horizontal movement a stretching or elongation of the edge of the goods may be effected, if desired.

The invention consists broadly in certain elements, combinations of the same and arrangements thereof as hereinafter described and claimed.

The feeding mechanism is "four motion" in character and for purposes of explanation an embodiment thereof is illustrated in the drawings and described hereinafter in connection with an overseaming machine of the well known Merrow type represented generally by the machines shown and described in Patents No. 591,049 issued October 5, 1897 to Joseph M. Merrow and No. 732,457, issued June 30, 1903 to William H. Stedman, but it will be understood that it is not intended to restrict the application of this invention to such type of machines.

In sewing machines provided with cutters for trimming the fabric or with guides for feeding tape or cords while sewing or overseaming, this feeding mechanism is also useful.

In the drawings: Figure 1 is an end elevation partly in section, showing the feeding mechanism assembled in a partially illustrated overseaming machine. Fig. 2 shows the feeding mechanism in elevation and on a somewhat enlarged scale, together with certain elements of the machine. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is an end elevation from a point of view at the right of Fig. 2. Fig. 5 is a sectional plan view on the line 5—5 Fig. 2. Fig. 6 is a sectional plan view taken on the line 6—6, Fig. 2, with parts in elevation. Fig. 7 is an elevation partly in section showing a certain detail of construction. Fig. 8 is a section taken in a vertical plane on the line 8—8, Fig. 3.

Like letters in the several figures indicate the same parts.

The reference numeral 10 denotes the frame or casing of an overseaming machine, 11 the head, 12 the needle plate support and 13 the needle plate secured to the latter. The presser foot 14 is supported in the head 11 and the shank 15 of the foot is engaged by a compression spring (not shown) whereby the foot 14 is normally pressed down to confine the goods between the foot and the needle plate. Said shank 15 has a stud 16 adapted to be engaged by a lifting lever 17 pivotally secured at 18 to the head cap 19. The main shaft 20 and an upper shaft 21 between which there is gear connection (not

shown) are journaled in frame 10 and the shaft 21 through a link 22 is connected with the needle carrier 23 pivoted at 24, so that the rotation of the shaft effects the oscillation of the carrier upon its pivot. The needle 25 is mounted in the carrier and the oscillation of the latter causes the needle to reciprocate and penetrate goods that may be on the needle plate. Suitable stitch forming implements or loopers coöperate with the needle to effect the formation of overseam stitches, but as these loopers and the manner of and means for their manipulation form no part of the present invention, their illustration and further description are not deemed necessary.

The construction and operation of the stitch forming or overseaming elements as above described are well known and need no further description herein.

The feeding mechanism includes two independent feeds each a complete organism. Each embodies a feed bar or carrier one being designated by the reference number 30 and the other by the number 40. The feed bars are located side by side and extend in a direction from front to rear of the machine, bar 30 being next the end face of the frame 10. At one end, each feed bar is cut out or provided with a recess, that of the bar 30 being indicated by the reference number 31 and that of the bar 40 by the reference number 41. These recesses receive respectively a block 32 upon which one end of the bar 30 is supported and may slide in its horizontal movements, and a block 42 upon which the bar 40 is similarly supported. The blocks 32 and 42 are preferably journaled to rock upon a pin 26 secured in the head 11 or other fixed part of the machine. Recesses 33 and 43 formed respectively in bars 30 and 40 receive respectively a block 34 to slidably support the bar 30 and a block 44 to similarly support the bar 40 the said blocks being mounted upon and driven by eccentrics as hereinafter explained to effect the vertical movements of the feed bars at their feed dog carrying ends. The feed dogs are denoted respectively by the reference numbers 35 and 45 the former being mounted near the forward end of the bar 30 and the latter near the forward end of the bar 40 and both being adapted to project upwardly through the needle plate 13 whereby their serrated surfaces may engage and feed the goods over the needle plate.

The main shaft 20 at its end adjacent the feed bars is provided with a reduced portion or stem 27 intersecting the planes of movements of the feed bars and preferably having its axial line eccentric to the axial line of the shaft proper. Upon the stem 27 are two eccentrics 50 and 51, respectively being adapted to fit and run in the eccentric blocks 34 and 44 to effect the vertical motions of the feed bars and dogs. Said eccentrics 50 and 51 have independent rotative adjustment on the eccentric stem 27 (that the timing of each feed may be independently controlled) and further the said eccentrics may if desired be of different eccentricity whereby the range of vertical motion as well as the timing may be different for the said feed bars and their dogs. Set screws 52 and 53 accessible through screw driver holes 36 and 46 in the eccentric blocks 34 and 44 serve to secure the feed raising eccentrics in position. Upon the eccentric portion or stem 27 of the shaft 20 there are also mounted two eccentrics 55 and 56, side by side and preferably keyed to the shaft stem by the key 57. Eccentrics 55 and 56 impart horizontal motions to the feed bars 30 and 40 motion being transmitted through link connection 60 between the eccentric 55 and the feed bar 30 and similar connection 70 (at the side of the link 60) between the eccentric 56 and the feed bar 40. Links 60 and 70 at their forward ends encircle their respective eccentrics 55 and 56 and at their rear ends are pivotally secured to their respective feed bars by bolts 61 and 71 respectively, which extend from the feed bars at right angles to the planes in which the latter move and parallel with the shaft portion 27. The bolt heads 62 and 72 are countersunk in the feed bars and nuts 63 and 73 serve to clamp sleeves 64 and 74 in place against the feed bars 30 and 40, the sleeve 64 between the side of the feed bar 30 and the nut 63 and the sleeve 74 between the side of the feed bar 40 and the nut 73. The sleeves 64 and 74 form pivotal supports for the ends of the links 60 and 70, and the feed bars 30 and 40 are so shaped near their rear ends that the bolt 61 and the sleeve 64 on the feed bar 30 will project beneath and behind the feed bar 40 and not interfere with the movements of the latter and the link 60 is provided with a suitable opening 65 through which the bolt 71 and the sleeve 74 of the feed bar 40 may project without interfering with the movements of the link. The shaft stem 27 is threaded to receive a nut 29 for holding the several eccentrics in place. Upon the rotation of the eccentrics 55 and 56 horizontal motions are imparted to the feed bars 30 and 40 and to the feed dogs 35 and 45 mounted thereon.

It will be observed that when the desired length of horizontal movement of either feed corresponds with that which would be produced by the eccentricity of the stem of the main shaft, the feed eccentric so called may be a simple collar instead of an eccentric collar. To change the length of the horizontal movements of either or both of the feeds, it is necessary to remove one or both of the feed eccentrics, as the case may

be, and substitute another or others of greater or less eccentricity or a collar or collars or one or both of different timing. It is therefore proposed that each machine shall be supplied with a suitable set of eccentrics and collars to produce the required different lengths of feed and degrees of gathering or stretching.

By means of the mechanism shown for giving the feed dogs their "four motion" movements, it will be seen that each feed dog may be caused to operate independently of its companion.

An important feature attained by constructing the shaft stem 27 with its axial center eccentric to that of the shaft 20 is in the fact that it is possible to use eccentrics of smaller diameters to effect a long throw of feed than would be possible were the eccentrics secured to a shaft stem not eccentric with the axis of the shaft. The stem 27 being itself eccentric to the axial line of the shaft provides a considerable part of the eccentricity required for a long feed. Where a shaft stem without eccentricity is used, however, the whole of the throw of the feeds will be produced by the eccentricity of the feed eccentrics.

The feed bar 30 preferably extends somewhat farther toward the front of the machine than does the feed bar 40 to permit of a more convenient construction and adjustment of the forward feed dog 35. The feed dogs 35 and 45 have tongue and groove connection with and are secured to their feed bars by screws 37 and 47 respectively and are each provided with serrated feeding surfaces in the usual manner. As shown in the drawings, the feed dog 35 operates largely in advance of the needle 25 and the feed dog 45 in the rear of the said needle, and this construction, assuming the forward feed to be somewhat greater than the rear feed, effects a gathering of the goods.

It will be seen that the double feeding mechanism illustrated and described has the capability of being assembled in a very compact form, the four elements consisting of the fed bar 30, the feed bar 40, the link 60 and the link 70 being placed one beside the other as best shown in the Fig. 3, each close to or even in contact with its neighbor. It will also be seen that the links 60 and 70 are both at that side of the pair of feed bars farthest from the machine proper in which position they do not occupy space that might be desirable for other mechanism and, furthermore, the said feed bars are positioned in close proximity to the frame of the machine, and permit of the easy removal of the links.

Having now described my invention, I claim:

1. In a sewing machine, two co-acting feeding mechanisms each including a feed dog and a feed bar, a support forming an axis common to both feed bars with reference to which axis the feed dogs have pivotal and longitudinal movements, a shaft, means on the shaft whereby said movements are imparted to the feed dogs, the said means including for each feed dog an eccentric imparting pivotal motion thereto the said eccentric being rotatively adjustable on the shaft, and an eccentric for imparting longitudinal movement to the feed dog, each of the several eccentrics being independent of the others.

2. In combination in a sewing machine, two feed bars mounted side by side on a common support upon which they are pivotally and longitudinally movable and carrying a plurality of feed dogs, two links mounted side by side parallel to and both at one side of the feed bars, the link adjacent the feed bars having one end pivotally connected to the farther feed bar, and the feed bar adjacent the links having one end of the farther link pivotally connected thereto, independent removable cylindrical collars fixedly mounted in a predetermined position on an eccentric portion of the driving shaft and embraced by the said links, the said collars having their drive shaft receiving apertures suitably disposed with respect to their peripheries to effect a definite longitudinal stroke to the links and feed bars, and means for vertically actuating the feed dogs.

3. In a sewing machine, feeding mechanism including a feed dog supported for "four motion" movements, a feed bar, a shaft having an eccentric portion, two collars having openings to receive the eccentric portion of the shaft upon which the said collars are mounted, one collar effecting vertical movement of the feed dog, and the other collar effecting horizontal movement of the feed dog, and a link connecting the last named collar and the feed bar.

4. In a sewing machine, feeding mechanism including a feed dog supported for "four motion" movements, a feed bar, a shaft formed with an eccentric portion whereby the feed dog is actuated, two collars mounted on the said eccentric portion of the shaft the collars having openings to receive the eccentric portion of the shaft, so located as to give the desired throw to the connections between the feed bar and the collars whereby the motions of the feed dog are attained.

5. In a sewing machine, feeding mechanism including two coöperating feed dogs independently supported, a carrier for each feed dog, a shaft having an eccentric portion, four eccentrics on said eccentric portion of the shaft, each eccentric being entirely independent of the others, two of said eccentrics respectively engaging the carriers

to impart vertical movements to the feed dogs and two eccentrics for imparting horizontal movements to the feed dogs, a connection between each of the last named eccentrics and one of the carriers respectively, a block for each carrier and upon which the said carriers are respectively slidably mounted, a pivotal support for the blocks and a presser foot coöperating with the feed dogs.

6. In an overseam sewing machine and in combination with differential feeding mechanism arranged for "four-motion" movements including a pair of feed dog carriers, of means for actuating the feed dogs horizontally, including a shaft having an eccentric portion upon which removable interchangeable eccentrics are mounted in fixed relation to the eccentric portion of the shaft whereby the throw of each may be independently changed, positively acting connections between the eccentrics and the feed dog carriers, and means for actuating the feed dogs vertically.

7. In a sewing machine and in combination, a feeding mechanism including a feed dog arranged for "four-motion" movements, means for actuating the feed dog horizontally including a shaft having a splined eccentric portion upon which is mounted one of a number of removable cylindrical collars each having a splined bore fitting the eccentric portion of the shaft and suitably disposed with relation to the periphery of the said collar to effect a desired throw of the feed dog, and means for actuating the feed dog vertically.

WILLIAM H. STEDMAN.

Witnesses:
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E. J. HEALY.