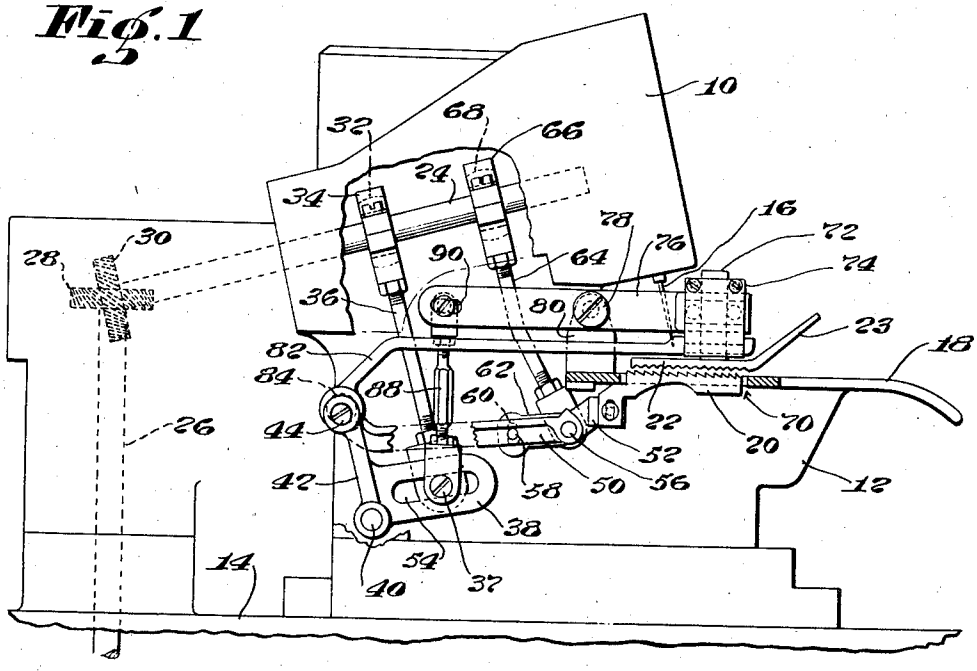
Aug. 8, 1944. E. H. TOZIER 2,355,189

FEEDING MECHANISM FOR SEWING MACHINE HEADS

Filed Aug. 12, 1941

Fig. 1



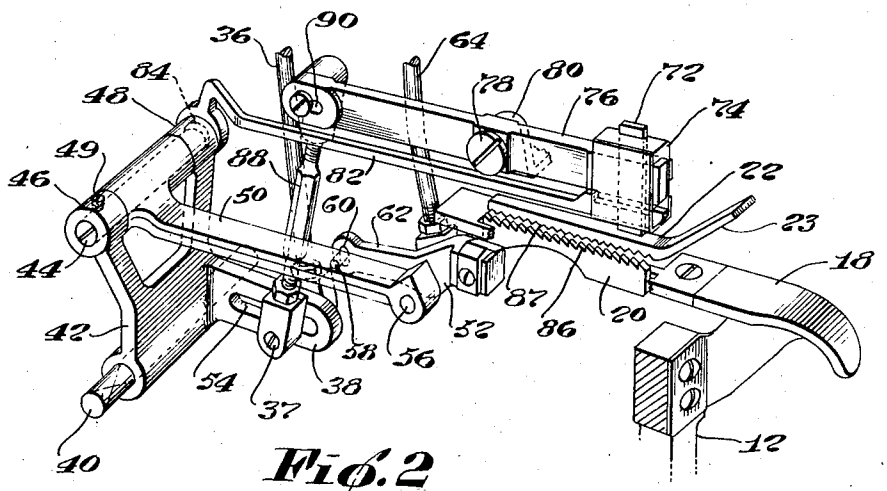


Fig. 2

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FEEDING MECHANISM FOR SEWING MACHINE HEADS

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2 Claims. (Cl. 112—207)

This invention relates to a feeding mechanism for a sewing machine head.

The invention has for an object to provide a feeding mechanism of the character described particularly adapted for efficiently feeding multiple plies of paper or other material to be stitched together and in which provision is made for positively feeding the plies in superposed relation with minimum relative movement between the upper and lower plies during the feeding and sewing operation.

With this general object in view and such others as may hereinafter appear, the invention consists in the feeding mechanism for a sewing machine head and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing illustrating the preferred embodiment of the invention, Fig. 1 is a side elevation of a sewing machine head embodying the present feeding mechanism; and Fig. 2 is a perspective view of the feeding mechanism and associated parts to be hereinafter referred to.

The present feeding mechanism is particularly adapted for use in a sewing machine head embodied in a tea bagging machine for the production of tea bags of the envelope or pillow type. In the commercial tea bagging machines for the production of tea bags of this type, such for example as is illustrated and described in the United States patent to Williams, No. 2,071,244, the bag is formed by folding a web of bag making material longitudinally upon itself, introducing individual charges of tea at predetermined intervals along the web, severing the web to form bag sections, and then sewing the open edges of the bag. The sewing machine heads heretofore employed in such bag making machines were particularly adapted for sewing cloth bags such as the usual gauze tea bags upon the market, such heads being provided with the usual horizontally reciprocable and serrated lower feeding member and a longitudinally stationary but vertically reciprocable presser foot. Such feeding mechanism was successful in feeding cloth bags since the textile fibers of the gauze would effect cohesion of the plies and tend to maintain them in superimposed relation, but when it was attempted to utilize such prior feeding mechanism to produce paper bags, such as the filter paper tea bags now upon the market, it was found that although the lower ply of the folded paper web would be advanced by the lower feeding member, the upper ply would tend to drag due to the frictional engagement of the relatively stationary presser foot and the lack of cohesion between one ply and another probably because of the relatively smooth surface of the paper. As a result, in practice, during the feeding operation, the upper ply would be moved with relation to the lower ply thus producing a paper bag with the upper and lower plies out of alignment with each other.

In accordance with the present invention, the presser foot is serrated and arranged to be horizontally reciprocated with a rectilinear movement and in cooperation with the horizontally reciprocating lower feeding member operates to feed both plies of the bag along in their initially superimposed relation during the sewing operation, eliminating relative movement between the plies.

Referring now to the drawing, **10** represents a sewing machine head of any usual or preferred type and which, as illustrated, is mounted upon a frame **12** attached to the platen **14** of a tea bagging machine and disposed as shown in said Williams patent in a position to sew the open edges of the folded bag as the latter is being continuously conveyed therepast while held between the usual horizontally disposed traveling grippers or bag holding members, not shown. The sewing head, as herein shown, is provided with the usual sewing mechanism, including a needle **16**, operative to stitch the free edges of the bag together and preferably of the type capable of producing a continuous chain of locked stitches, while the bag is being continuously advanced by the traveling grippers. Since the construction and mode of operation of such sewing mechanism is well known to those skilled in the art, it is not deemed necessary to illustrate or describe such mechanism in further detail.

In the operation of the device, the free edges of the paper bag to be closed are supported and guided into operative position with relation to the stitching head by a stationary plate **18** attached to the frame **12** upon which the sewing head is supported. As the bag is advanced by the traveling holders, not shown, the free edges of the bag comprising two plies of paper, are carried into position to be engaged by the material feeding mechanism comprising a lower serrated feeding member or jaw **20** and a cooperating upper serrated jaw or feeding member **22**, the latter also constituting the presser foot of the sewing machine head and being provided with an upturned forward guide portion **23**, as shown.

As herein shown, the cooperating feeding mem-

bers or serrated jaws 20, 22 are arranged to be horizontally reciprocated in a substantially rectilinear path and are also mounted to be capable of opening and closing upon the material so that in operation the open edge of the bag to be sewn is progressively fed along in successive increments in timed relation to the operation of the needle 16 to perform the stitching operation. The above described movement of the feeding jaws 20, 22 is preferably accomplished through linkages operatively connected to the driving shaft 24 of the sewing machine head which may and preferably will be driven through connections from the driving mechanism of the tea bagging machine including a vertical drive shaft 26 and cooperating spiral gears 28, 30, as illustrated in Fig. 1. This arrangement enables the sewing machine head and the feeding members 20, 22 thereof to be driven in timed relation to the movement of the continuously traveling bag holding members of the tea bagging machine so that the movement of the latter and the movements of the feeding jaws may be accurately coordinated.

In the preferred embodiment of the invention, the lower feeding member 20 is arranged to be reciprocated in substantially a straight horizontal path, while the cooperating presser foot and feeding member 22 is mounted to be rocked up and down with relation to the lower feeding member, during its horizontal reciprocable movement so that in operation, the presser foot is raised to release the material being fed during its retracting movement, and is lowered into gripping engagement with the material and its cooperating jaw during the forward feeding movement.

As herein illustrated, the lower feeding member 20 is arranged to be horizontally reciprocated in a substantially rectilinear path through linkages including an eccentric cam 32 fast on the shaft 24, a cooperating strap 34, and link 36 connected by a pin 37 to one arm 38 of a bell crank lever pivotally mounted on a shaft 40. The second arm 42 of the bell crank, which as best shown in Fig. 2 is yoke shaped, carries a pin 44 held fast in the bearing members 46, 48 of the yoke by a set screw 49. An arm 50 carried between said bearing members is pivotally mounted on the pin 44 and has secured to its outer end an adapter 52 in which the lower feeding member 20 is adjustably mounted for vertical adjustment, as clearly shown in Fig. 2. Provision is made for adjusting the linkage at the various points of connection. As herein shown, the link connection 36 is adjustable in a slot 54 provided in the arm 38 of the bell crank. The adapter 52, which is formed as a bell crank, is capable of being rocked on a pin 56 carried in the end of the arm 50 and is secured in its rocked or adjusted position with relation to the latter by a bolt 58 which is received in a slot 60 provided in one arm 62 of the adapter.

The above described linkage operates to reciprocate the lower feeding member 20 through the connections described, and in order to guide the member 20 through a substantially rectilinear path, a second link 64 is provided which is connected at one end to the pin 56 carried by the arm 50 and at its other end to a strap 66 cooperating with an eccentric cam 68 mounted fast on the driving shaft 24. The cam 68 and link 64 are designed to guide the arm 50 and to modify the movement of the latter so as to produce a substantially straight line horizontally reciprocating motion of the lower feeding member 20. It will be observed that the latter extends through and is movable in a slot 70 provided in the guide plate 18. The eccentric cam 68 is provided with an arcuate surface, as shown, to permit the strap 66 to swivel during the reciprocal movement of the arm 50. The eccentric may be adjusted on the shaft 24 to raise and lower the pivot 56 slightly in accordance with the change of position of the pivot 44 during the rocking movement whereby to maintain the lower jaw in a substantially horizontal position during its reciprocation.

The upper feeding member or presser foot 22, as hereinbefore described, is mounted to be capable of rocking vertically during its horizontally reciprocable movement. As herein illustrated the member 22 is provided with an upstanding portion 72 which is carried by and vertically adjustable in a block 74. The block 74 is slidingly mounted upon one end of a lever 76 which latter is pivotally mounted at a point intermediate its ends upon a stud 78 carried in a bracket 80 attached to the stationary plate 18. In order to provide reciprocating movement of the block 74 and its attached feeding member 22, the block is connected to an arm 82 which is pivotally connected to one end 84 of the pin 44 carried in the arm 42 of the bell crank. As herein shown, the end 84 of the pin 44 projects beyond the bearing member 48 and is eccentric with respect to the rest of the pin. The other end of the pin is slotted to permit rotary adjustment of the pin and the eccentric portion thereof. Such adjustment is operative to change the relative longitudinal position of the upper jaw 22 with respect to the lower jaw 20 in order to permit the teeth 86, 87 of the serrated jaws to properly mesh for most efficient gripping results.

The pivotally mounted lever 76, above referred to, is arranged to be rocked during the reciprocative movement of the upper jaw thereon as above described, by a link 88 adjustably connected to the slotted end 90 of the lever 76 and to the pin 37 adjustably secured in the slotted arm 38 of the bell crank.

With the construction above described, it will be observed that in the operation of the feeding mechanism when the bell crank 42 is rocked in a clockwise direction viewing Fig. 1, both the lower and the upper feeding members 20, 22 are retracted and simultaneously therewith the lever 76 is rocked in a counterclockwise direction to raise the upper feeding member during its retracting movement. Conversely, when the bell crank 42 is rocked in a counterclockwise direction, the upper member or presser foot 22 is lowered into cooperative engagement with the lower feeding member 20 to grasp the material therebetween and to feed the two plies of material forwardly in a positive and efficient manner and in a manner such as to minimize chance for relative movement between the plies.

From the above description it will be observed that the present feeding mechanism of the sewing machine head is designed to positively feed multiple plies of bag forming material in a manner such that the plies will not be moved with relation to one another during the operation of sewing together the marginal edges of a tea bag whereby a perfectly formed bag may be produced.

While the preferred form of the invention has been herein illustrated and described, it will be understood that the invention may be embodied

in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a sewing machine of the character described having a needle, feeding mechanism for feeding multi-ply flexible material in successive increments and in timed relation to said needle to perform the sewing operation comprising a lower serrated feeding member mounted to be horizontally reciprocable in a substantially rectilinear path, an upper serrated and horizontally reciprocable feeding member cooperating with said lower member, means for effecting reciprocation of said upper and lower feeding members including a bell-crank, and means for effecting movement of said upper feeding member into and out of operative engagement with said lower feeding member during said reciprocal movement, said last named means including a substantially horizontal bar pivoted intermediate its ends upon a fixed pivotal point, one end of said bar being arranged to slidingly carry said upper feeding jaw and connections between said bar and said bell-crank whereby to positively grasp the plies of material being fed and to maintain them in their initially superposed relation during the sewing operation.

2. A sewing machine of the character described having a needle, and feeding mechanism for feeding two plies of paper in superposed relation in successive increments and in timed relation to said needle to perform the sewing operation, said feeding mechanism comprising a lower serrated feeding member horizontally reciprocable in a substantially rectilinear path, an upper serrated and horizontally reciprocable feeding member cooperating with said lower member, means for effecting reciprocation of said upper and lower feeding members including a bell-crank, means for effecting movement of said upper feeding member into and out of operative engagement with said lower feeding member during said reciprocal movement whereby to positively grasp the upper and lower plies of paper being fed and to maintain the latter in their initial superposed relation during the sewing operation, and means for permitting initial adjustment of the longitudinal position of the upper jaw with respect to the lower jaw whereby to position the serrated portions of the jaws in meshing engagement, said last named means including an eccentric stud carried by one arm of said bell crank and connections between said stud and said upper jaw.

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