July 31, 1945. C. T. WALTER 2,380,912

SEWING MACHINE

Filed June 16, 1941 2 Sheets-Sheet 1

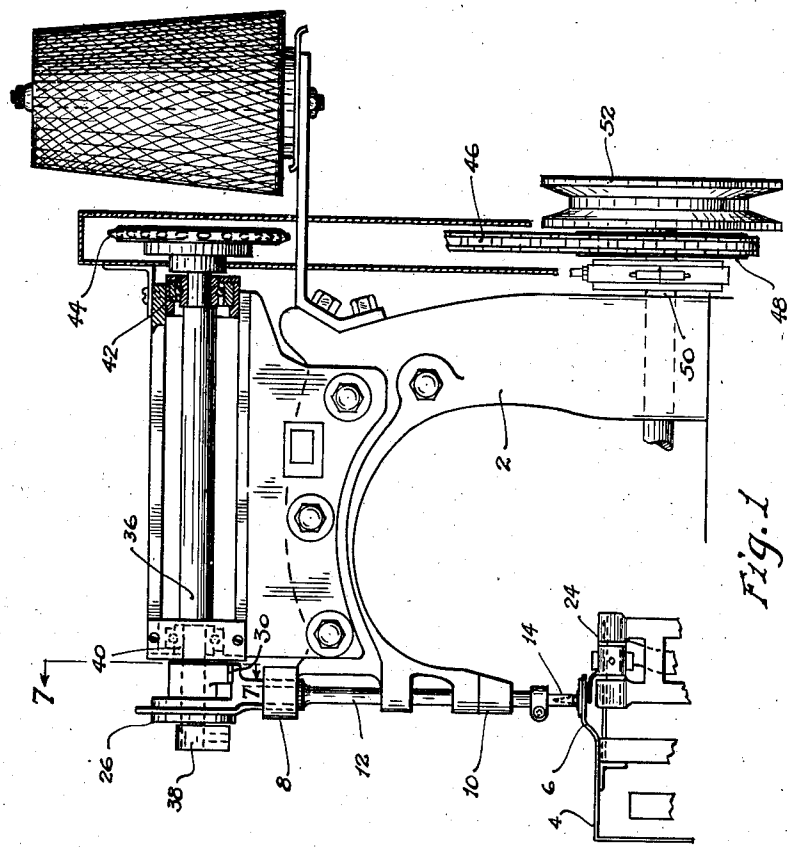


Fig. 1

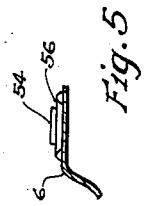


Fig. 5

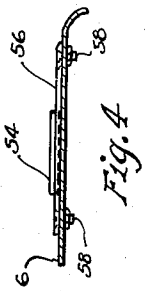


Fig. 4

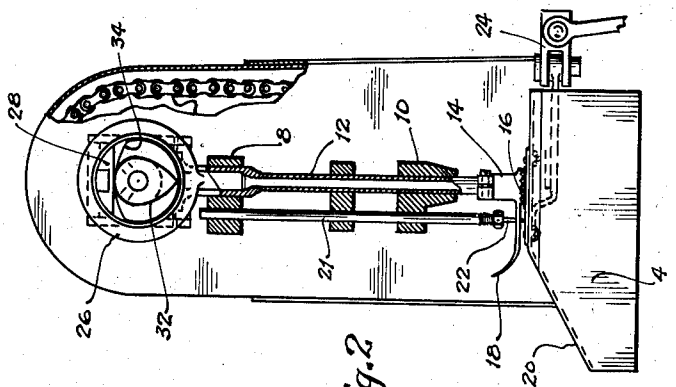


Fig. 2

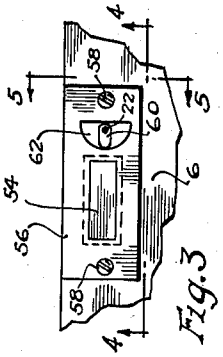


Fig. 3

ATTEST -

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SEWING MACHINE

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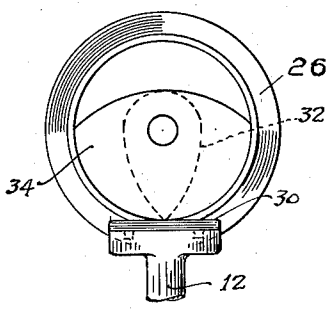


Fig. 7

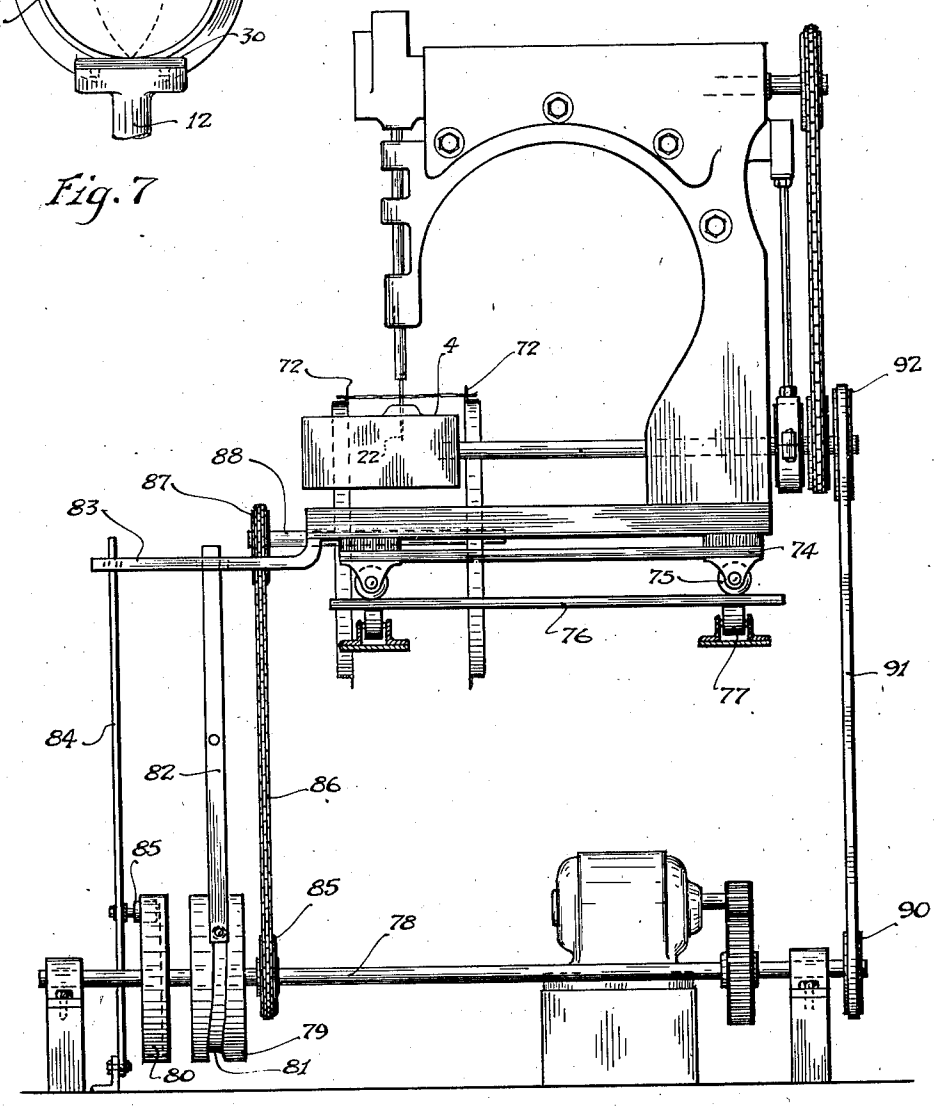


Fig. 6

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UNITED STATES PATENT OFFICE

2,380,912

SEWING MACHINE

Charles T. Walter, Chicago, Ill., assignor to Industrial Patents Corporation, Chicago, Ill., a corporation of Delaware

Application June 16, 1941, Serial No. 398,224

6 Claims. (Cl. 112—239)

The present invention relates to sewing machines, and more in particular to improvements therein adapting the said sewing machines for use particularly in connection with the sewing of materials such as animal intestines and the like.

Among the objects of the present invention is to provide novel means in a sewing machine for effectively and securely holding material, such as animal intestines and the like, against motion during a sewing operation without exerting excessive pressure on the casings or intestines which would otherwise tend to break the fibers and damage the same.

Another object of the present invention is to provide novel means in a sewing machine for securely holding material such as animal intestines and the like, against motion during a sewing operation without damaging the same and which provides a cushion to absorb compression forces set up by machine vibrations, thus permitting higher operating speeds to increase the productive capacity of the device.

The present invention includes as a further object the provision of a resilient support disposed in cooperative relation to a reciprocating pressure foot to temporarily arrest movement of material, such as animal intestines and the like, being fed into the sewing machine and to securely hold said material against motion without damage thereto while the needle of the sewing machine penetrates said material during a sewing operation.

As a further object of the present invention, the resilient support hereinabove referred to provides means whereby accurate mechanical adjustments of the moving parts of the sewing mechanisms are avoided and become unnecessary, which otherwise would be required were the pressure foot to be used in cooperative relation with a non-resilient support.

Another object within the purview of the present invention is to provide a novel drive for the pressure foot comprising an overhead drive shaft driven from the main drive shaft for the sewing machine and which, through spaced cams cooperating with suitable cam followers associated with the said pressure foot, effectively and positively reciprocate said pressure foot for its cycle of operation.

Other objects, features, capabilities and advantages are comprehended by the invention, as will later appear and as are inherently possessed thereby.

Referring to the drawings:

Figure 1 is a fragmentary view in side elevation of a sewing machine embodying the novel features of the present invention and having parts broken away to show more in detail certain of the elements thereof;

Figure 2 is a fragmentary view partly in section and in end elevation of the sewing machine shown in Figure 1 of the drawings;

Figure 3 is a fragmentary top plan view of a table top or material support for the sewing machine of Figures 1 and 2 of the drawings;

Figure 4 is a view in section taken in the plane represented by line 4—4 of Figure 3 of the drawings;

Figure 5 is a view in section taken in the plane represented by line 5—5 of Figure 3 of the drawings;

Figure 6 is a diagrammatic representation of the entire conveyor and sewing mechanism, showing a modified casing enclosing structure for the sewing head with the casing removed from over the driving sprocket and needle bar driving pitman; and

Figure 7 is a view taken on line 7—7 of Figure 1.

Referring now more in detail to the drawings, a sewing machine embodying the improvements of the present invention and which has been selected to disclose the said improvements is shown in Figures 1 and 2 as comprising a sewing head or frame 2 and a sewing table or support 4 formed with a throat plate 6 over the top surface of which material, such as animal intestines and the like, may be moved for a sewing operation. The feed mechanism for moving the material with respect to the sewing machine forms no part of the present invention, but may comprise any suitable type of conveyor mechanism which properly presents the animal intestines or other material to be sewn in proper relation to the sewing mechanisms of the sewing machine.

The sewing head 2 includes frame structure embodying the fixed bearings 8 and 10 in which is slidably mounted guide element 12 having mounted on its lower end a pressure foot 14 formed with a toothed working surface 16 and a guide element 18 cooperating with the inclined wall 20 of the support 4 for directing and guiding the material being fed to the sewing machine into proper relation to the needle bar 21 having a needle 22 on the lower end thereof. This needle bar is mounted as shown for reciprocation in the fixed bearings 8 and 10 and cooperates with certain other mechanisms, generally shown at 24, enclosed in part by the support 4, for forming the stitches used in this sewing operation.

The upper end of the guide 12 is formed with a generally ring shaped member 26 to which are secured two hardened steel plates 28 and 30 serving as cam followers which engage complementary and opposed cams 32 and 34, respectively. These cams are integrally formed and mounted adjacent the end of the drive shaft 36 for reciprocating the pressure foot 14 through the guide 12. The shaft 36 is counterbalanced as at 38 and is mounted for rotation in the head 2 through the medium of anti-friction bearings 40 and 42, the said shaft at its other end having a sprocket 44 driven by means of a sprocket chain 46 which passes around another sprocket 48 mounted upon the shaft 50 and which is driven from a source of power through the medium of the pulley 52.

The drive for the pressure foot as above set forth constitutes a novel arrangement in that the driving mechanism for the sewing machine elements including the needle and pressure foot are disposed above the table or support 4, thus avoiding any interruption to the continuous feed of material to the sewing machine and providing a direct drive for effective operation of said elements.

A means for feeding the intestines past the stitch forming means is disclosed in the co-pending application of Charles T. Walter and Lowell R. Newton, Serial No. 379,288 filed February 17, 1941. If desired, however, material could be continuously fed past the sewing machine by hand.

While as above stated the feed mechanism forms no part of the present invention, a suitable mechanism for feeding material both longitudinally and sidewise relative to the work support is diagrammatically shown in Figure 6. The elements here pictured represent the essentials of the mechanism disclosed in the co-pending application wherein means are shown for continuously moving the material past the stitch forming means while also moving the sewing machine bodily sideways to effect the desired cross-stitching. In this machine, the continuously moving conveyor 72 engages the material to carry it over the work table 4 and under the needle 22 in order that the material may be stitched together. The conveyor normally carries the intestines continuously forward across the work table, but at spaced intervals, the entire sewing machine is carried across the path of the conveyor movement to provide the cross-stitching as disclosed in said co-pending application of Walter and Newton. Preferably the machine while moving transversely to the path of the conveyor movement is also moved forwardly with the material on the conveyor so that the cross-stitching may be disposed at approximately right angles to the longitudinal axis to the pieces of the intestines being worked upon.

In order to move the sewing machine in both of the directions suggested above, the machine may be mounted on a platform 74 which is supported on rollers 75 that have a bearing on a plate 76. The rollers 75 are so mounted that the sewing machine may move across the path of the conveyor movement when so urged. The plate 76 is in turn supported on rollers 77 disposed at right angles with respect to rollers 75 so that the plate 76 together with the rollers 75 and the sewing machine carried on its upper surface may be moved forward and backward to carry the machine along with the intestines when cross-stitching as explained above.

Suitable cam means are provided to move the machine on rollers 75 and 77 in properly timed sequence and a drive shaft 78 supported in suitable bearings is provided for this purpose having cams 79 and 80 keyed thereto. Cam 79 having cam track 81 therein is operative through the pivoted lever 82 to drag the sewing machine transversely the path of movement of the conveyor. The lever 82 is connected to the platform 74 through the laterally extending rigid arm 83. Cam 80 engages a lever 84 through the cam follower 85 which follows the periphery of cam 80. The lever 84 engages the arm 83 to carry the platform 74 longitudinally along the path of the conveyor movement and the platform 74 drags plate 76 with it so that the assembly moves as a unit on rollers 77. The arm 83 is mounted in the lever 84 so that it may reciprocate therethrough as the platform 74 rolls on the rollers 75, the lever 83 serving only to drag the platform 74 backward and forward with respect to the movement of the conveyor.

The conveyor 72 may be driven from the continuously rotating shaft 78 through a sprocket 85, sprocket chain 86 and the sprocket wheel 87 affixed to the conveyor drive shaft 88. Thus the conveyor may be continuously driven to carry the intestines past the stitch forming means.

The sewing machine drive may also be taken from shaft 78 as by sprocket or pulley 90, belting means 91 and pulley 92 keyed to the main drive shaft of the sewing machine. The belting means 91 must have sufficient slack provided therein to accommodate the slight movement of the sewing machine with respect to shaft 78.

The sewing machine above described further embodies a novel work engaging element disposed to cooperate with the pressure foot 14 to effectively hold the material, such an animal intestines and the like, during a sewing operation without injuring the same in any way and to serve as a cushion to absorb compression forces set up by machine vibrations. In the illustrative example, the work engaging element which cooperates with the pressure foot is constituted by a pad 54 of any suitable resilient and compressible material, such as rubber or the like, which is mounted on the throat plate 6 beneath the pressure foot 14 and which is secured in operative position by means of the securing plate 56 connected to the throat plate through the screws 58. The throat plate 6 is further provided with an opening 60 to receive the needle mechanism 22 and which is in association with an opening 62 formed in the upper securing plate 56 for a purpose which is clearly set forth and claimed in a copending application of Charles T. Walter and Lowell R. Newton filed March 25, 1942, and bearing Serial No. 436,116.

The resilient pad 54 as above set forth provides a compressible medium immediately below the pressure foot 14 which, in its cooperative relation with said pressure foot, effectively holds the material being fed to the sewing machine without injury the same in any way and which has been found to permit operation of the machine at higher speeds, thus increasing its capacity.

While I have herein described and upon the drawings shown an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto but may comprehend other constructions, arrangements of parts, details and features without departing from the spirit of the invention.

I claim:

1. In a sewing machine, the combination of a

support for material to be sewed, a frame disposed above said support, a source of power, a pressure foot fixed to a carrying bar that is mounted in said frame for reciprocation substantially normal to said support, and means for positively operating said pressure foot, said means comprising a drive shaft disposed substantially normal to said pressure foot carrying bar and mounted in said frame and driven by said source of power, opposed cams mounted on said shaft, means adjacent the end of said pressure foot carrying bar including cam followers cooperating with said cams whereby said pressure foot is reciprocated upon rotation of said shaft, and said carrying bar forming a rigid means interconnecting said pressure foot and said cam followers for positively transmitting the motion derived from the cams to the foot.

2. In a sewing machine, the combination of a support for material to be sewed, a frame disposed above said support, a source of power, a pressure foot fixed to a carrying bar that is mounted in said frame for reciprocation substantially normal to said support, and means for positively operating said pressure foot, said means comprising a drive shaft disposed substantially normal to said pressure foot carrying bar and mounted in said frame and driven by said source of power, opposed cams mounted on said shaft, means adjacent the end of said pressure foot carrying bar providing a driving connection between the foot and said shaft, said driving connection means comprising a ring embracing one of said cams and provided with a cam follower cooperating therewith, and a cam follower disposed adjacent said ring cooperating with the other of said cams.

3. A sewing machine for stitching animal intestines and the like comprising means to continuously feed the material to be stitched past a stitching station, a needle operative at said station, said needle being constrained to movement in a straight line relative to said station, a support for the material at said station, a reciprocable pressure foot movable into engagement with said material, means to drive said pressure foot in timed relation to the operation of the needle whereby the pressure foot engages the material when the needle is passing through the material, and said support beneath said pressure foot being of resilient material.

4. A sewing machine for stitching animal intestines and the like comprising means to continuously feed the material to be stitched past a stitching station, a needle operative at said station, said needle being constrained to movement in a straight line relative to said station, a support for the material at said station, a reciprocable pressure foot movable into engagement with said material, cam means, cooperating cam follower means and a rigid bar interconnecting the follower means and pressure foot to positively drive said pressure foot in timed relation to the operation of the needle whereby the pressure foot engages the material when the needle is passing through the material, and said support beneath said pressure foot being of resilient material.

5. A sewing machine for stitching animal intestines and the like comprising means to continuously feed the material to be stitched past a stitching station, a needle operative at said station, said needle being constrained to movement in a straight line relative to said station, a support for the material at said station, a reciprocable pressure foot movable into engagement with said material, said pressure foot having a frictional material engaging surface, means to drive said pressure foot in timed relation to the operation of the needle whereby the pressure foot engages the material when the needle is passing through the material, and said support beneath said pressure foot being of resilient material.

6. A sewing machine comprising a working support having an aperture therein over which the work passes, means to feed the work continuously through the machine, a needle reciprocable between a position above said support and a position below the support through the aperture, means to drive said needle between said positions, a friction block affixed to the upper surface of the support, a presser movable in timed relation with respect to the needle and against said block to hold the portion of the work into which the needle passes immovable while the needle passes therethrough, and means to drive said presser into engagement with said block in timed relation to the reciprocation of the needle.

CHARLES T. WALTER.