Dec. 6, 1955 E. L. SEAMAN 2,725,837

EMBROIDERY ATTACHMENT FOR SEWING MACHINES

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Fig. 1.

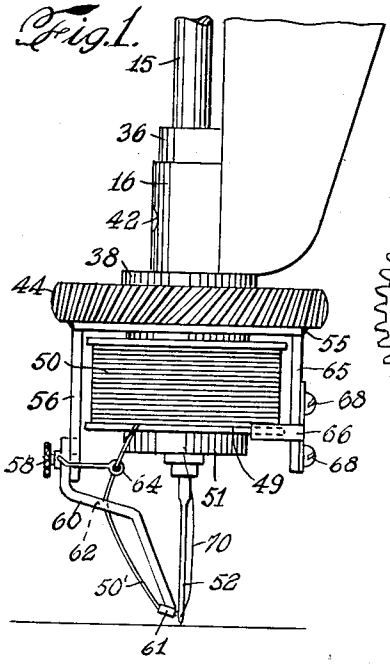



Fig. 2.

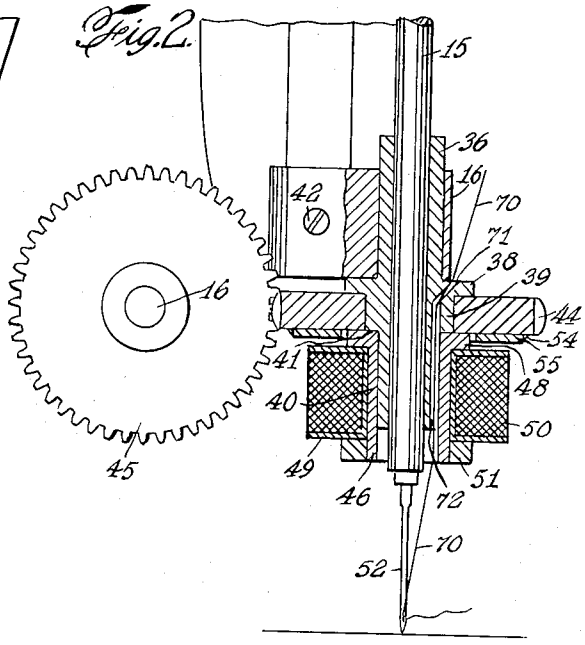



Fig. 3.

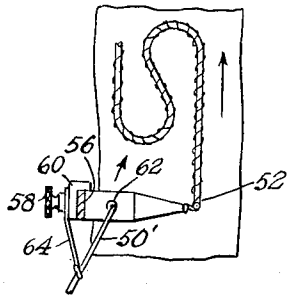



Fig. 4.

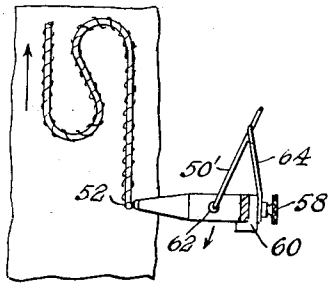



Fig. 5.

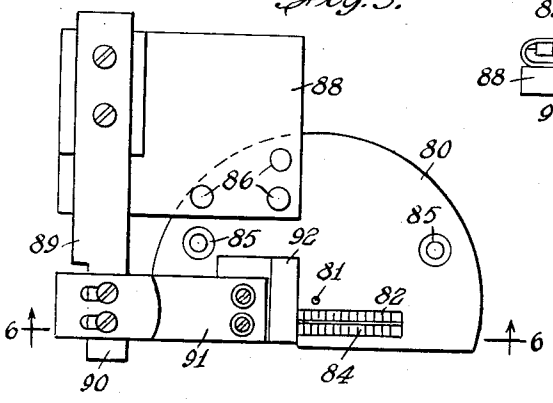
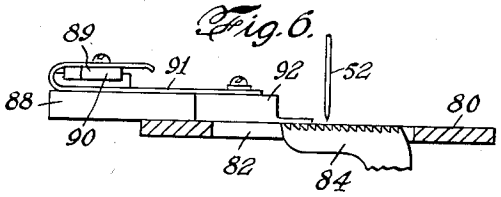



Fig. 6.




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EMBROIDERY ATTACHMENT FOR SEWING MACHINES

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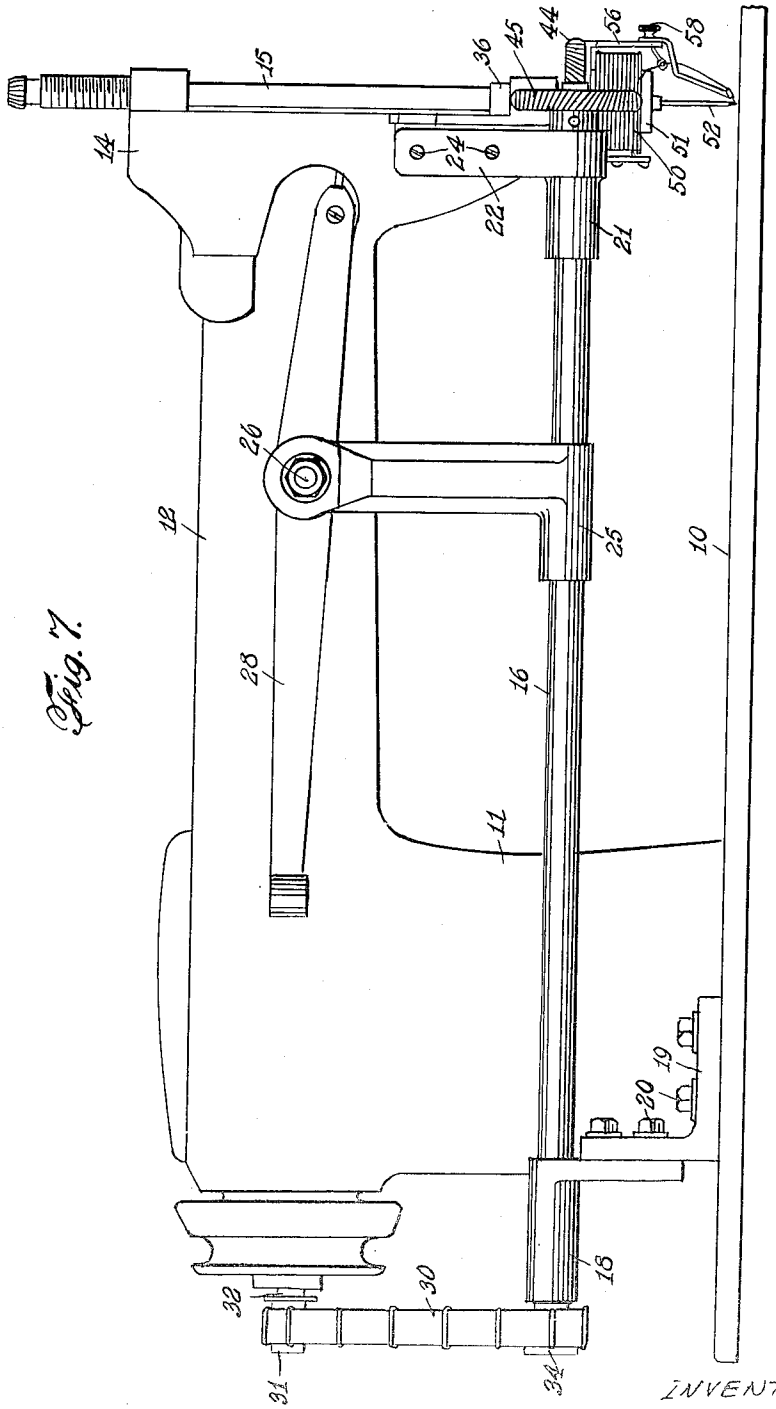



Fig. 1.

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# EMBROIDERY ATTACHMENT FOR SEWING MACHINES

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5 Claims. (Cl. 112—101)

This invention relates to attachments for sewing machines and more particularly to an embroidery attachment for applying a cord or the like to a base fabric to be secured by means of the sewing thread.

The general object of the invention is to provide an embroidery attachment which may be applied to existing sewing machines without alteration of their basic structure, or which may be incorporated in new machines, said attachment comprising a spool for carrying a supply of embroidery material in a position close to the needle and a guide for said material which rotates about the axis of the needle and delivers said material closely adjacent to the point where the stitching is produced in such manner as to cause the stitches to be formed across the embroidery material.

The invention is characterized by an embroidery material supply and feeding means attached to the head of the machine in coaxial relation to the reciprocating needle bar, as hereinafter described, the feeding means preferably being driven from the main shaft through appropriate drive means.

The invention will best be understood from the following detailed description of the present preferred embodiment thereof, taken in conjunction with the drawings in which:

Fig. 1 is a front elevation of the supply and feed means shown as attached to the head of the machine, the lower end of which is shown with the usual cover plate removed;

Fig. 2 is an end elevation, partly in central section, corresponding to Fig. 1 as seen from the left thereof;

Figs. 3 and 4 are fragmentary details of small sections of embroidery work showing the guide arm in two diametrically opposite positions;

Fig. 5 is a plan and Fig. 6 an end elevation taken on the line 6—6 thereof showing an auxiliary presser foot mechanism which may be used in conjunction with the embroidery attachment in place of the usual presser foot of the machine when it is desired to do straight work; and

Fig. 7 is a rear elevation of a sewing machine showing the complete attachment with its drive means in position thereon.

Referring to Fig. 7, it shows a type of standard sewing machine having a base or cloth plate 10, pedestal 11, overhanging arm 12 and head 14, the latter carrying a reciprocating needle bar 15.

The drive for the attachment preferably comprises a horizontal rotating shaft 16 supported in a bearing 18 attached to base 10 by means of an angle bracket 19 and bolts 20, a bearing 21 attached to head 14 by bracket 22 and screws 24, and an intermediate bearing 25 suspended from a stud 26 which replaces the usual stud found on machines of this type for supporting the presser foot lifter 28, the latter being unused since the usual presser foot mechanism is removed when the attachment is applied. Shaft 16 is driven by a cleated belt 30 having driving connections with a pulley 31 on the main shaft 32



and a second pulley 34 on shaft 16. The relative sizes of these two pulleys may be selected as desired to give the desired rotation of the guide arm hereinafter described. As shown, the ratio is 1:1 which gives one complete revolution for each stroke of the needle. In some cases it is desirable to use a 1:2 ratio so that the cord feeding arm turns through 180° for each stroke of the needle.

Referring to Figs. 1 and 2, the cord supplying and feeding mechanism is, as above stated, coaxial with the needle bar 15. In standard machines this bar is normally supported at its lower end in a bushing mounted in head 14 which is removed and replaced by a special inner bushing 36 having a flange 38, a bearing portion 39 and a skirt portion 40 of smaller diameter which provides a shoulder 41. This bushing is fixed in the head 16 by one or more set screws as shown at 42 in Fig. 1.

Rotatably mounted on bearing portion 39 of bushing 36 is one of a pair of 45° spiral gears 44, 45, the latter gear of this pair being fixed to shaft 16. Thus gear 44 makes one revolution for each revolution of shaft 16 and gear 45.

Gear 44 is held in place on bushing 36 by an outer bushing 46 which has a flange 48 bearing against shoulder 41 and against the under face of gear 44. This outer bushing is secured to inner bushing 36 in any suitable manner as by one or more set screws (not shown) threaded into the outer bushing.

Outer bushing 46 carries a flanged spool 49 on which is wound a supply of cord or other embroidery material 50. This spool is freely rotatable on bushing 46 and is retained in place by a collar 51. This may be a metal collar held on bushing 46 by means of a set screw or a simple rubber ring which frictionally engages the bushing and bears against the lower flange of the spool. Between such a rubber ring and the spool a metal washer may be inserted if desired. In any case, the spool is made readily removable so that when the supply of cord or the like is exhausted it may be replaced by a new spool. To this end the parts are so proportioned that the spool 49 is removable through the space between the base 10 of the machine and the point of needle 52 when the latter is in its fully raised position.

Secured to the lower face of gear 44 in any suitable manner, such as brazing 54, is an annular plate 55 which has at least one downwardly depending arm 56 (Fig. 1), tapped at its lower end to receive a threaded fastening such as the thumb screw 58, by means of which the guide arm 60 is movably or removably attached. This arm is movable or removable to clear the way for removal of spool 49. It may be swung through 90° or taken off completely for this purpose. As best shown in Fig. 1, this arm extends inwardly toward the axis of needle 52 and thence downwardly to a position adjacent the point where the needle enters the fabric being worked on and at its lower or delivery end carries a short tubular guide 61 through which passes the cord 50′ or other embroidery material. For the further guiding of the cord in its passage from spool 49 to the tubular guide 61, arm 60 is provided with a hole 62 and, if desired, also with a looped guide 64 of spring wire, the end of which may be in line with the periphery of spool 49.

Optionally, the plate 55 may have a second depending arm 65 which supports a spring finger or detent 66, secured thereto by screws 68, this finger frictionally engaging a flange of the spool 49 and acting to rotate the spool with gear 44 while permitting it to turn relative thereto as the cord or the like is withdrawn. This friction means may be omitted and the rubber ring 51 without a washer used for this purpose.

Referring to Fig. 2, the sewing thread 70 of the machine, which passes through the eye of needle 52, is

guided through an angularly disposed hole 71 through the flange 38 of bushing 36 and thence into a groove 72 in the outer face of this bushing which is closed by the outer bushing 46.

In operation, as needle 52 reciprocates to produce stitches, the cord guide arm 60 is rotated around the needle axis so that the sewing thread and the cord or the like are twisted together with the result that the stitches are formed across the cord which, in the end, is laid straight along the line of stitching. Since this wrapping or twisting movement is continuous as the stitching progresses, the cord passes first in front of the sewing thread or needle and then behind it, the result being a cord secured to the base fabric by a series of stitches passing more or less spirally around it as shown in Figs. 3 and 4. The cord may be laid on the base fabric in a straight line or in any desired design, and when non-linear designs are desired, the machine is operated without a presser foot, the work being fed under the needle by hand in a sinuous path following any desired pattern.

Since the cord feeding and guiding attachment makes it impossible to use the presser foot with which machines are ordinarily equipped, a presser foot of special design, as shown in Figs. 5 and 6, may be used. In this portion of the attachment, the usual needle plate of the machine is replaced by a plate 80 having a needle hole 81 and an aperture 82 for the feed dogs 84 and holes 85 for securing screws by which it is fastened to the base plate 10. Secured to the needle plate 80 as by rivets 86 is a support plate 88 to which is attached an overhanging arm 89 adjustably supporting near its narrower end 90 a looped leaf spring 91 to the end of which is fixed by screws a presser foot 92 which cooperates with the usual feed dogs 84 of the machine.

It is to be understood that the invention is not restricted to the details of construction of the embodiment above described which are merely for purposes of illustration and that various changes may be made therein within the purview of the claims.

What is claimed is:

1. An embroidery attachment for sewing machine of the standard type which has a base, an overhanging head, a needle bar supported for vertical reciprocation in the head, a bushing for the lower end of the needle bar mounted in said head and a main drive shaft extending horizontally through said head having a driving connection with said needle bar; said attachment comprising: a substitute bushing for replacing the original bushing of a machine and having a portion to be secured in the head of the machine, a flange adapted to abut the head of the machine, a bearing portion adjacent said flange and a skirt portion adjacent thereto of smaller diameter than the bearing portion; a flanged outer bushing adapted to fit on said skirt portion with its flange adjacent said bearing portion; means fixing the outer bushing on said skirt portion; a first spiral gear rotatably supported on said bearing portion between said two flanges; a guide arm affixed to said gear and having its guiding end positioned adjacent said base and the axis of the needle bar; retaining means adapted to cooperate with the end of said outer bushing to rotatably support a spool of decorative cord or the like on said outer bushing; an auxiliary drive shaft; means for rotatably supporting said auxiliary drive shaft parallel to said main drive shaft; driving means connecting said two drive shafts; and a second spiral gear mounted on said auxiliary shaft in driving engagement with the said first gear.



2. An attachment according to claim 1 wherein a passage is in part provided for the needle thread of said sewing machine by a groove formed in the skirt portion of said substitute bushing and by the inner surface of said outer bushing.

3. An attachment according to claim 1 wherein said guide arm is of two-piece construction whereby its lower end is movable to permit insertion and removal of spools.

4. An attachment according to claim 1 wherein said spool retaining means comprises a resilient ring adapted to frictionally engage said outer bushing and a face of said spool.

5. An attachment according to claim 1 wherein a second depending arm is affixed to said first gear, and means for frictionally engaging said spool carried by said second arm.

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