SPOOLING ATTACHMENT FOR SEWING MACHINES
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1. Claim. (Cl. 248—158)

This invention relates to sewing machines and
more particularly to a spooling or reeling attach-
ment, adapted to be driven by a sewing machine,
for winding on spools strip materials which are
continuously produced by a machine in long
lengths.

As is well known, various forms of trimmings,
bindings and the like may be and are commerci-
ally produced on sewing machines operating
more or less continuously and at the present time
it is the practice to collect such materials in
baskets as they are delivered from the machines,
which necessitates their being subsequently
placed on spools by hand. The spooled mate-
rials are subsequently used in connection with
further operations on other machines at which
time the material is unwound from the spools as
needed.

The principal object of the present invention
is to provide an automatic spooling attachment
which serves to wind the continuously produced
materials on spools as they are made without
requiring the attention of an operator except for
the necessary replacement of full spools with
empty ones.

Another object of the invention is to provide
such an attachment which is driven directly from
the sewing machine.

A further object is to provide a spooling device
which is adapted to receive spools of different
lengths and having feedly adjustable for use with
such different spools.

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

Fig. 1 is a top plan view of a sewing machine
and spooling attachment mounted on the usual
machine table;

Fig. 2 is an end elevation as seen from the left
of Fig. 1;

Fig. 3 is an elevation partly in section of one
form of friction drive means for rotating the
spool having spring-pressed balls engaging per-
forations;

Fig. 4 is a similar view of another form of fric-
tion drive means having a rubber friction ring;

Fig. 5 is a section taken on the line 5—5 of Fig.
3 showing the face of the flanged end of the
spool holder;

Fig. 6 is a vertical section through the guide-
carrying block, traversing screw and related
parts, taken on the line 6—6 of Fig. 1; and

Fig. 7 is an elevation of the pivoted screw-
follower which is carried by the block shown in
Fig. 6 as seen from the right at that figure.

2. The attachment comprises two main groups of
element which are mounted in a common sup-
porting frame and which have common driving
means. The first group is the spool-holding
mechanism and the second group is the material-
guiding mechanism. These groups will be sepa-
ately described but reference will first be made
to the supporting structure and driving connec-
tion.

Referring to Figs. 1 and 2, there is provided a
main frame 10 in the form of a casting, genera-
ally U-shaped with its open side toward the head
of the sewing machine. This frame is supported
on a pedestal consisting of the base 11 and ver-
tical rod 12. This pedestal may be secured to the
machine table 14 by screws 15.

The sewing machine is of the usual type hav-
ing a head 16, reciprocating needle bar 18 and
presser foot 19 beneath which are the usual feed
dogs (not shown) which propel the stitched
material 20 rearwardly of the machine. The
machine has the usual main shaft provided with
a hand wheel 21 and drive pulley 22 through
which the machine is driven by a belt 24. Fixed
to the end of the main shaft is a small drive
pulley 25 which supplies the power for the spool-
ing attachment.

At its right-hand side the frame 10 is provided
with a drilled boss 26 in which is rotatably
mounted the drive shaft 28 which carries on its
outer end a pulley 29 which is operatively con-
ected with the pulley 25 by a belt 30 or the like.
The inner end of shaft 28 carries a gear 31 which
is the first of a train of reduction gears includ-
ing the gear cluster 32 and the gear 34, the latter
being attached to the end of a stub shaft 35
which is rotatably mounted in the frame 10. The
gear cluster 32 is rotatably mounted on a suit-
able bearing likewise attached to the frame. The
particular form of gearing is not important and
the gears 31 and 32 may be replaced, with suit-
able modification of the shape of the frame, by
a single large gear for driving the gear 34 so that
the desired speed reduction is obtained. A cer-
tain amount of speed reduction is also obtained
by making the pulley 29 larger than the pulley
25 and all of the reduction might be obtained, if
desired, by the selection of suitably sized pul-
leys.

Spool-holding and driving mechanism

The spools customarily used for materials of
the type described are made of cardboard and
each spool consists of a pair of circular ends
attached to a central hollow cylindrical core. In
Fig. 1 the core is shown at 36 and the ends at 37
and 38. Such spools are available in different lengths and the spool-holding mechanism is so designed that spools of various lengths may be utilized.

Referring to Figs. 1, 3 and 5, there is provided a flanged tube which is adapted to fit snugly into the core of a spool with sufficient friction to prevent rotation of the spool on the tube. The tube is shown at 40, a large circular flange or plate 41 being attached to the tube flush with its end. Tube 40 is no longer than the core of the shortest spool which is to be used so that, as shown in Fig. 1, the end 46 of the tube may not reach the end of the spool. Provided on shaft 35 is a grooved wheel 42. Fixed in recesses in the face of wheel 42 are two short tubes 44 which are disposed on a diameter of the wheel. Attached to the outer ends of these tubes is a flat plate 45 containing perforations in alignment with the bores of the tubes 44. Mounted in the latter are springs 46 and balls 47, the perforations in plate 45 being of such size as to permit the balls in the tubes while permitting them to extend slightly beyond the outer face of plate 45. As shown in Fig. 5, the flange or plate 44 is provided with pairs of diametrically disposed perforations 49 capable of being aligned with the balls. Plate 45 is concentrically mounted on a shouldered bushing 50 which fits on shaft 35 and has an outer end of such diameter as to have a slip fit with the inside of the tube 40.

It will be seen that when the tube 40 is inserted in the core of a spool its flange 41 lies against the outside face of the end 38 of the spool and this assembly may be centered on the bushing 50 with the plates 41 and 45 in contact. This assembly provides a friction drive since relative rotation between the plates 41 and 45 will cause the balls 47 to engage with the perforations 49 so that continued rotation will move the spool. However, the friction is sufficiently slight so that a moderate force tending to hold the spool still will result in disengagement of the balls 47 from the perforations 49 permitting the plates 41 and 45 to slip on each other. This keeps a gentle tension on the gears being wound on the spool.

To support the other end of the spool and to urge the flange 41 against the plate 45 there is provided, at the left side of frame 16 as shown in Fig. 1, a spindle 51 slidably mounted in a boss 52 integral with the frame. This spindle is provided at its inner end with a conical plug 54 which engages in the end of the core 36 of the spool. On spindle 51 is a fixed collar 55. Surrounding the spindle 51 between the collar 55 and the boss 52 is a coil spring 56 which provides a means for resiliently urging the spindle into engagement with the spool and the relatively movable parts of the friction drive into engagement with each other. For retracting the spindle, it is provided at its outer end with a knob 58.

Material guiding mechanism

To guide the material delivered from the sewing machine longitudinally of the spool so that it is wound evenly thereon, a double-threaded traversing screw 60 is rotatably mounted in the frame 16 parallel to the axis of the spool. At one end, in alignment with the grooved wheel 42, screw 60 has fixed on it a smaller grooved wheel 62 and a driving connection is effected between these two wheels by the belt 64. Slidably mounted on screw 60 is a block 65 from which a guide 66 is supported on a bracket 61. To prevent rotation of the block on the screw there is attached to the frame 16 a fixed rod 68 which passes freely through a hole in block 65 as shown in Fig. 6. Vertically mounted in the top of block 65 is the screw follower shown in Fig. 7 which consists of the shaft 69, bearing portion 70 and screw-engaging tongue 71. Block 65 is provided with a bored tubular arm in the form of a leaf spring 78 adapted to engage the stop. Such engagement rotates the screw follower in block 65 so that the tongue 71 crosses from one thread to the other, changing the direction of travel of the block. Leaf spring 78 is capable of yielding to permit some continued movement of block 65 after the spring engages stop 75 to accommodate the situation where the tongue 71 has not quite reached a point on the screw 60 where it can cross over the other. Cross over the other. Cross over the other.

Referring to Fig. 4, a modified form of friction drive is shown in which a grooved wheel 42a is substituted for the wheel 42 shown in Fig. 3. Wheel 42a is provided in its face with a circular groove 80 concentric with shaft 35 in which groove there is secured an annular ring 81 of rubber or other resilient material which bears against the flange 41 of tube 40, the rubber providing the necessary friction for rotating the spool. The friction drives of Figs. 3 and 4 are adapted for use with cardboard spools. However, if spools of rigid material of sufficient strength are used, the tube 40 and flange 41 may be omitted and a friction drive such as that of Fig. 4 made to bear directly on the end of the spool.

When a spool is placed in the device it is obviously necessary to rotate the empty spool at a more rapid rate than when the spool is nearly full because the circumference of the material wound on a nearly empty spool is smaller than the circumference of the material on a partly filled spool. The friction driving member therefore rotates at a speed sufficient to wind the material tightly on an empty spool and, as the spool fills up, more and more slipping occurs between the elements of the friction driving member. The pressure is of course so adjusted as to provide a relatively light driving force on the spool only sufficient to effect proper winding without binding. This adjustment may be made by the selection of a spring 55 of proper size and the positioning of the collar 55.

Being driven from the machine, it is of course evident that the reeling device operates only when the machine is operating and the device
has the further advantage that no separate source of power is required.

It is to be understood that the foregoing detailed description is merely for the purpose of illustration and that the invention is not to be limited thereto but is to be construed broadly within the purview of the claim.

What is claimed is:

In a reeling device for use with material-receiving spools of differing lengths and having means for supporting and rotating a spool, adjustable traversing means to direct material onto the said spool as it rotates comprising: a double-threaded traversing screw, means for supporting the screw parallel to the spool axis and rotating it with the spool, a block slidably mounted on the screw and movable to and fro thereon as the screw rotates, a fixed member extending parallel to said screw, said block having sliding engagement with two opposite surfaces of said member whereby rotation of said block is wholly prevented, a guide for the material being spooled carried by said block, a screw-follower rotatably mounted in said block and having a tongue engaging the threads of said screw, a resilient arm affixed directly to said follower and extending outwardly therefrom at an angle to its axis of rotation and to one side of the axis of said screw, a stop positioned in the path traversed by said resilient arm and adjustable in position along said path according to the length of the spool being wound, whereby when said arm engages said stop said follower is rotated to reverse the direction of travel of said block, said arm flexing upon engagement with the stop until said follower reaches a point on the screw where it is free to rotate.

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