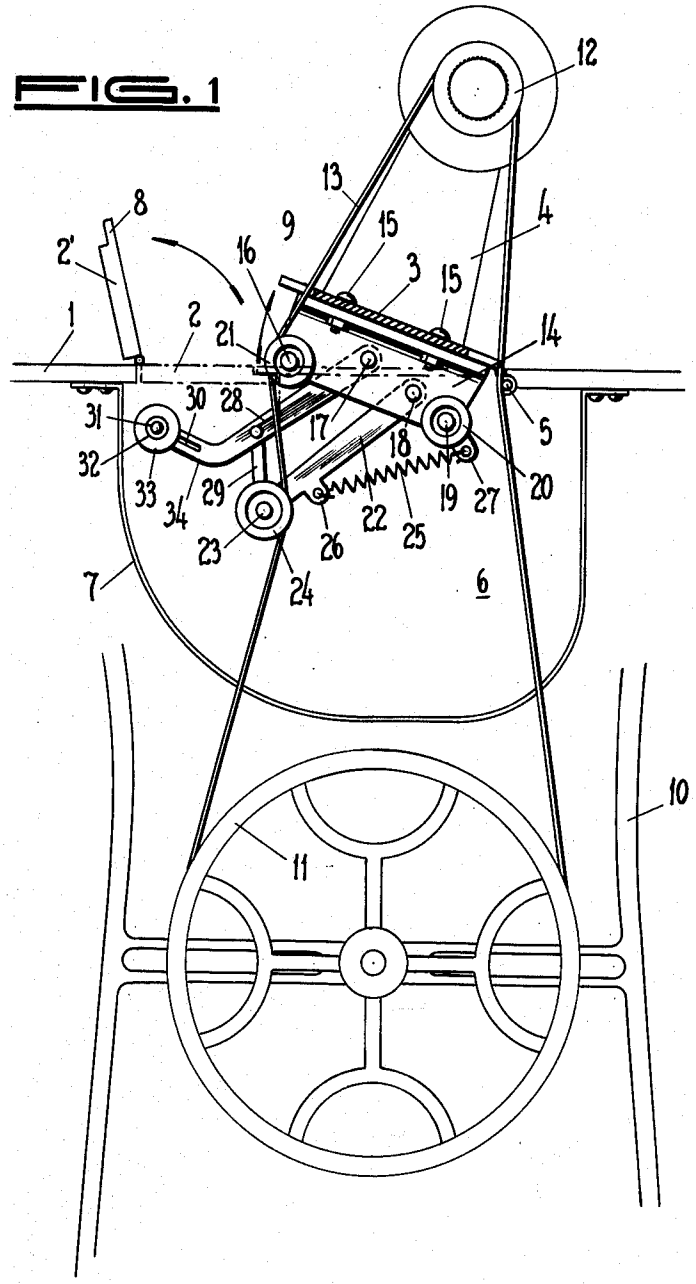
March 31, 1964 E. A. FONTANA 3,126,852

BELT-TENSIONING DEVICE FOR FOLDABLE SEWING MACHINES

Filed Nov. 24, 1961 2 Sheets-Sheet 1

FIG. 1



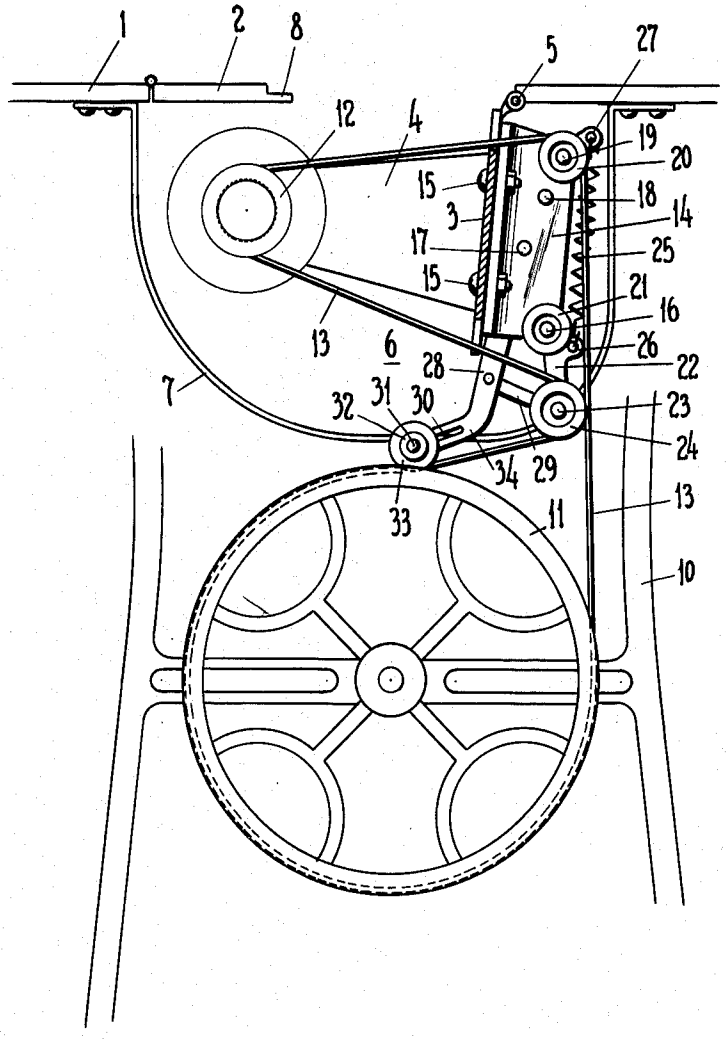
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FIG. 2



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BELT-TENSIONING DEVICE FOR FOLDABLE SEWING MACHINES

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The invention relates to domestic sewing machines of the type mounted on a table, so that they stand over the table during their use, but may be withdrawn into the interior of the table, under its top, when not in use, while the table carries in its lower part a pedal mechanism, for driving the machine by means of a belt.

In the known machines of this type, the body of the machine is generally hinged at its base on the top of the table, and may be swung down, so as to lay fully under the top. In so doing, the driving belt has to be withdrawn from the driving sheave, and therefore it must be put again upon the same, each time the machine is put once more in working position. This operation is tiresome and annoying, and it impairs the immediate use of the machine when needed. Moreover, it subjects the belt to repeated stretchings, which shorten its useful life and require frequent tightening of the same, with the following loss of time and general annoyance for the user of the machine.

The object of the invention is, therefore, to avoid the drawbacks mentioned above, by providing means adapted to keep the belt constantly on its sheaves, notwithstanding any movement of the body of the machine for putting into working position or to rest, so that after putting the machine in position to work, it already is in working order, and no more time needs to be lost in arranging the belt.

According to the invention, this purpose is attained by providing a swinging arm, pivoted to the underside of the machine body, urged by a spring, and carrying a sheave adapted to bear against the belt and to tension the same, being aided in this by a couple of grooved guides, also carried by the underside of the machine body. It has been found that, with such an arrangement, the very swinging motion of the machine body for reentering into the table, forms a fold in the belt and maintains it tensioned, notwithstanding the swinging movement of the body and its folding down into the table's interior. This device may be completed by a brake shoe fixed to the swinging arm, or to an extension thereof, and adapted to bear against the driving sheave when the sewing machine is in its folded, or closed, rest position.

According to a more elaborate embodiment of the invention, a second swinging arm is provided, also pivotally mounted on the underside of the machine body, and carrying an adjustable brake shoe, this second arm being linked with the first mentioned swinging arm in such a manner, that in the folded position of the machine body, its brake shoe bear against the driving sheave and prevents the movement thereof, while in the working position of the machine body, the brake shoe does not interfere with the table top.

According to a still more useful embodiment of the invention, all of the elements coming into contact with the belt are formed of sheaves of the same kind, which are used without any modification to serve as guide sheaves, replacing the above mentioned grooved guides, and with the addition of a rubber tire, in order to serve as a brake shoe. It is understood, that for this latter purpose, as well as for the use as a guide, in the cases where only a standing belt comes to rest upon them, these sheaves do not need to be provided with bearings, but may be rigidly fixed on their supports.

In carrying out the invention, it should be kept in mind, that the relative positions of the various sheaves and guides should be such as to give the same, invariable length for the belt, both in the folded and in the most elevated

position of the machine body. This feature, as well as other details of the invention, will be fully understood from the following description of a preferred embodiment thereof, aided by reference to the accompanying drawings, in which:

FIGURE 1 is a diagrammatical side elevation of the preferred embodiment, shown in its most open position; and

FIGURE 2 is a diagrammatical side elevation of the same embodiment, but in its folded, or closed, position.

The embodiment shown on the drawings, of which only the features pertinent to the invention have been shown, comprises a table top 1, having a movable portion, or flap 2, which may be raised into the extended position 2', to the purpose of letting free the base 3 of the machine body 4, as well as the top thereof, to swing about hinge 5 and drop into the interior 6 of the table, which is closed by a cup-like wall 7, until they assume the position of FIG. 2, which will be referred to as the retracted, or folded position. In the normal, or working position, as is well known, the tip 9 of the base 3 of the machine rests on a recessed tip 8 of the flap 2, reconstituting a generally smooth top for the table of the machine. On a frame 10 supporting the table and the pedal mechanism of known construction, which therefore is not shown, the driving sheave 11 is journalled, and linked with the driven sheave 12, usually integral with the flywheel of the machine and carried by the body 4, by means of a belt 13, of substantially circular section, which is usually made of leather, but according to this invention is preferably made of a synthetic plastic material, either alone, or covered with an outer coating of vulcanized, natural or artificial rubber.

In the embodiment shown on the drawings, the characteristic features of the invention are assembled on a bracket 14, which is fixed through bolts 15 to the base plate 3 of the machine, but which could also be made integral with plate 3 or with the body 4 of the sewing machine. The embodiment shown has the advantage, that it may be readily and easily applied to any known and existing sewing machine, so that it may transform any old machine into a new one according to the invention.

The bracket 14 carries four pivots 16—17—18—19, located at suitable positions with respect to one another and to the body 4, and which comprise substantially the whole width of the base 3 of the machine. Pivot 19 carries a guide sheave 20, to the purpose of supporting the rear, or aft strand of belt 13 during and after folding of the machine, as may be seen from FIG. 2. Since this sheave 20 does not support the belt while moving, but only at rest, there is no need to provide it with a bearing. In fact, sheave 20 could be fixed, or even substituted by a simple grooved guide.

Pivot 16 carries a guide sheave 21, which supports the forward, or fore strand of belt 13. Like sheave 20, sheave 21 too supports the belt from the inner face thereof, and both act to prevent both strands of the belt from getting too near to one another. Unlike sheave 20, sheave 21 supports belt 13 at any time, that is, also when running. To this purpose, it must be provided with a full bearing; preferably a ball bearing.

Pivot 18 carries one end of an oscillating, arm 22, whose other end carries a pivot 23 for a loose sheave 24, which bears on the external, or outer surface of the fore strand of the belt 13. A spring 25, hooked between a lateral projection 26 of the lever 22 and a fixed projection 27 of bracket 14, loads sheave 24 and pushes it against the belt 13, driving it towards the interior of the loop. Sheave 24 must also be provided with a full bearing, since it must deal with the moving belt.

Another lever or arm 28 swings about pivot 17, being linked to lever 22 by beans of a connecting rod or link

29, and is provided at its outer end with a slot 30 extending in a longitudinal direction, so that a pin 31, entering slot 30 and carrying a brake sheave 32 with rubber tire 33, may be adjusted on lever 28, in order that, in the position of the device shown in FIG. 2, the brake sheave 32 press its tire 33 against the driving sheave 11, exerting thereon an adequate braking action. It should be noted at once that, although this second arm 28 is a very useful feature and constitutes a highly adequate mechanism, it is, however, by no means necessary, since under given circumstances the outer cranked section 34 of lever 28 could be attached directly to arm 22, so that the latter would carry also the braking device 32—33, or any other type of device, adapted to fit sheave 11.

Supposing now the machine be in its working position, shown with dotted lines on FIG. 2, for folding and closing the same, it is first necessary, that the body 4 with base plate 3 be raised into the position shown in FIG. 1, and that successively flap 2 of the table top also be raised into position 2'. In this position, tips 8 and 9 come out of mesh, so that the body of the machine may, now, be lowered into the interior 6 of the table.

In this most extended, or open, position, the belt 13 is almost fully extended, so that the tension sheave 24 inflects but slightly the fore strand of the same. However, it may be seen from this figure, that in order to use the apparatus according to the invention, a slightly longer belt is necessary, than with standard machines without belt-tensioning device. When dropping from this position, the machine body, with bracket 14, swings about hinge 5, the fore strand of belt 13 slackens, but arm 22 with sheave 24 follows, as it also swings about the same hinge, so taking up the major portion of the slack, whilst the small difference is taken up by the relative movement of lever 22 with respect to bracket 14, under the pull of spring 25, so maintaining the tension in the belt quite constant. During this process, the rear strand of the belt is kept tight by sheave 20.

At the end of this process, when the body 4 of the machine has reached the position shown in FIG. 2, and the opening in the table top 1 may be closed with the appropriate cover, the tensioning sheave 24 will have reached essentially a position against the rear strand of the belt 13, thus maintaining the latter in tension, notwithstanding the folded shape of the machine. In this position, brake sheave 32 will have pressed its rubber tire 33 into and against the groove of driving sheave 11, as well as against the part of belt 13 lying therein, thus effecting a suitable braking of this wheel, which can no more be put in motion, as long as the machine remains in its folded position. This braking effect may be suitably adjusted by moving pin 31 along slot 30. Alternately, a braking effect may also be obtained by locking sheave 20, or replacing it by a fixed, grooved, or V guide, which may have a form different from the circular, and so effect a quite adequate braking, without the braking, without the complexity of brake shoes, linked arms, etc.

In order to put the machine in its working position, the reverse process is carried out, removing the cover of the table top (not shown), raising the flap 2 into its position 2', and pulling the machine body 4 into its most extended, or open position shown in FIG. 1, as is commonly done with foldable sewing machines of common construction. After lowering flap 2' to its normal position 2, the body 4 is then also lowered, until its tip 9 of base plate 3 rests upon tip 8 of flap 2, and then the machine according to the invention is ready for work, without any need of adjusting the belt, since this is done automatically by spring 25 and related organs.

It is to be understood that the second oscillating lever 28, and generally the brake means 32 with resilient cover 33, has still another purpose; that is, to dampen the impact of the falling body 4 against any hard surface or point which should stop its fall. According to the invention, indeed, the braking means 32—33 are the first to take the impact of the fall, and damp it down to an acceptable, dangerless limit.

The embodiment of the invention as described and illustrated is to be considered merely as an example, and it will be understood that various omissions, substitutions and changes may be made by those skilled in the art, without departing from the spirit of the invention. It is therefore intended that this application cover any embodiments, modifications and adaptations and uses of the invention which fall within the scope of the invention and the limits of the appended claims.

I claim:

1. In a foldable sewing machine comprising a table top, a hinge carried by said table top, a body adapted to swing about said hinge between a working and a folded position, a driving and a driven sheave, and a round, cord-like belt, having a fore and aft strand; a tensioning device for said belt adapted to keep said belt in tension while said body swings about said hinge, a guide sheave adapted to retain said fore strand of said belt against said tensioning device for any position of said body, means adapted to retain said aft strand of said belt during said swinging of said body, a braking device operatively connected with said tensioning device and adapted to block said driving sheave when said sewing machine is in said folded position, a bracket fixed to said body adapted to swing therewith and to carry said guide sheave and said means, an arm having an end pivotally mounted on said bracket and another free end, a loose sheave rotatably carried by said free end of said arm and adapted to bear against said fore-strand of said belt, and a spring tensioned between said arm and said bracket and adapted to push said loose sheave against said belt as to keep said belt in tension for any position of said body, while the latter is swinging about said hinge.

2. In a sewing machine as defined in claim 1, a brake shoe carried by said arm and adapted to bear against said driving sheave when said body is in said folded position.

3. In a sewing machine as defined in claim 1, a second arm having an end pivotally mounted on said bracket and another free end, a brake shoe carried by said free end and adapted to bear against said driving sheave when said body is in said folded position and a link pivotally connected with said first mentioned arm and with said second arm, said two arms being located on opposite sides of said bracket so that in said folded position of the machine body said brake shoe bears against said driving sheave, and in said working position of said body said second arm clears said table top.

4. A sewing machine as defined in claim 3, wherein said guide sheave bears against the inner face of said fore strand of said belt and said loose sheave bears against the outer face of said fore strand of said belt and pushes the later against said aft strand of the same belt when said body is swinging to said folded position.

5. In a sewing machine as defined in claim 3, a slot provided in said free end of said second arm, and adapted to receive said brake shoe so that said shoe bears exactly upon said driving sheave whenever said sewing machine is folded up.

6. In a foldable sewing machine comprising a table top, a body adapted to swing about a hinge carried by the rear portion of said table top between a working and a folded position, a driving and a driven sheave having grooves, and a round cord-like belt having a fore and an aft strand; a bracket fixed to said body and adapted to swing therewith, an arm having an end pivotally mounted on said bracket and another free end, a loose sheave rotatably carried by said free end of said arm and adapted to bear against said fore strand of said belt, a spring fixed to said bracket and to said arm and adapted to cause said loose sheave to exert a pressure against said belt so as to keep said belt in tension independently of the swinging motion and of the position of said body about said hinge, a guide sheave rotatably carried by said bracket

and adapted to retain said fore strand of said belt against said pressure exerted thereon by said loose sheave in any swinging position of said body, a second guide sheave carried by said bracket and adapted to retain said aft strand of said belt when said swinging body swings off from said working position and towards said folded position, a second arm having an end pivotally mounted on said bracket and another free end having a slot, a braking sheave having a groove and adapted to be fastened to said slot and to be adjusted along the same so as to reach to an appropriate distance from said driving sheave when said body is in its said folded position, a rubber tire adapted to fit into said groove of said braking sheave and to bear against said belt and said groove of said driving sheave with an adequate pressure when said body is in its said folded position and a link pivotally connected with said first mentioned and with said second arm so that in said folded position of the said machine body said brake sheave bears against said driving sheave and in said working position of said body said second arm clears said table top.

7. A sewing machine as defined in claim 6, wherein said guide sheave bears against the iner face of said fore strand of said belt and said loose sheave bears against the outer face of said fore strand of said belt and pushes the latter against said aft strand of the same belt when said body is swinging to said folded position.

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