Aug. 28, 1962 F. STAHLECKER 3,050,929

BELT TENSIONER, PARTICULARLY FOR SPINNING OR TWISTING MACHINES

Filed Dec. 27, 1960 4 Sheets-Sheet 1

Fig. 1

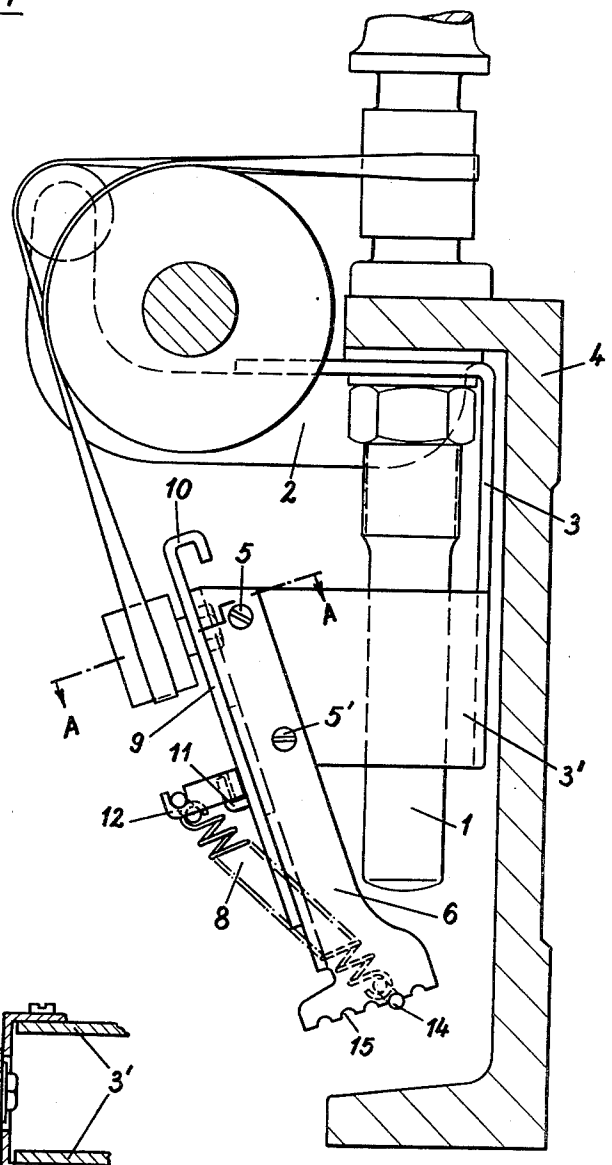
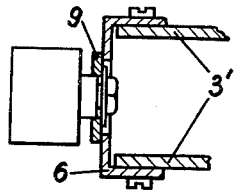



Fig. 2




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Aug. 28, 1962 F. STAHLECKER 3,050,929

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Filed Dec. 27, 1960 4 Sheets-Sheet 2

Fig. 4

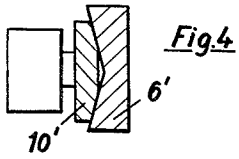



Fig. 3

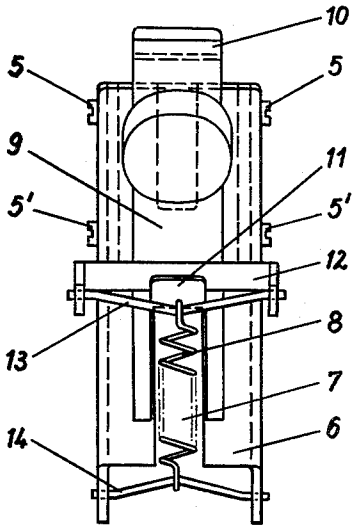



Fig. 5

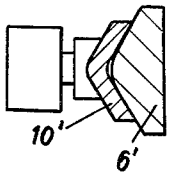



Fig. 6

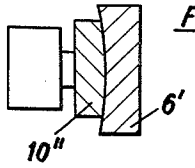



Fig. 7

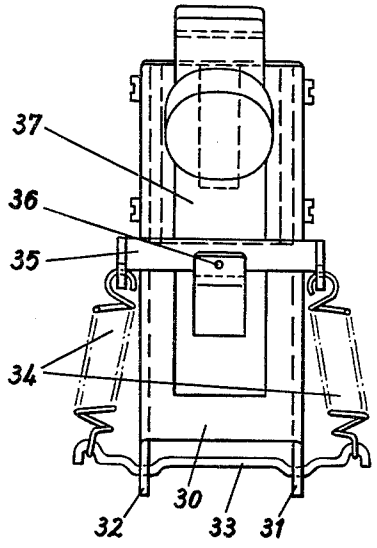
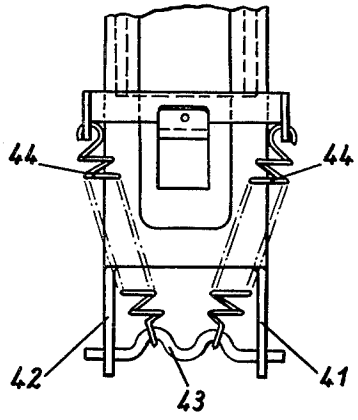



Fig. 8




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Aug. 28, 1962 F. STAHLECKER 3,050,929

BELT TENSIONER, PARTICULARLY FOR SPINNING OR TWISTING MACHINES

Filed Dec. 27, 1960 4 Sheets-Sheet 3

Fig. 9

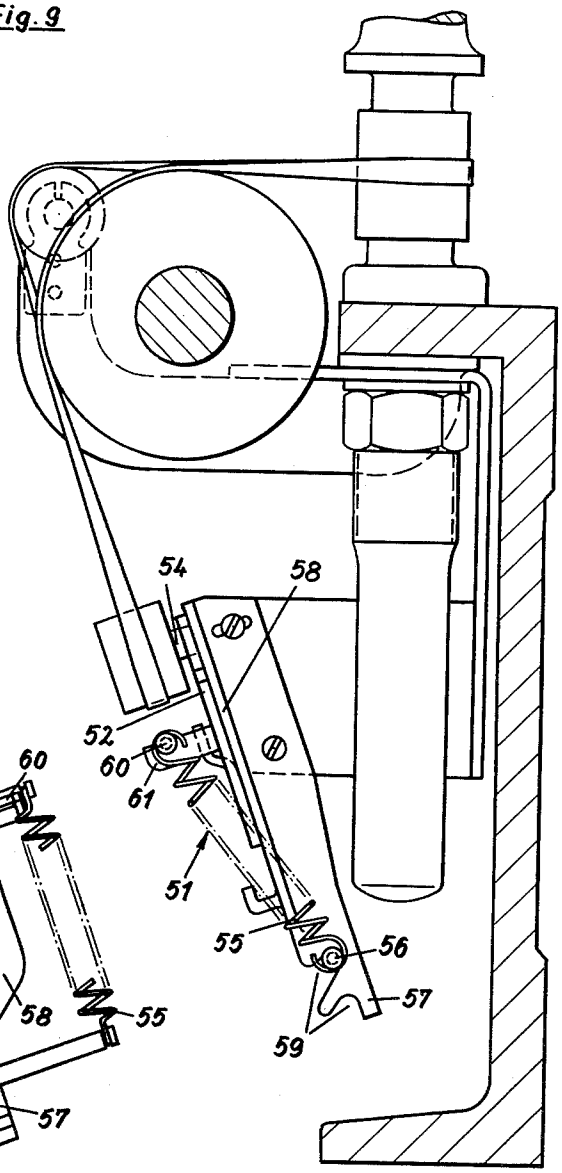
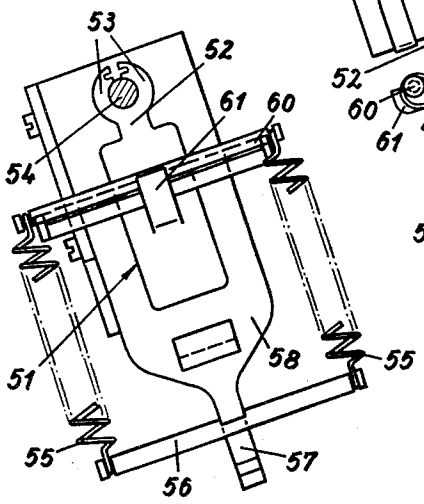



Fig. 10




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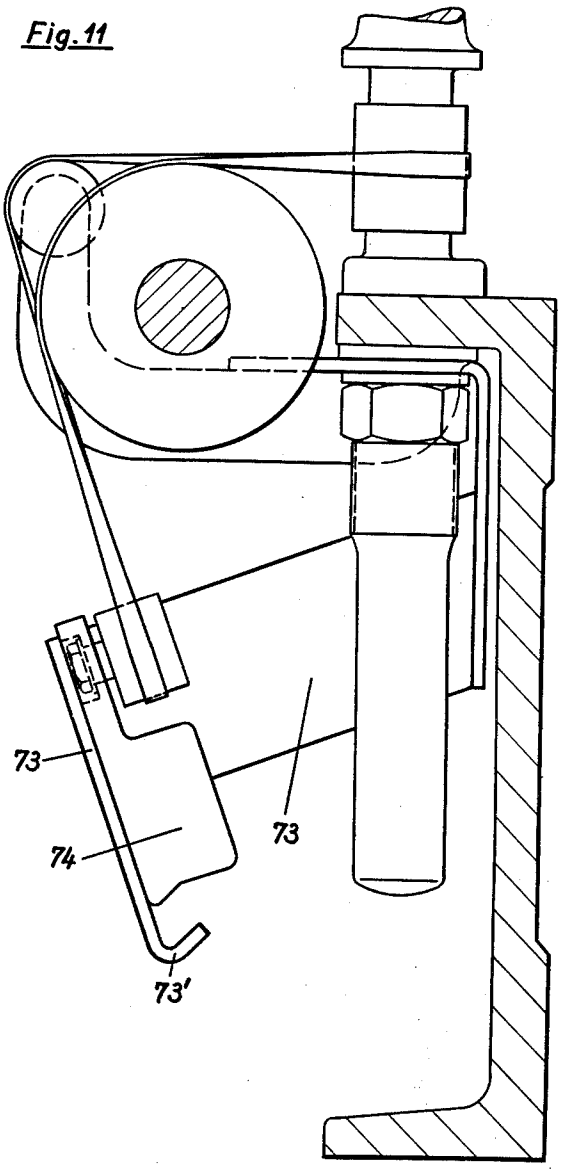
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Aug. 28, 1962 F. STAHLECKER 3,050,929

BELT TENSIONER, PARTICULARLY FOR SPINNING OR TWISTING MACHINES

Filed Dec. 27, 1960 4 Sheets-Sheet 4

Fig. 11




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3,050,929

# BELT TENSIONER, PARTICULARLY FOR SPINNING OR TWISTING MACHINES

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15 Claims. (Cl. 57—105)

The present invention relates to a belt or cord tensioner, espectially for the tension pulleys of spinning or twisting machines, and preferably of such machines in which only one spindle is driven by a drive pulley which is mounted in the immediate vicinity of the spindle, and the relatively short belt or cord of which is guided by an idling or tensioning pulley.

The conventional belt or cord drives are provided with tension-pulley supports which consist of slides which are movable within guides. Such devices have the disadvantage that, due to the unavoidable vibrations, the guides sooner or later become worn, with the result that the tension pulley will be insecurely guided and rapidly worn which, in turn, means that the tension on the belt or cord will become uneven.

It is an object of the present invention to provide a more secure mounting of the tension pulley which permits the pulley to adjust itself freely to the proper belt tension and which is subject to the least possible friction and wear. This object is attained according to the invention by providing a pulley support, which consists primarily of a slide member and a pulley carrier, with one or more force-accumulating elements, for example, weights or resilient means, and by applying these elements on the pulley support in such a manner that the belt or cord will thereby be tightened and the pulley carrier will in any position be automatically pressed upon its supporting base.

Another object of the invention is to support the pulley carrier merely by means of the driving belt or cord and by one or more force-accumulating elements, preferably in the form of springs.

For supporting the pulley carrier by means of one or more resilient elements, the invention provides that these elements are preferably disposed at an oblique angle relative to the base of the pulley carrier and that they are secured to fixed points of the apparatus at the side of the supporting base opposite to the pulley carrier.

The slide member of the pulley carrier may be provided with a flat sliding surface which is adapted to slide along a flat base. The sliding surface may, however, also be angular or curved, in which case the necessary supporting base should be shaped accordingly.

The useful life of the tensioning device according to the invention may be further prolonged and the sliding properties may be further improved if, according to another feature of the invention, the pulley carrier or its slide member and/or the supporting base thereof are made of plastic.

If the tension which is necessary to secure the pulley carrier is provided by springs, it is advisable to provide them in pairs. The points of connection of these springs on the pulley carrier may be spaced either at a smaller or greater distance from each other than the fixed connecting points are spaced from each other. In other words, if a pair of springs is provided, they should not be active in a direction parallel to the longitudinal axis of the slide member, as seen fro mthe front thereof, but at a certain angle to the longitudinal axis. The force components which then arise act as supplementary lateral guiding forces. In some cases, these supplementary forces for securing the pulley carrier in the proper position may, however, be omitted and the spring elements may then



be mounted so as to extend parallel to the longitudinal axis of the slide member.

A secure connection of the springs may be attained according to the invention by connecting them at one end to the pulley carrier and at the other end to a supporing member which is designed and suspended like a swingletree. This supporting member may be adjusted to different positions so as to permit the spring tension and/or its direction to be varied.

A very preferred feature of the invention when applied to a belt or cord drive with several pulleys consists in securing these pulleys, and particularly the tension pulley, in a fixed position by clamping their shafts. The pulley carrier which is secured to the slide member is then designed in the form of a clamp which securely grips the shaft of the tension pulley. The construction of this device may be simplified by making the pulley carrier an integral part of the slide member.

The above-mentioned and other objects, features, and advantages of the present invention will become more clearly apparent from the following detailed description thereof, particularly when the same is read with reference to the accompanying drawings, in which—

FIGURE 1 shows a side view of a spindle drive with a tension-pulley carrier in the form of a slide bar without lateral guides, the spindle rail and the drive shaft being shown in cross section;

FIGURE 2 shows a cross section of the slide bar taken along line A—A in FIGURE 1;

FIGURE 3 shows a front view of the tension-pulley carrier according to FIGURE 1 on a slightly smaller scale;

FIGURE 4 shows a cross section of a tension-pulley carrier according to a modification of the invention in which the slide bar and slideway are of an angular cross section;

FIGURE 5 shows a view similar to FIGURE 4, but of another modification in which the slide bar and slideway are of a different angular shape than in FIGURE 4;

FIGURE 6 shows another view similar to FIGURES 4 and 5, but of a further modification in which the slide bar and slideway have an arcuate cross section;

FIGURE 7 shows a front view of a tension-pulley carrier which is similar to that according to FIGURES 1 to 3, but which is subjected to the load of a pair of springs which are disposed at a certain angle to the longitudinal axis of the pulley carrier;

FIGURE 8 shows an arrangement similar to FIGURE 7, but with the springs extending in a different direction;

FIGURE 9 shows a side view similar to FIGURE 1 of a spindle drive according to a further modification in which the shaft of the tension pulley is secured by a resilient clamp and the springs are connected to a cross-bar which functions like a swingletree.

FIGURE 10 shows a front view of the tension-pulley carrier according to FIGURE 9, but without the tension pulley; while

FIGURE 11 shows a side view of a further modification of a pulley drive, in which the load on the tension-pulley carrier is provided by its own weight.

Referring first to FIGURES 1 to 3 of the drawings, the spindle housing 1 in which the spindle is rotatably mounted also serves as the means securing a bracket 2 for supporting the guide pulley and a sheet-metal bracket 3 for supporting the tension pulley to the spindle rail 4. Bracket 3 is bent to a U-shape to form two arms 3' on which the likewise U-shaped slideway 6 is secured by means of screws 5 and 5'. Slideway 6 is provided with a central elongated aperture 7 in its lower part, as shown in FIGURE 3, for accommodating a coil spring 8. Slideway 6 supports a slide bar 9 which forms the carrier of the tension pulley and is movable along the flat upper

surface of slideway 6. Slide bar 9 is bent over at its upper end to form a hook 10 which serves as a safety element which will arrest slide bar 9 on the closed upper end of slideway 6 in the event that the belt might tear. Slide bar 9 also has an elongated aperture coinciding with the aperture 7 in slideway 6, and a part of the material which is cut to form this aperture is bent upwardly to form a hook 11 into which a U-shaped bridge member 12 is inserted. This bridge member 12 supports a yoke-shaped crossbar 13 upon which the upper end of spring 8 is hooked. The lower end of spring 8 is connected to a yoke-shaped crossbar 14 which may be inserted into one of several pairs of notches 15 in the lower ends of the two arms of slideway 6. Since the tension of spring 8 and the tension of the belt extend in directions parallel to each other, as seen from the front, and since the spring tension engages centrally of the equal tensions of the two belt strands, no force component can arise which might tend to draw slide bar 9 laterally from its slideway 6.

FIGURES 4 and 5 illustrate two modifications of the slide bar 10' which is made of an angular cross section and is supported by a slideway 6' of a corresponding shape, so that the slide bar will be guided to some extent in the lateral directions. This guide action is, however, not restrictive since the slide bar is prevented from being lifted off its support merely by the direction of the tension of spring 8.

The further modification of slide bar 10'', as shown in FIGURE 6, in which the contact surfaces of the slide bar and of slideway 6' are arcuate is of advantage particularly for keeping these surfaces as clean as possible since they have less tendency to collect dirt than the angular surfaces as shown in FIGURES 4 and 5. Obviously, the contact surfaces may also be of an elliptical or parabolic shape, in which event the slide bar may also be guided in lateral directions.

FIGURE 7 shows a modification of the spring arrangement, in which the spring tension engages on the slide bar outside of the side walls of the slideway. The two arms 31 and 32 of the U-shaped slideway 30 are provided with notches similarly as shown in FIGURE 1, into which a crossbar 33 may be inserted. A pair of springs 34 are hooked at one end into the two ends of crossbar 33 and at the other end into the ends of the U-shaped bridge member 35 which is connected at 36 to the slide bar 37. Due to the lateral arrangement of the springs, the elongated apertures in the slide bar and slideway may be omitted so that the size of the bearing surface of the slide bar will be increased. Since springs 34 do not extend parallel to each other, the position of slide bar 37 with the tension pulley thereon will be additionally secured on slideway 30, which is of importance when the belt tension on the two strands of the belt is unequal, for example, when the rotation of the spindle is started.

In the modification according to FIGURE 8, the two springs 44 are likewise hooked at their upper ends to the outer ends of the U-shaped bridge member outside of the side walls of the slideway, while the other ends of the springs are connected to crossbar 43 between the two arms 41 and 42 of the U-shaped slideway. The effect of this arrangement is the same as that of the arrangement according to FIGURE 7, although the bearing surface of the slide bar is slightly smaller. This spring arrangement is preferably applied in those cases where the spindles are mounted closely adjacent to each other so that only very little space is available between them.

In the further embodiment of the invention, as shown in FIGURES 9 and 10, the slide bar which is generally indicated at 51 also serves as a carrier of the tension pulley since the clamping member 52 forms an integral part of the slide bar. Shaft 54 of the tension pulley is clamped tightly by spring arms 53 of clamping member 52. The two coil springs 55 are hooked at their lower ends to



the ends of a crossbar 56 which is suspended like a swingletree on the central web 57 of slideway 58 and may be inserted into either of the notches 59 in the latter in accordance with the desired tension. The upper ends of springs 55 are hooked on the ends of a crossbar 60 which is inserted into the U-shaped bridge member 61 which is hooked into slide bar 51.

In the further modification of the invention, as shown in FIGURE 11, the sheet-metal bracket 73 is designed so as to surround the slide bar 74 which also carries the tension pulley. Slide bar 74 is made of a very heavy construction or provided with additional weights so as to tighten the belt by its own weight. Since slide bar 74 with the tension pulley thereon rests on bracket 73 or on a slideway which is secured to bracket 73, and since the weight of the slide bar and the tension pulley produces a force component which presses the slide bar securely upon the supporting surface of the bracket or the slideway, the slide bar is sufficiently guided. If required, however, the slide bar may also be designed similarly as shown in FIGURES 4, 5, and 6. The bent portion 73' on bracket 73 prevents the slide bar and tension pulley from falling off in the event that the belt might tear.

It is within the scope of the invention to provide still further modifications thereof. Thus, for example the springs may consist either of coil springs, leaf springs, rubber springs, or the like and they may also be differently arranged from the specific ways as illustrated herein. Furthermore, existing spindle drives of different designs may be suitably converted to apply the invention thereon.

Having thus described my invention, what I claim is:

1. A belt tensioning device, especially for spinning and twisting machines, comprising a tension pulley adapted to tighten a belt and having a shaft, a stationary support, a slideway on said support, a slide member carrying said shaft and slidable along said slideway, and means connected to said slide member for exerting a tension thereon in the direction opposite to said belt so as to tighten said belt and also for pressing said slide member in any position thereof into engagement with said support said slide member and the tension pulley thereon being held on said slideway solely by said belt and said means.

2. A belt-tensioning device, especially for spinning and twisting machines, comprising a tension pulley adapted to tighten a belt and having a shaft, a stationary support, a slideway on said support, a slide member carrying said shaft and slidable along said slideway, and means connected to said slide member for exerting a tension thereon in a direction opposite to said belt so as to tighten said belt and also for pressing said slide member in any position thereof into engagement with said support, said means including at least one spring member, said slide member and the tension pulley thereon being held on said slideway solely by said belt and said spring member.

3. A belt tensioning device as defined in claim 2, in which said spring member is connected at one end to said slide member and at the other end to said stationary support and extends in an inclined direction toward said support so as to press said slide member thereon.

4. A belt tensioning device as defined in claim 3, in which said slide member and said slideway have flat surfaces adapted to slide along each other.

5. A belt tensioning device as defined in claim 3, in which said slide member and said slideway have corresponding angular surfaces adapted to slide along each other.

6. A belt tensioning device as defined in claim 3, in which said slide member and said slideway have corresponding curved surfaces adapted to slide along each other.

7. A belt tensioning device as defined in claim 1, in

which at least one essential part of said device is made of plastic.

8. A belt tensioning device as defined in claim 3, in which there is at least one pair of said spring members arranged bi-laterally of said slide member, each of said spring members being connected at one end to said slide member carrying said tension pulley.

9. A belt tensioning device as defined in claim 8, in which the distance between said spring members at their points of connection to said slide member is greater than at their points of connection to said stationary support.

10. A belt tensioning device as defined in claim 8, in which the distance between said spring members at their points of connection to said slide member is smaller than at their points of connection to said stationary support.

11. A belt tensioning device as defined in claim 8, further comprising a swingletreelike crossbar centrally connected to said stationary support, said spring members being connected at said other end to the ends of said crossbar.

12. A belt tensioning device as defined in claim 3, further comprising means for adjusting the angle of inclination of said spring member relative to said stationary support.



13. A belt tensioning device as defined in claim 1, further comprising means secured to said slide member for clamping said shaft thereto.

14. A belt tensioning device as defined in claim 13, in which said clamping means form an integral part of said slide member.

15. A belt tensioning device as defined in claim 1, further comprising means for arresting said slide member with the tension pulley thereon in a fixed position if said belt becomes separated from said tension pulley.

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