Sept. 16, 1952 D. A. AHLSTRAND 2,610,654

SPINDLE BUMPER

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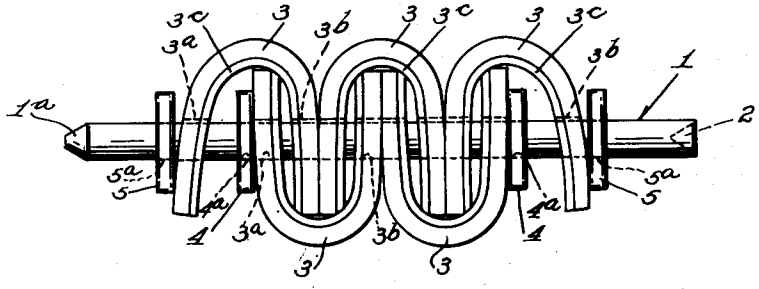

Fig. 1.

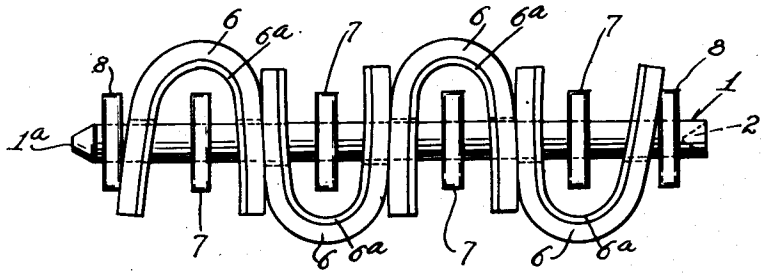

Fig. 2.

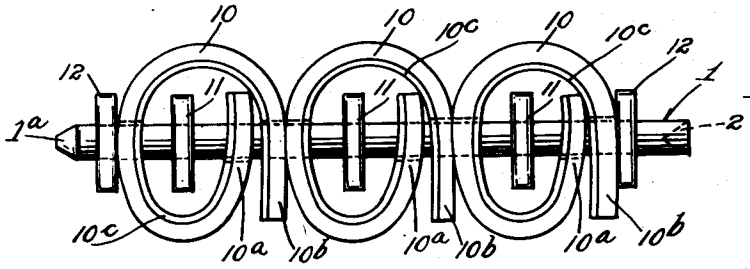

Fig. 3.

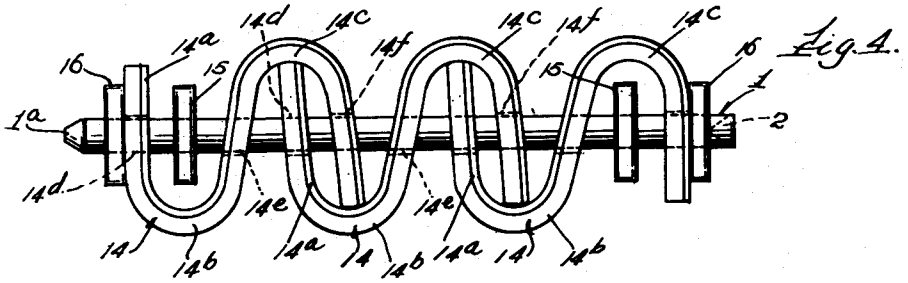

Fig. 4.

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SPINDLE BUMPER

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11 Claims. (Cl. 139—166)

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The invention relates to an improvement in spindle bumpers for textile machinery and has for one purpose to provide a spindle bumper of increased life and efficiency.

Another purpose is to provide a spindle bumper in which breaking under wear is reduced to a minimum.

Another purpose is to provide a spindle bumper in which relatively small pieces of inexpensive material may be employed.

Another purpose is to provide a spindle bumper in which, upon breakage or wear, only part of the spindle bumper structure need be replaced.

Another purpose is to provide a spindle bumper, the cost of which is substantially reduced in relation to the spindle bumpers in current use.

Another purpose is to provide a spindle bumper which may be formed of a wide variety of material, including plastics, textiles, rubber and rubber substitutes, in a variety of combinations.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a side elevation of one embodiment of my invention;

Figure 2 is a side elevation of another embodiment of my invention;

Figure 3 is a side elevation of a third embodiment of my invention; and

Figure 4 is a side elevation of a fourth embodiment of my invention.

Like parts are indicated by like symbols throughout the specification and drawings.

Since I do not claim any novelty in the mechanism on which the spindle bumper is used, I illustrate herein only the spindle bumper structure itself.

Referring to the drawings, 1 indicates an applicator. The applicator has for its purpose to apply the bumper structure to the spindle itself. The applicator may be made of any suitable material, preferably of a cheap material, so that, if desired, the applicator may be thrown away after use. It enables the bumper structure to be easily applied to the spindle. The spindle is not herein shown, but the applicator can be taken as typical of a rod or spindle structure upon which the bumper is positioned during use. In application, the conic recess 2 of the applicator 1 is placed over the conic end of

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the machine shaft or spindle, and the straps are pushed off of the applicator shaft and onto the machine shaft. On the spindle, the bumper parts are positioned as shown on the applicator in the drawings herein.

It will be understood that the bumper, when used in textile weaving, absorbs the shock which, in machines now available, is absorbed by a unitary strap formed in a plurality of bends. In the use of the forms of my invention, in Figures 1 and 2, no piece of material is subjected to more than one bend. Taking, for example, the form of Figure 1, I provide a plurality of relatively short straps 3, each of which is bent to form a U, having, in its opposite arms, apertures 3*a* and 3*b*. These apertures are of sufficient size to permit the U-shaped bent strap 3 to be applied readily to the applicator 1, being passed over its tapered end 1*a*. I find it advantageous, in the members 3, to employ pieces or straps which, if desired, may be arranged in multiple plies. I illustrate, in Figure 1, the separate plies formed by adding an additional ply 3*c* to the single ply or member 3, but, if desired, more than two plies may be employed, depending upon the material used. The plies may be connected by cementing, by sewing, or by any other suitable means. I may employ multiple plies of any suitable plastic, including, but not limited to nylon. I may employ rubber, or any suitable rubber substitute. Under some circumstances, it may be advantageous to employ leather, either alone or in connection with a ply or plies of rubber or some other substance. In the present application I emphasize, primarily, the form rather than the substance of the various pieces employed.

In the form of Figure 1, I illustrate, for example, five U-bent short pieces or straps arranged in interpenetrating relationship, with the arms of the U's at one side of the applicator 1 entering the folds of the U's at the opposite side of the applicator. Where five of the U's are employed, as in Figure 1, I maintain the individual straps or parts properly positioned by using any suitable intermediate blocks or bits 4 within the folds of the end members of the series of U's. Each such block 4 may be made rectangular, or of any other suitable form, and may be apertured, as at 4*a*, to be readily applied to the applicator. The parts are so dimensioned, when rectangularly formed, that the blocks 4 may be held against rotation by the adjacent bends of the U. I may also employ any suitable end blocks or washers 5, 5 with the apertures 5*a*.

The form of Figure 1 merely illustrates one satisfactory arrangement. In Figure 2, the individual U-shaped strap elements 6 are shown with their arms arranged in abutting relationship. An additional ply 6a may be added to the single ply or member 6. I may find it advantageous to provide one or more intermediate or inner blocks or washers 7 within the bend of each U. I also illustrate the terminal blocks or washers 8, as in the case of the form of Figure 1.

In the form of Figure 3, for the U-shaped members or short straps, I provide loops 10 each having overlapping ends 10a and 10b. I diagrammatically indicate, at 10c, any suitable additional ply or plies which may be employed. 11 indicate inner blocks or spacers, and 12 indicate end members or spacers. Any suitable number of spacers may be used.

In the form of Figure 4, I illustrate straps bent, in effect, to form reverse U's. Each such strap 14 is formed with loops 14b and 14c. 14a diagrammatically indicates any suitable additional ply or plies. Each such member is apertured at three points, as at 14d, 14e and 14f, to permit the passage of the applicator 1. The straps are then positioned in interfitting arrangement, as shown in Figure 4, with the free end of each strap entering the bend of an adjacent strap. At the end bends, spacers 15 may be used. 16 indicate the end spacers.

All forms of my device have, in common, the use of a plurality of relatively short pieces or strap members. In the forms of Figures 1 and 2, each strap has a single bend. In the forms of Figures 3 and 4, each strap has two bends. In order to reduce the bending stresses, and to prevent over-bending, I may employ any suitable spacers, such as are shown at 4 in Figure 1, at 7 in Figure 2, at 11 in Figure 3, and at 15 in Figure 4. The number and spacings may be widely varied to suit particular needs.

It will be realized that, whereas, I have described and illustrated one practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative or as diagrammatic, rather than as limiting me to my precise showing.

The use and operation of my invention are as follows:

In current weaving equipment it is customary to use spindle bumpers formed of a single piece. These pieces are hard to apply to the spindles, and break easily at the radius of the individual bends.

In the use of my invention I provide a structure which efficiently absorbs the shocks which the spindle bumper has to absorb. My design maintains the radius of each piece and prevents a break in the radius. The radius is maintained by the interposition of the free ends of adjacent pieces, and, where necessary, by the insertion of spacers such as are shown in the various figures. This maintenance of radius assures continuation of the compression effect of the bent pieces. The use of short pieces in place of the former one-piece element simplifies the replacement of worn or broken pieces. The form of Figure 1 has the advantage of reducing to a minimum the spacers, which are used in greater numbers in the form of Figures 2 and 3. In other words, the interpenetrating ends of the U's in the form of Figures 1 and 4 themselves constitute spacers and reduce the necessity for using intermediate spacers.

It will be realized that I may employ multi-ply elements or pieces. In use, the bumper structure, as a whole, is supplied to the user on an applicator in which the individual parts are positioned as they will be positioned on the spindle. The applicator is aligned with the spindle, and the parts are easily slid from the applicator upon the spindle. By using a relatively large number of small parts I find it simple and easy to move the parts from the applicator to the spindle, and to position them properly on the spindle. A minimum of force has to be applied, force entirely insufficient to damage the bumper elements.

I claim:

1. In a spindle bumper structure, a multi-piece bumper including a plurality of bent straps arranged in abutting relationship, each such strap having a pair of free ends and an intermediate curvilinear portion, the free ends of all the straps being apertured and being thereby adapted to be applied to a spindle, and a free end of each strap being disposed adjacent the curvilinear portion of an adjacent strap.

2. The structure of claim 1 characterized in that the bent straps are formed of multiple plies.

3. The structure of claim 1 characterized in that the straps are bent into U-shape with the arms of adjacent straps abutting.

4. In a spindle bumper structure, a multi-piece bumper including a plurality of bent straps arranged in abutting relationship, each such strap having overlapping free ends, the free ends of all the straps, and an intermediate portion of each strap, being apertured in alignment and being thereby adapted to be applied to a shaft, each strap having an inner free end and an outer free end, the outer free end of each strap abutting an intermediate portion of an adjacent strap.

5. In a spindle bumper structure, a multi-piece bumper including a plurality of bent straps arranged in abutting relationship, each such strap having a pair of free ends and two intermediate, oppositely facing, U-shaped bends, each strap being apertured at three points and being applicable to a spindle.

6. As a replacement unit for spindle bumper structures, an applicator adapted for alignment with a bumper spindle and a multi-piece bumper arranged on the applicator, with the individual pieces of the multi-piece bumper in the relationship they will have when applied to the spindle.

7. As a replacement unit for spindle bumper structures, an applicator adapted for alignment with a bumper spindle and a multi-piece bumper arranged on the applicator, with the pieces in the relationship they will have when applied to the spindle, said multi-piece bumper including a plurality of bent straps having portions arranged in abutting relationship, each such strap being bent into U-shape and having free ends apertured for application to the spindle.

8. The structure of claim 7 characterized in that the free ends of adjacent U-shaped straps interpenetrate.

9. The structure of claim 7 characterized by and including spacers on said applicator positioned within the U-shaped bends of said straps.

10. As a replacement unit for spindle bumper structures, an applicator adapted for alignment with a bumper spindle and having an end portion adapted to receive the end of the spindle, and a multi-piece bumper arranged on the applicator, with the individual pieces of the multi-piece bumper in the relationship they will have when applied to the spindle.

11. As a replacement unit for spindle bumper structures, an applicator adapted for alignment with a bumper spindle and having an end portion adapted to receive the end of the spindle, and a multi-piece bumper slidably arranged on the applicator, with the individual pieces of the multi-piece bumper in the relationship they will have when applied to the spindle, whereby the individual pieces may be readily removed from the applicator and positioned on the spindle when the spindle is received within the end portion of the applicator.

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