Nov. 12, 1968 K. NIMTZ ET AL 3,410,074

DOUBLING OR DOUBLE-TWIST SPINDLE MACHINE

Filed March 6, 1967 3 Sheets-Sheet 1

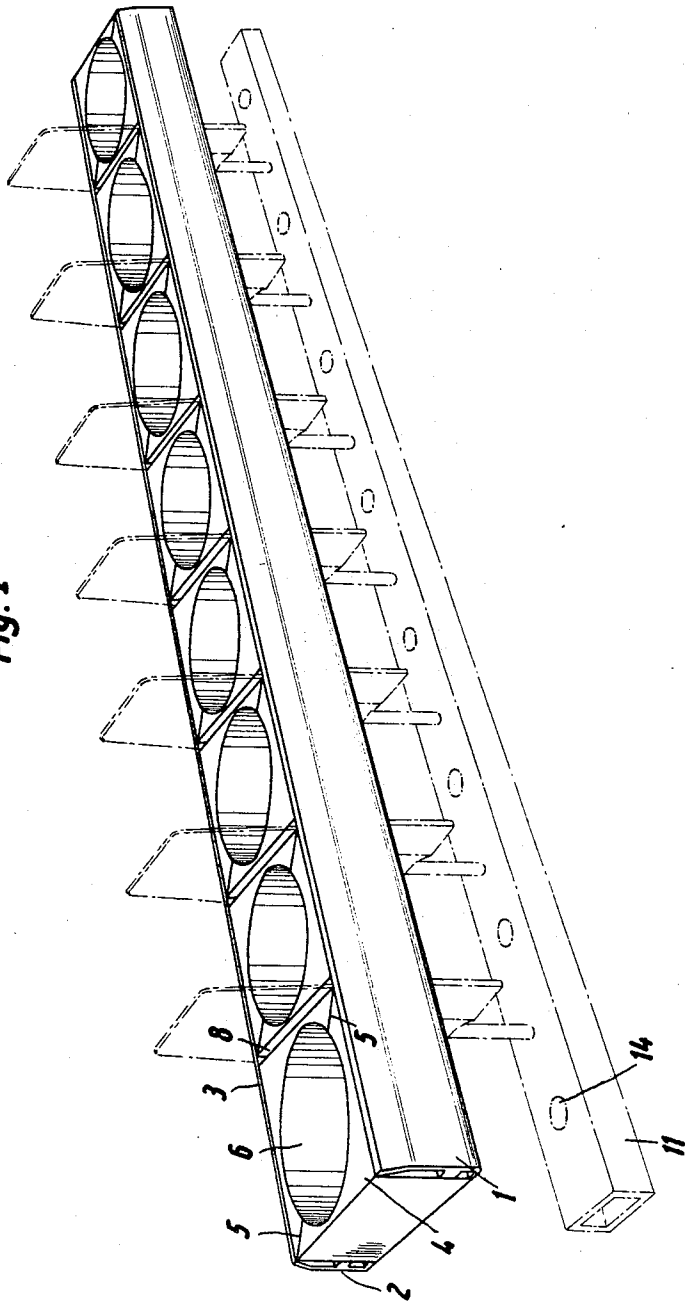


Fig. 1

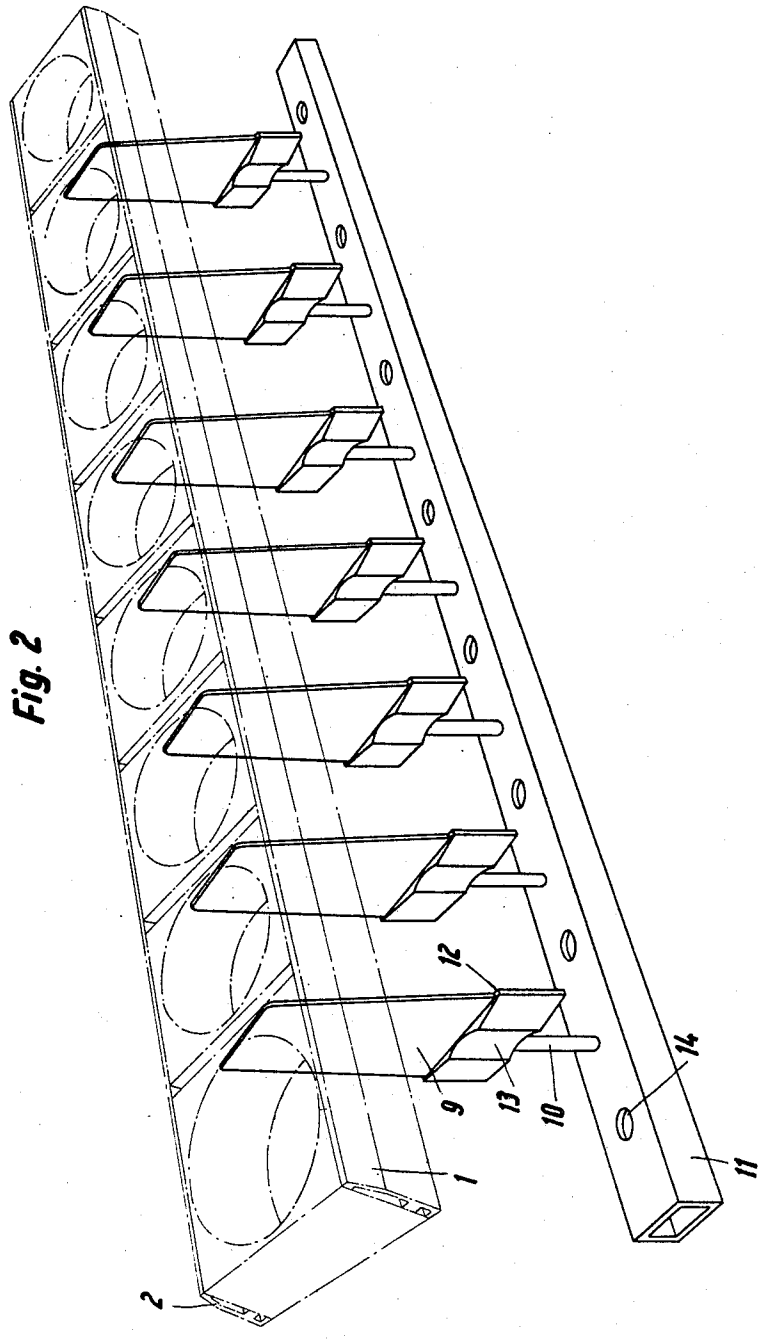
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Fig. 2



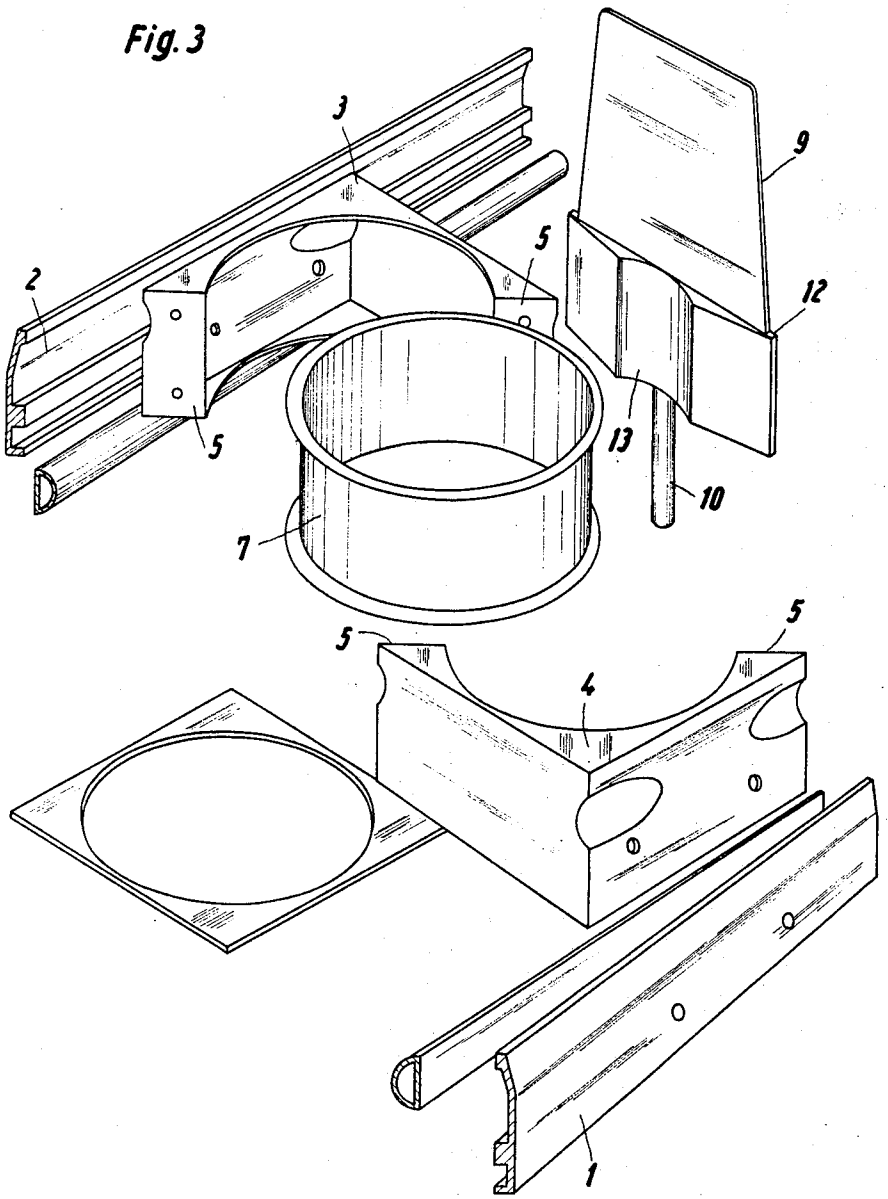
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Fig. 3



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DOUBLING OR DOUBLE-TWIST SPINDLE MACHINE

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7 Claims. (Cl. 57—108)

ABSTRACT OF THE DISCLOSURE

The invention relates to a doubling or double-twist spindle machine provided with separators and balloon limiters, the balloon limiters being comprised in unit assemblies, adapted to be fitted by simply placing them over the spindles and separators.

It has already been proposed so to construct doubling and double twist frames that they can be used with and without balloon limiters. This is frequently necessary and advisable when yarns of different counts are to be twisted, since the finer counts are twisted without balloon limiters, whereas the coarser counts require the use of balloon limiters. The machines are therefore adapted to permit the balloon limiters to be hingedly swung away from the spindles. The change-over in such a machine for working by one method or the other is a complicated and time-consuming operation. Moreover, the construction of the machine is fairly complicated and the balloon limiters which are not in use are continuously exposed to the dust and dirt which the twisting operation creates.

It is therefore the object of the present invention to eliminate the shortcomings of these known arrangements and to provide a machine which can be readily converted from one method of operation to the other without much trouble, and which is of simple and uncomplicated construction. The proposal in this context to make use of balloon limiter units must be clearly distinguished from known proposals which provide balloon limiter assemblies by rigidly affixing the balloon limiters to a common rail or the like, an arrangement with which the present proposal has nothing in common.

The object of the present arrangement is to prevent the balloon limiters from being exposed to dust and dirt. In earlier proposals the conversion of the machine from operation with to operation without balloon limiters and conversely is not contemplated and would not be directly possible.

The proposal according to the present invention consists in so constructing the balloon limiter units that they can be fitted simply by placing them over the spindles and separators. Conveniently the balloon limiter units have a length complying with the length of a working division of the machine. This permits an entire division to be converted in one manipulation from operation with to operation without balloon limiters or conversely. Preferably the balloon limiter units are provided with slot-shaped openings for the passage therethrough of the separators which are mounted on the spindle rail, and preferably the separators are formed with shoulders upon which the balloon limiter units can rest.

This arrangement generally simplifies the overall construction of the machine and more particularly it permits the design of balloon limiter units which have clear and well defined contours and lack cavities, corners and angles in which dirt can accumulate.

To this end the invention further proposes to provide two longitudinal bearer sections with cross pieces attached

thereto for the reception of the balloon limiters. The several cross pieces are longitudinally spaced to provide clearances for the passage therethrough of the separators. An alternative to the provision of cross pieces consists in providing a plastics filling, such as a foamed plastics filling, as a carrier member for the balloon limiters, between the two bearer sections and in saving out slot-shaped gaps in the filling for the passage therethrough of the separators. The latter form of construction is particularly convenient because it considerably simplifies manufacture. Moreover, the required spacing of the different faces can be very accurately maintained since the introduction of the plastics can be effected by using a single set of tools for the injection and casting equipment.

The separators which may be mounted on the spindle rail by means of push-in pins or holders are formed with shoulders which support the balloon limiter units. The separators may also contain the magnets required for keeping the draw-off bobbin carries stationary.

In the accompanying drawings FIGS. 1 and 2 are perspective views of a preferred embodiment of the invention, whereas FIG. 3 is an exploded view of the parts associated with a single spindle.

According to the invention the unit assembly of balloon limiters comprises two longitudinal bearer sections **1** and **2** which are preferably equal in length to the length of one working division of the machine. Cross pieces **3** and **4** are attached to these longitudinal bearers. Preferably these have diagonal cooperating faces **5** and, when fitted together, the cross pieces define cylindrical openings **6**, each of appropriate size for the reception of a balloon limiter **7**. The arrangement in detail will be readily understood from FIG. 3 which shows the several cooperating parts in a perspective exploded view.

In the illustrated embodiment the cooperating pairs of cross pieces **3** and **4** are relatively spaced to leave slot-shaped gaps **8** between them. These slots are for the accommodation of the separators **9**. Conveniently the separators are so contrived that they can be mounted on the spindle rail **11** by means of push-in pins **10**. Each separator is formed with a shoulder **12** for supporting the unit assembly of balloon limiters which can be lowered over the separators and spindles, the latter not being shown in the drawing. This form of assembly of the balloon limiter unit and of the separators provides a rigid structure which is free from corners, edges and cavities of any kind in which dust and the like could accumulate. Moreover, it will at once be appreciated that the arrangement is such that it readily permits the necessary change-over to be made for converting the machine from one mode of operation requiring balloon limiters to another mode of operation for which the balloon limiters must be removed, and conversely.

The separators are formed with concavities **13** which with a given amount of radial clearance conform in shape with the circumference of the spindles. Located behind these concavities are the magnets which in conventional manner serve to keep the draw-off bobbin carriers of the several spindles stationary. As is customary and well known, the spindles are mounted on the spindle rail **11**, the necessary drillings being indicated at **14**.

As an alternative to the form of construction shown in the drawings the invention also comprises an arrangement in which the cylindrical openings **6** for the reception of the balloon limiters **7** and the slot-shaped gaps **8** between the longitudinal bearers **1** and **2** are formed in a plastics, for instance a foamed plastics, filler. This permits of a particularly simple method of production because the required clearances and surface configurations can be readily and reproducibly created by using a suitably shaped set of tools.

What we claim is:

1. In a doubling or double twist spindle machine comprising a plurality of spindles having stationary carriers for draw-off bobbins and adapted to balloon yarn drawn off said bobbins and comprising transverse separators arranged between said spindles; the improvement which comprises a plurality of balloon limiters for enclosing said balloons and formed as a unit assembly which can be lowered over the said spindles and the said separators to position the balloon limiters around the spindles and between the separators.

2. A machine according to claim 1 comprising a rail on which said spindles and the said separators are mounted and said unit assembly is provided with slot-shaped gaps to receive the separators when the unit assembly is lowered thereover.

3. A machine according to claim 1 in which the said separators are formed with shoulders for supporting the balloon limiter assembly.

4. A machine according to claim 1 in which the balloon limiter assembly comprises two longitudinal bearer sections and cross-pieces between the bearer sections adapted to receive the balloon limiters, said cross-pieces being longitudinally spaced to provide clearances for the passage therethrough of the separators.

5. A machine according to claim 1 in which the balloon limiter assembly comprises two longitudinal bearer sections with an intervening filling of plastics said filling having slot-shaped openings to accommodate the separators and apertures to accommodate the balloon limiters.

6. A machine according to claim 5, in which the said filling is of foamed plastics.

7. A machine according to claim 1 comprising magnets for keeping the said draw-off bobbin carriers stationary, said magnets being carried by said separators.

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