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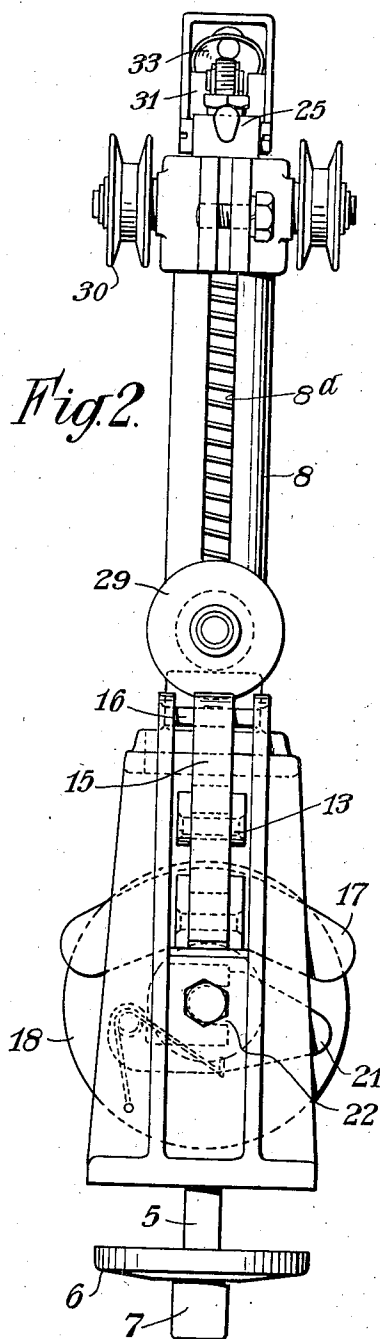
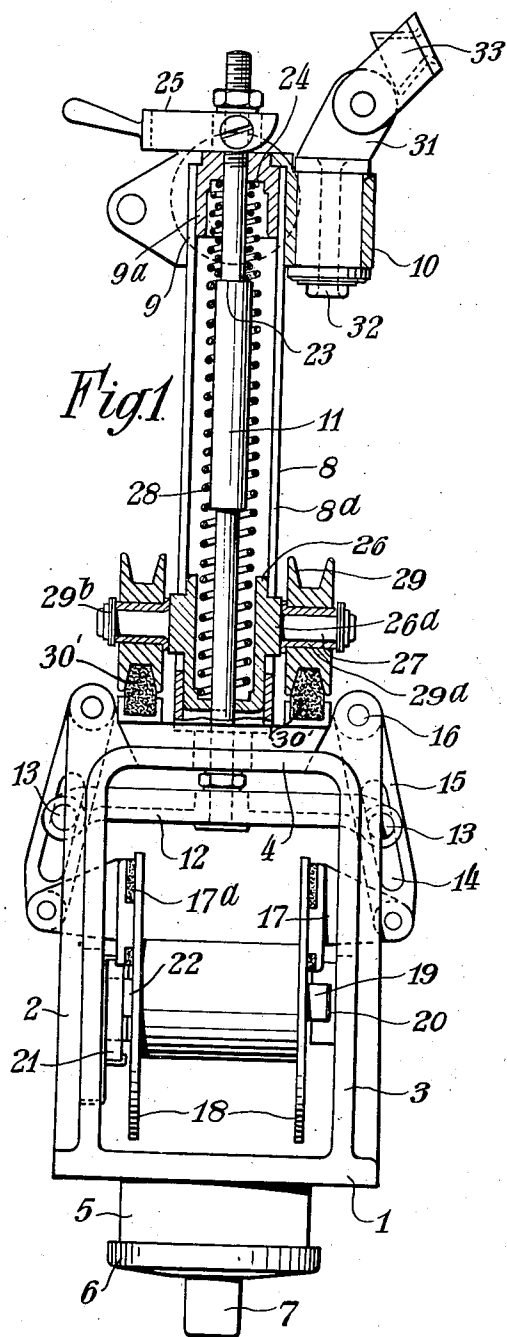
B. CARTER

2,459,617

BOBBIN TENSIONING MECHANISM

Filed July 24, 1945

3 Sheets-Sheet 1



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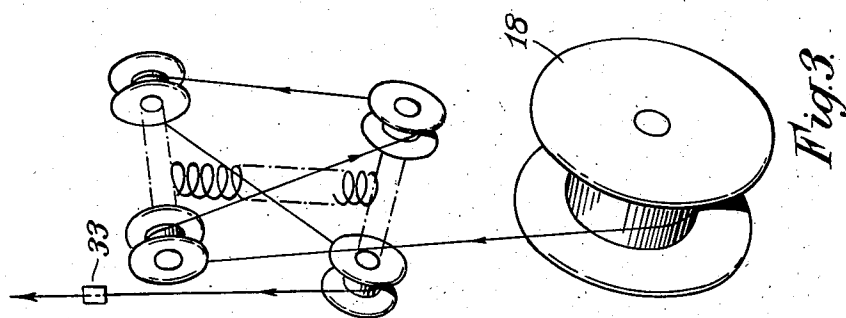
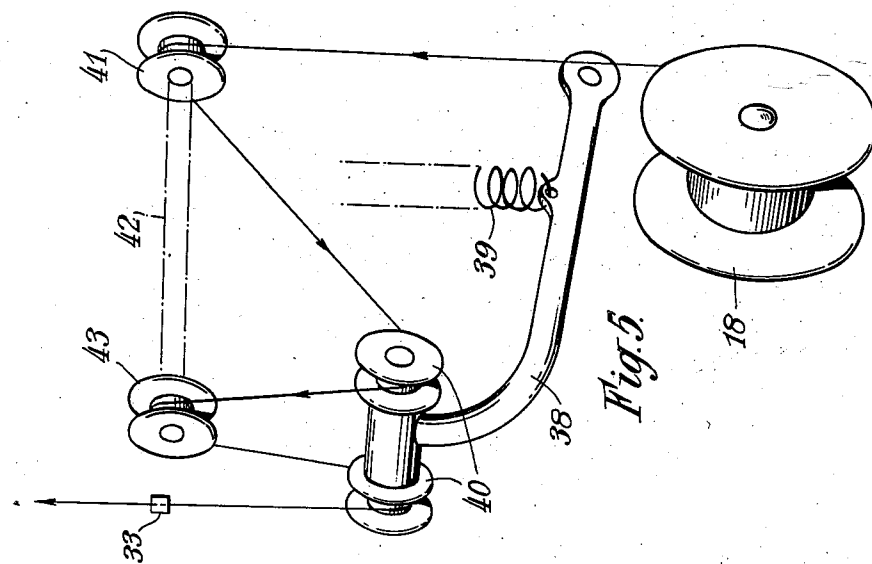
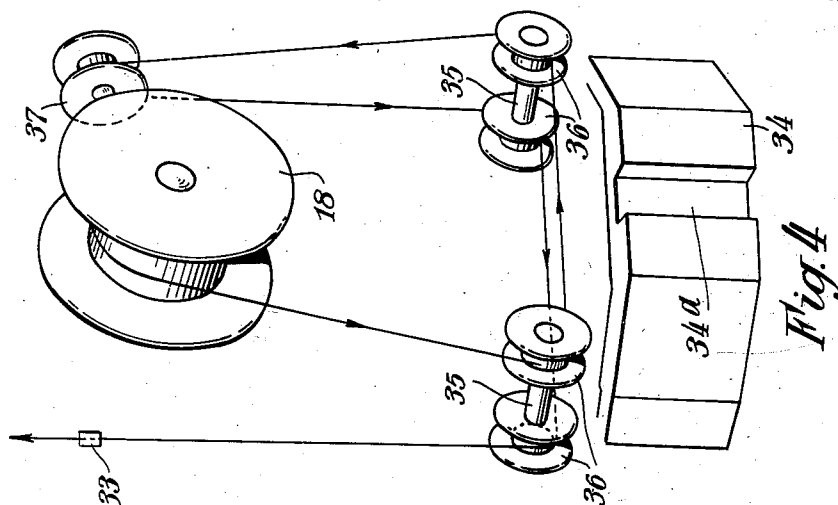
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BOBBIN TENSIONING MECHANISM

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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

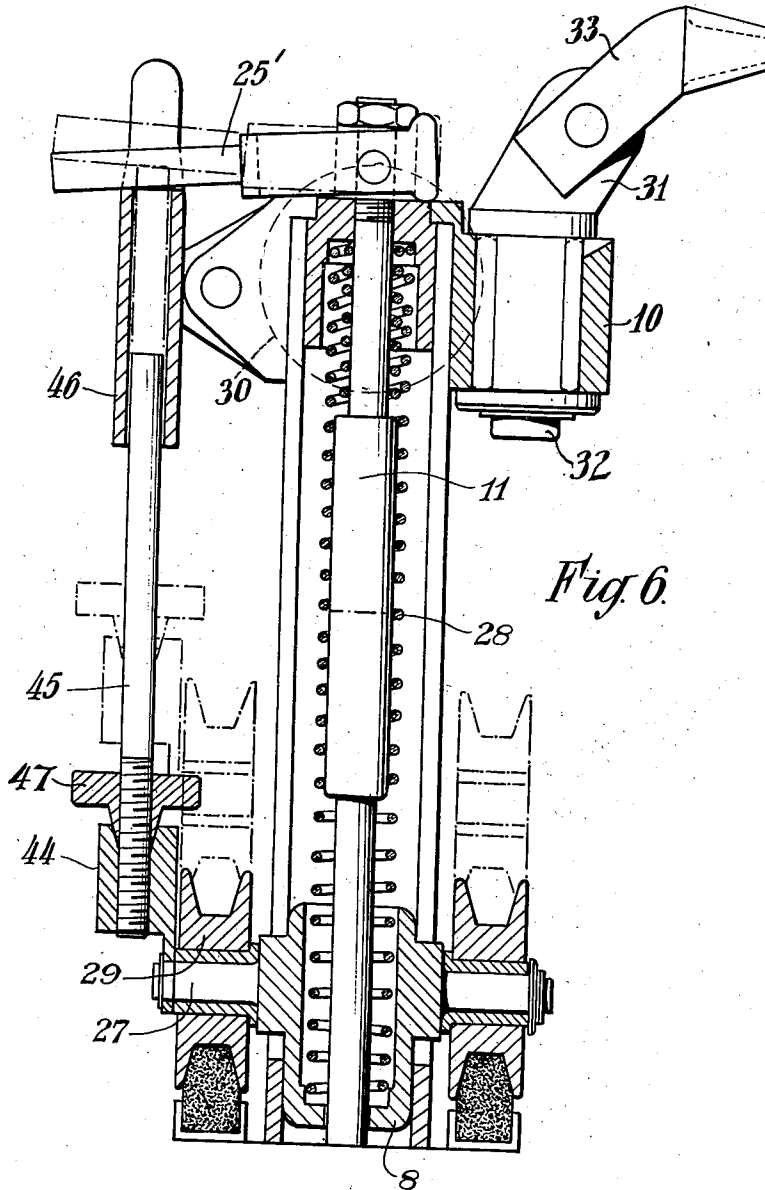


Fig. 6.

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UNITED STATES PATENT OFFICE

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BOBBIN TENSIONING MECHANISM

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9 Claims. (Cl. 242-156)

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This invention relates to the bobbin carriers of braiding and like machines, the bobbins carried thereby being the source of supply of the wire, thread or like material for introduction into the machines for the making of the braided or other goods. These carriers include a tensioning device, which rises and falls in a loop of the wire or thread (hereinafter referred to as wire) as variations occur in the tension of the wire, and they also include means for removing and replacing the bobbins quickly.

As hitherto known, these carriers have the tension device in a single loop of the wire, which means that the height of the carriers has to be correspondingly great, to allow room for sufficient movement of the tension device as the carriers pass from the inside to the outside of the machine. Springs are sometimes employed to increase the tension, but so large a movement creates a wide difference of tension between the two extreme positions, making the tension uneven. Moreover, the means for removing and replacing the bobbins has comprised a removable spindle which needs to be drawn out of the bobbin axially, and the withdrawal and replacement of the bobbins has been rendered all the more difficult by the constant pressure of the brakes which bear on the bobbin flanges as tensioning devices. Again, the carriers hitherto known have had the guide rollers on the tension device inside the supporting frame, so that, in threading up, it has been necessary to pass the wire endwise to the rollers. A still further difficulty with the known types of carriers has been that, when in the minimum tension position, with the wire slack, the natural springiness of the wire has caused it frequently to pass over the bobbin flange, off the bobbin, and it has been necessary to provide shields to prevent this.

The object of the present invention is to remove the drawbacks attaching to the constructions referred to above.

According to the invention, the tension device is adapted to ride in at least two loops of the wire, so that its total movements between the minimum tension and maximum tension positions are correspondingly reduced and therefore the overall height of the carrier may be reduced, and a much less variation is brought about in the tension due to the said spring, if used.

According to another feature of the invention the guide rollers for the tension device are arranged outside the supporting frame, so that the wire may be passed on to them laterally and not necessarily endwise, thereby greatly facilitating the threading up of the machine.

A further feature of the invention comprises the use of bosses on the bobbin ends, in place of the usual loose spindle, and of a spring catch or catches on the frame to hold such bosses in suit-

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able bearings, these being arranged so that the normal pull of the wires when being drawn off the bobbin, presses the bobbin into the bearings, if it is not properly fitted therein. There are no loose parts to become lost, nor is there any need to bring a number of holes into register for passing a spindle therethrough.

An additional feature of the invention, which aims at preventing the loose wire springing from the flanges of the rollers, when the tension is slack, comprises the provision of rubber or like gripping blocks, positioned and shaped so as to enter the rollers in the minimum tension position and grip the wire against the roller.

The invention also comprises a trip lever for disengaging the friction members from the bobbin flanges, so that the bobbins may be removed and inserted easily, without the operator having to struggle with the brakes.

Useful embodiments of the invention comprise a body or frame, shaped at the base to engage the usual horn gear or like mechanism, bearings for a bobbin at the lower part of the frame, spring-operated friction members for the bobbin flanges, means for tripping the friction members to release the bobbin, and a sliding weight in the frame carrying at each side a deeply-grooved roller, which, at the lowermost position fits on to a friction block for gripping the wire. The upper part of the carrier has a pair of rollers on fixed spindles, to co-operate with those on the rising and falling part, and also has a final delivery guide or die.

In other embodiments of the invention, the tension device is a weight-box, instead of a spring, and the bobbin is arranged at a higher part of the carrier, the weight-box moving the traversing guides or rollers up and down below the bobbin, and co-operating with a fixed intermediate roller adjacent the bobbin; or alternatively, the tension device is provided by a movable arm, loaded by a spring or weight, such arm carrying a pair of guide pulleys or rollers to receive the wire from a fixed pulley on the frame and deliver it to the machine, the wire passing over an intermediate roller fixed to the frame, in its passage from one to the other of the rollers on the arm.

In either of these alternatives, the intermediate roller or rollers may be movable against spring or weight resistance instead of being on a fixed axis.

As above stated, springs are sometimes employed to increase the tension, and the drag effect from these springs increases as the springs are compressed, thereby resulting in an uneven tension, according to the amount of wire or the like drawn off from the rising and falling tensioning device.

The present invention has a further object, the provision of means for relieving the bobbin of the increased tension as the tension spring becomes compressed. According to this feature of the invention, the friction members engaging the bobbin are adapted to be released therefrom and re-engaged therewith by a rising and falling member, and the rising and falling tension device is arranged to engage with and raise such member at a predetermined part of its upward movement, thereby easing the friction members from the bobbin.

In the accompanying drawing, representative forms of these several embodiments of the invention are illustrated:

Fig. 1 is a vertical section through one form of the improved carriers; and

Fig. 2 is a side view of the same;

Fig. 3 is a diagrammatic perspective view showing the arrangement of bobbin, guide rollers and tensioning means of Figs. 1 and 2 in diagrammatic form, whilst

Figs. 4 and 5 are similar views to Fig. 3 but showing a third form of the invention;

Fig. 6 is a view similar to Fig. 1 showing an addition for relieving tension.

Referring first to Figs. 1 and 2, the lower part of the carrier is in the form of an open-sided substantially-rectangular frame, having base 1, sides 2 and 3 and top 4, there being below the base 1 a vertical web 5, horizontal flange 6 and vertical stud 7 to fit the usual track and engage the horn-gear (not shown). Rising from the centre of the top 4 of the frame, is a tubular part 8 slotted longitudinally at two diametrically opposite points, to provide slots 8a and the top of this tube 8 is embraced by a split cap 9 which also serves as a clamp and which has an extended boss 10 hereinafter referred to again.

Co-axial within the slotted tube 8 is a solid rod 11 the lower part of which screws into a cross-member 12, within and extending beyond the sides of the said frame, whose outer ends carry small rollers 13 to fit slots 14 in inclined levers 15 pivotally connected by their upper ends at 16 to the top part 4 of the frame. The lower ends of these levers 15 are pivotally connected respectively to thrust members 17 slidable transversely in the side walls 2 and 3 of the frame, and carrying on their inner faces pads 17a of friction material to engage the outer sides of the bobbin flanges 18. Each bobbin is formed with a short boss 19 at the centre of each end, one of which bosses fits an aperture 20 in one side of the frame and the other of which rides up a spring-actuated catch lever 21, into an aperture 22, in the other side of the frame, where it is held until such catch lever 21 is depressed manually. The said pads 17a of friction material are of crescent or like shape (see Fig. 2) to engage the bobbin over a substantial area.

The said rod 11 within the slotted tube 8 has a projecting shoulder 23 near its upper end, between which shoulder and a bush 9a held in place by the said cap 9 is a compression spring 24, tending to depress the rod 11 and thereby, through member 12, draw the inclined levers 15 together and force the friction pads 17a on to the bobbin faces to retard the bobbin and help to create a tension in the wire. However, there is pivotally connected to the rod 11, above the said cap 9, a finger-operated cam, or trip member 25, which, in one position raises the rod against the pressure of the spring 24 and thereby withdraws the brakes 17a from the bobbin, to release the

tension, making removal and replacement of the bobbins more easy.

Slidable within the said tube 8 and surrounding the rod 11, is a sliding member or support 26, having flat-sided bosses 26a to slide in the slots 8a of the tube and having a short stud or axle 27 growing out of each such boss. A further compression spring 28 encircling the rod 11 operates between this sliding member 26 and the said bush 9a, tending to force the sliding member to the bottom of the tube 8. The said studs 27 carry deeply-grooved rollers 29, externally of the tube 8, these being mounted on self-lubricating bushes 29a or the like, and being held in place by spring washers 29b, cotter pins or the like. Secured to the top portion 4 of the said frame are rubber or like blocks 30', with tapered upper faces to fit into and engage the grooves of the rollers 29 when the sliding member 26 is in the lowermost position, thereby preventing the springing of the loose wire over the flanges of the rollers.

Carried by the said cap 9, on an axis at right-angles (in plan) to that of the said rollers 29, is a pair of similar rollers 30 (see Fig. 2) also on self-lubricating bushes and also held in place by spring washers, cotter pins, or the like; whilst mounted on needle bearings in the said projecting boss 10, is a swivelling support 31, with hollow stem 32, this support carrying a quick-thread cone die 33 or like delivery member, from which the wire is passed on to the machine (not shown).

In use, the wire passes upwards from the bobbin to one of the rollers 30 on the cap 9, from thence to one of the rollers 29 on the sliding member or support 26, then upwards again to the other roller 30 on the cap 9, down to the second roller 29 on the sliding member or support 26 and from thence upwards through the tubular stem 32 of the swivelling guide 31 and to the cone die 33. It will be seen that there is a "double-purchase" arrangement of the wire, the sliding member or support 26 being carried by two loops, so that for one unit of movement of the sliding member, or support, four units of wire are released. The arrangement of the wire is shown diagrammatically in Fig. 3.

Referring now to Fig. 4, the bobbin (shown diagrammatically) is removably held in the carrier at or near the upper part of the carrier, and below the bobbin is a weight box 34 of usual form, having recesses 34a to move on vertical guides (not shown) such box 34 carrying a pair of parallel spindles 35, one near each end, each of which spindles carries a pair of guide rollers 36. The wire passes from the bobbin downwards to a guide roller 36 on one such spindle 35, from thence horizontally to the corresponding guide roller 36 on the other spindle 35, from thence upwards to a guide roller 37 on a fixed axis near the bobbin, but in a direction at right angles to that of the bobbin, from thence downwards to the other guide roller 36 on the second-named spindle 35 and finally to the corresponding guide roller 36 on the first-named spindle 35 and upwards through the delivery eye 33 to the machine. As in the previous example (Figs. 1 and 2), there are four contractible lengths of wire between the bobbin and the guide rollers 36, so that one increment of movement of the weight-box 34 means four increments of wire passed on, or taken up, as the case may be.

Referring next to Fig. 5, the bobbin is at the lower part of the carrier as in Figs. 1 and 2; but there is provided above it a pivoted lever

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arm 38 moved in the downward direction by a compression spring 39, one end of this lever arm carrying two co-axial guide rollers 40. The wire in this case passes upwards from the bobbin to a guide roller 41 on a fixed axis 42, from thence to one of the guide rollers 40 on the end of the pivoted arm 38, then upwards to another guide roller 43 on the fixed axis 42 and finally, to the other guide roller 40 on the pivoted arm 38 and then on to the delivery eye 33.

Other arrangements of guide rollers could be provided so related to the bobbin that the movements of the tension device are multiplied in the change of length of the wire held by them.

Other features of the example shown in Figs. 1 and 2 relating to the bobbin-holding means, and the prevention of loose wire springing over the roller flanges will, of course, be adopted where required, with the constructions of Figs. 3 and 4.

Referring finally to Fig. 6, the axle 27 of one of the pulleys 29 has an upstanding arm 44, drilled vertically to receive as a sliding fit the screwed lower end of a push rod 45, which rod carries an externally-tapered nut 47 by which the height of rod 45 in the arm 44 may be adjusted. The upper end of push rod 45 enters a hollow sleeve or guide 46, above which is the trip lever 25' for releasing the tension members 17 from the bobbin flanges. As the sliding member 8 is raised by the wire, and the spring 28 becomes more and more compressed, with resultant increase of tension, the push rod 45 eventually raises the trip lever 25', thereby operating parts 11, 12, 15 and 17 to reduce or eliminate the drag on the bobbin. This counter-acts the increased effect of compressed spring 28, and makes the tension more uniform over the whole movement of sliding part 8. By adjusting the nut 47 on the rod 45, the time at which the trip lever 25 is lifted may be varied. The broken lines show the parts in the raised position. It is to be understood that the bobbin, brake, rectangular frame, etc. as disclosed in Figure 1 of the drawings also forms a part of the construction illustrated in Figure 6. These parts have been omitted from the drawing solely in order to illustrate the elements in enlarged detail.

What I claim is:

1. A bobbin carrier for a braiding machine comprising a base, an upright extending from said base, co-axial guide pulleys at the top of said upright, other co-axial guide pulleys slidable along said upright, their axis being generally at right angles to the axis of the first-named guide pulleys, means on the base below said upright for removably holding a bobbin, frictional braking means tending to restrain rotation of the bobbin, spring means tending to drive the said slidable guide pulleys to the bottom of said upright, an outlet guide in line with one of the slidable guide pulleys and means for releasing the braking means to facilitate removal and insertion of the bobbin.

2. In a bobbin carrier for a braiding machine, a support for the bobbin, an outlet guide for the material drawn from the bobbin, fixed guide pulleys and movable guide pulleys forming a take-up and give-out system between the bobbin and the outlet guide, means for exerting a braking

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effort on the bobbin, and means operated by the movable guide pulleys for reducing such braking effort as the said system becomes exhausted.

3. A bobbin carrier for a braiding machine comprising a holder provided with spring latches to receive the bobbin by a snap action, a guideway extending from the holder and a slide on such guideway, guide pulleys on the slide and on the guideway generally at right angles to each other, spring means for separating the pulleys on the slide from those on the guideway, and spring urged means for applying friction to the bobbin, with means for relieving the bobbin of such friction to facilitate removal thereof

4. A bobbin carrier for a braiding machine comprising a vertically-disposed open rectangular frame, supports for the bobbin within such frame, a slotted tube extending upwardly from such frame and closed at the top end, a slide in such tube extending through the slots and carrying guide pulleys outside the tube at opposite sides thereof, a split clamp secured on the top end of the tube, guide pulleys carried thereon at opposite sides thereof, such pulleys being on an axis generally at right angles to that of the pulleys on the slide, a slidable rod within the tube, a brake mechanism for the bobbin connected at the lower end of such rod, a finger lever on the top of the tube for lifting such rod to release said brake mechanism, spring means in the tube to move the slide to the lower end and further spring means to urge said sliding rod to braking position.

5. A bobbin carrier according to claim 3, wherein the slide co-operates with the bobbin-relieving means, as the pulleys on the slide approach those on the guide, to relieve the friction of the bobbin accordingly.

6. A bobbin carrier according to claim 4, wherein the slide in the slotted tube carries an extension to engage the finger lever after a pre-determined rise of the slide, and thereafter to lift the sliding rod and release the bobbin proportionally to the further rise of the slide.

7. A bobbin carrier according to claim 4 wherein the slide in the slotted tube carries an extension to engage the finger lever after a pre-determined rise of the slide, and thereafter to lift the sliding rod and release the bobbin proportionally to the further rise of the slide, and means on the frame to engage the guide pulleys on the slide when in the lowermost position to trap the material lying around such pulley.

8. A bobbin carrier according to claim 2, having a frame to enclose the support for the bobbin, an upstanding post thereon carrying the fixed guide pulleys at its upper end, a pivoted lever carrying the movable pulleys and spring means operating on such lever to separate the movable pulleys from the fixed pulleys for take-up purposes.

9. A bobbin carrier according to claim 2, having the movable pulleys carried on a weight box, means for guiding the weight box vertically and means locating the bobbin support vertically above the weight box adjacent the fixed guide pulley.

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No references cited.