

Oct. 14, 1969

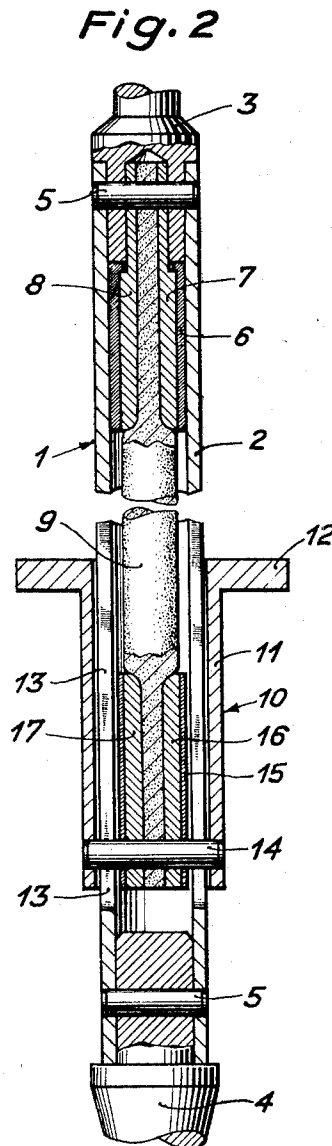
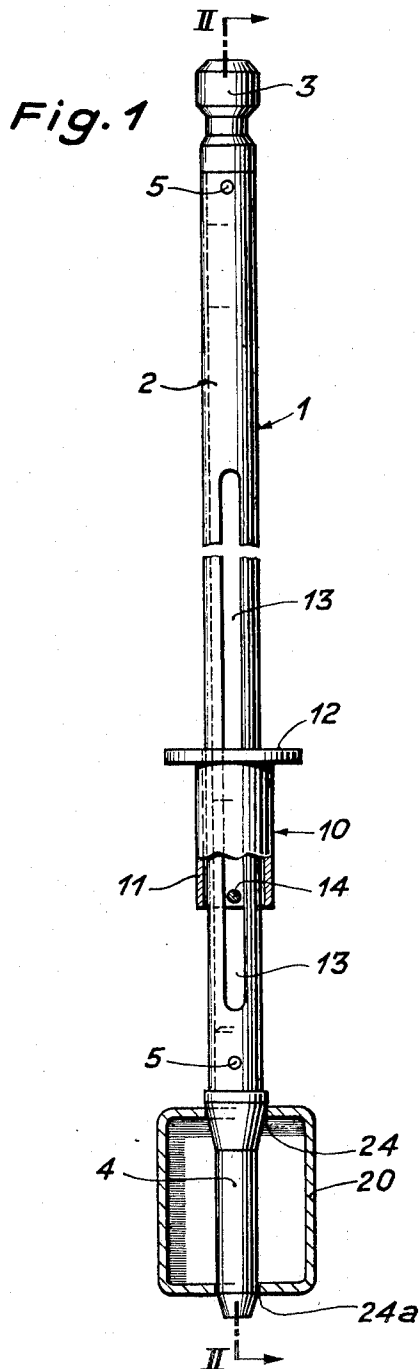
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3,472,466

APPARATUS FOR STORAGE AND TRANSPORT OF WEFT THREAD BOBBINS

Filed Nov. 3, 1966

4 Sheets-Sheet 1



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Fig. 3

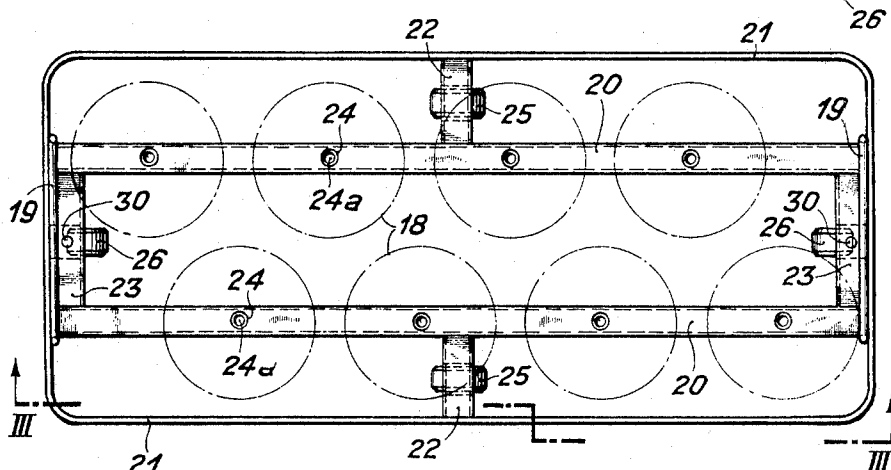
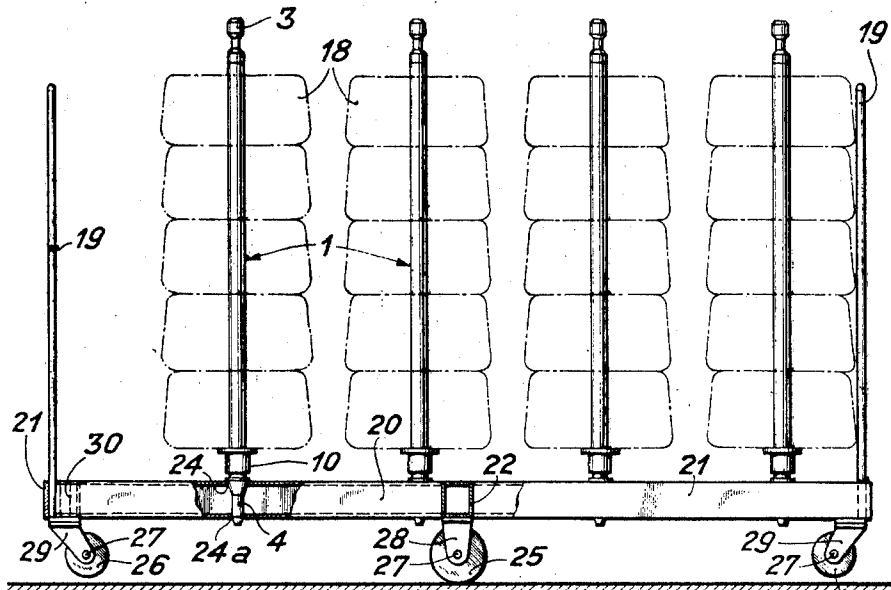


Fig. 4

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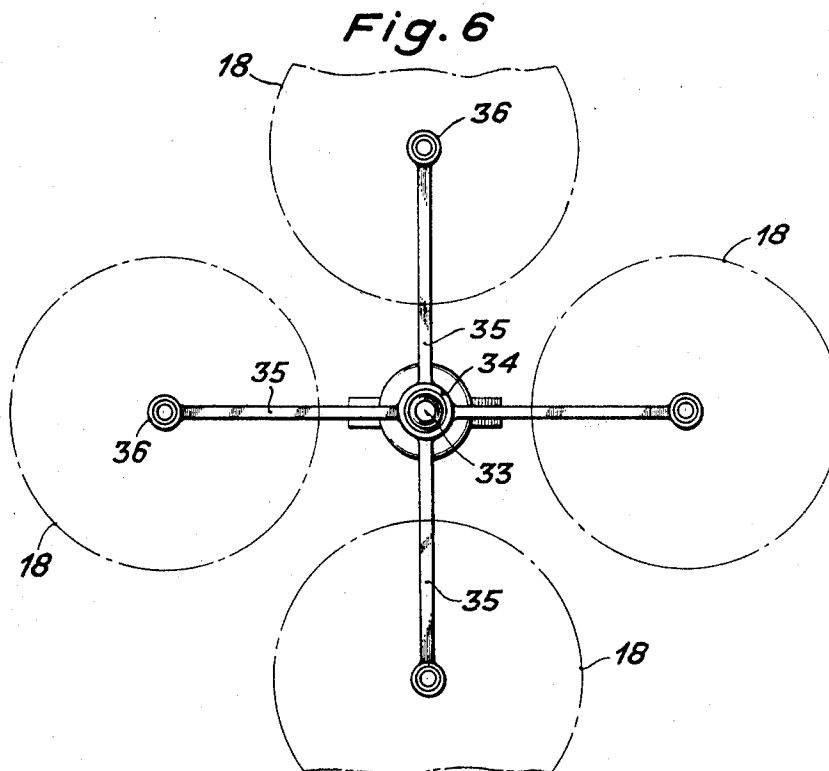
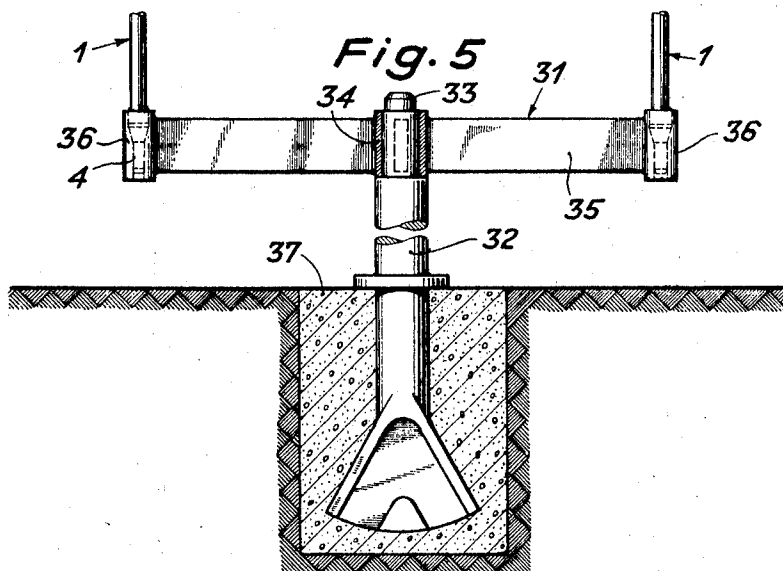
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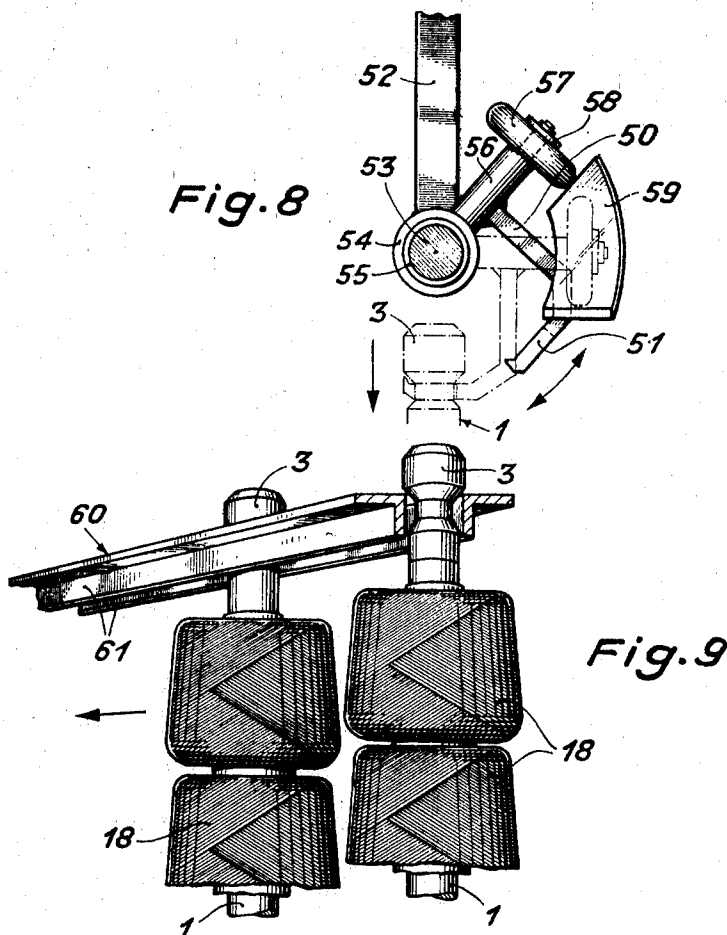
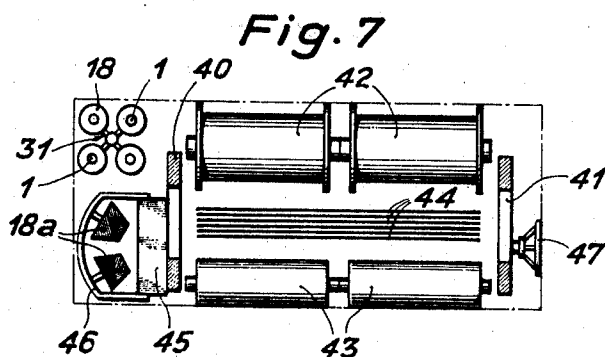
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APPARATUS FOR STORAGE AND TRANSPORT OF WEFT THREAD BOBBINS

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Filed Nov. 3, 1966, Ser. No. 591,867

Claims priority, application Switzerland, Nov. 5, 1965, 15,321/65

Int. Cl. B65h 49/18

U.S. Cl. 242—129.5

3 Claims

ABSTRACT OF THE DISCLOSURE

A carrier or support for thread bobbins having a spindle provided with a resiliently supported abutment. The abutment supports one or more bobbins on the spindle at the same height regardless of the number of bobbins supported.

The present invention pertains to apparatus for the transport and storage of weft thread bobbins of the type which remain outside the shed during weaving and which are customarily employed in gripper shuttle looms.

In order to sustain a continuous weaving operation it is necessary to have a store of weft thread at each loom, the size of the supply so stored being dependent on the nature of the cloth being woven and on the weft thread being used therein. In gripper shuttle type looms there is provided a weft thread bobbin rack or the like on the picking side of the loom which contains two bobbins for each type or color of weft thread employed, the weft thread being pulled off the free end of these bobbins. The tail end of the thread on one bobbin is connected to the head end of the thread on the other. When a bobbin has been exhausted there must be prompt insertion of a new bobbin in its place with connection of the head end of the thread thereof to the tail end of the other bobbin now feeding the shuttles. Consequently it is desirable to have a number of bobbins in reserve at each machine.

It has been proposed to transport the bobbins from the winding machines where they are wound to the looms in suitable containers. In such an arrangement, one or more such containers are disposed adjacent each loom and the bobbins are taken therefrom as necessary. It has also been proposed to store a number of bobbins on a storage device adjacent to the bobbin support of the loom itself.

With the containers above mentioned it is easy for the bobbins to become damaged upon removal therefrom, so that thread breakages occur leading to interruption in the operation of the loom. In order to have a weft thread supply of say 16 or 24 bobbins per loom, large and cumbersome containers are required which are difficult to bring to and away from the looms. Likewise temporary storage of the bobbins withdrawn from these containers and supported on racks is an uneconomic and inconvenient solution.

The invention provides a light and readily handled device by means of which transfer of the weft thread from the winding machines to the looms can be efficiently carried out, and which surmounts the disadvantages above referred to.

In accordance with the invention, there is provided a spindle which is held or suspended upright in a suitable carrier and which has a support for the bobbins which is movable lengthwise of the spindle, this support being elastically stressed against the bobbins so as to permit the carrying of a number of bobbins on the spindle.

The elastic means are so stressed by the action of even

one of the bobbins that this support is pressed down by approximately the height of one bobbin for each bobbin loaded onto it. When the bobbin is removed, the support rises on the spindle by the same distance. Consequently, the uppermost of the spools on the spindle is always at substantially the same level close to the top of the spindle. The length of the spindle is advantageously so made that bobbins can be put onto and removed from it at a convenient position for the operators, for example at chest height for the operator.

In one embodiment, the elastic means above referred to takes the form of a rubber cord or filament which is fastened to the upper end of the spindle and to the movable bobbin support. There is a substantially constant ratio between the stretching of such a rubber cord and the weight which it carries. Other elastic media such as tension springs may be used instead.

In one embodiment of the invention, a carrier is provided for a spindle or spindles to be inserted therein. This carrier may form part of a wagon or truck which can take a number of spindles and which can be moved down the aisles between the looms.

The apparatus of the invention may include further a stationary carrier for a spindle to be inserted therein, this carrier constituting a part of a bobbin replacement store. This carrier can, for example, be constructed to accept four spindles and is located adjacent to the warp beam of the loom near the loom rack for the bobbins from which the warp thread is drawn by the shuttles.

In another embodiment the carrier is arranged for the suspension of a spindle therein. This carrier may constitute part of a transport device which is to be hung from an overhead pulley and by means of which the spindles can be delivered to various looms and inserted in a replacement rack.

The invention will now be further described in terms of a number of non-limitative exemplary embodiments and with reference to the accompanying drawings in which:

FIG. 1 is a view in side elevation of a spindle for the support of weft thread bobbins;

FIG. 2 is an enlarged vertical section taken on the line II—II in FIG. 1;

FIG. 3 is a view in side elevation of a truck, this construction being shown partly broken away;

FIG. 4 is a plan view of the truck of FIG. 3;

FIG. 5 is a view in side elevation of a stationary support for a plurality of spindles;

FIG. 6 is a plan view of the apparatus of FIG. 5;

FIG. 7 is a diagrammatic plan view of a loom with a weft thread supply and replacement storage according to the invention associated therewith;

FIG. 8 is a representation of a mechanism for suspending a spindle; and

FIG. 9 is a perspective view of a trolley for the suspension of spindles.

FIGS. 1 and 2 show a spindle generally indicated at 1 made up of a tube 2 having a head 3 and a foot 4, each fastened to the tube by means of a pin 5. In the head 3, the two halves 7 and 8 of a clamping tube are held by means of the pin 5, these halves being surrounded by housing 6.

A bobbin support 10 is movably disposed on the spindle. The support comprises an outer casing or sleeve 11 and a flange 12. The tube 2 is provided with two longitudinal slits 13 in which a pin 14 is arranged to move, the pin extending crosswise to the tube. The pin 14 is fastened in the casing 11. By means of the pin 14, there are held together the two halves of a longitudinally divided clamping tube 16, surrounded by a sleeve 15. The sleeve 15 is movable in the tube 2 so that the motion of the support 10 longitudinally at the spindle can be effected.

A rubber cord 9 is disposed within the tube 2, one end

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being fastened to the clamp 7, 8 affixed to the head of the spindle and the other to the clamp 16 of the support 10.

The spindle 1 extends at its lower end 4 into a carrying device 20. Bobbins 18 are engaged on the spindle as indicated in FIG. 3 and rest on the support 10. This support sinks under the weight of the bobbins 18, the extension of the rubber cord being approximately proportional to the weight imposed on it. Thus the length of the cord corresponds approximately to the aggregate height of the spools which it is carrying. Upon removal of one bobbin, the cord 9 shortens in length and lifts the support 10 through approximately the height of one bobbin. The limits of motion on the carrier 10 are specified by the ends of the slits 13. The upper limit is located according to the minimum length of the rubber cord at something more than the height of one bobbin below the head 3 at the upper end of the spindle. The first bobbin engaged on the spindle will be held at approximately this position, i.e., just beneath the head 3, as indicated in FIG. 3. Upon addition of further bobbins, the support 10 falls always by an amount such that the uppermost bobbin remains substantially at the level of the head 3.

FIGS. 3 and 4 illustrate a truck comprising two box-like frames 20, a rim 21 and two pairs of struts 22 and 23. The support frames 20 are provided with holes 24 and 24a to receive the lower ends 4 of the spindles. The wheels 25 and 26 of the truck are disposed each at the middle of one side of the truck. In particular, the wheels 25 on the long sides on the truck have their axles 27 disposed in brackets 28 fastened to the struts 22. The wheels 26 at the ends of the truck have each a caster with a vertical shaft 27 supported in a bracket 29 affixed to a strut 23. The caster is thus rotatable about a vertical axis. The wheels 26 may be smaller than the wheels 25 so that the truck can be rocked about the wheels 27. Push bars are indicated at 19 on the ends of the truck. The truck of FIGS. 3 and 4 can be moved down the aisles of the weaving room between the looms, and spindles 1 stored in the carriers 20 are arranged for carrying a number of bobbins 18 wound at a winding station not shown.

FIGS. 5 and 6 show a weft bobbin changing or replacement storage device 31 borne on a vertical stud 32 anchored in the floor 37. The stud has a reduced upper end 33 about which the device 31 rests. More particularly the carrying device comprises a hub 34 having four arms 35. Each arm has a holder 36 at the end thereof to receive one of the spindles shown in FIGS. 1 and 2.

The wound bobbins are first engaged on the spindles 1, the feet 4 of which engage the carrying elements 20 of one of the trucks. The truck is then brought to the bobbin changing device 31 of the loom, thereupon the spindles are removed from the carrying elements 20 of the truck and inserted into the holders 36 of the changing device 31.

FIG. 7 shows one of the weft thread bobbin changing devices 31 adjacent a gripper shuttle loom. The loom has two end frames 40 and 41, a two-part warp beam 42, a two-part cloth beam 43, and heddles 44. Outside or outboard of the frames 40 is provided a housing 45 which contains the loom drive for the heddles. A rack 46 has two weft thread spools 18a arranged therein. Beyond the frame 41 is disposed a handwheel 47 by means of which, with the aid of mechanism not shown, the cloth beam 43 and the heddles can be moved. The other parts of the loom are not shown in the drawing. The bobbin replacement device 31 is disposed on the picking side of the loom adjacent the rack 46 and near the warp beams 42. It carries four spindles 1, each having bobbins 18 engaged thereon. The warp beam 42 is driven by means of a motor not shown. A multiplicity of warp threads are wound up on the warp beam. They pass over various tensioning and guide elements not shown and through the heddles 44. These serve to form the shed in

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which a weft thread is picked by a shuttle-picking and catching mechanism not shown. To this end the weft thread is drawn by means not shown over the free end of one of the spools or bobbins 18a in the rack 46 and fed to a gripper shuttle, likewise not shown. This is sent through the shed by means of a picking mechanism not shown on the frame 40 and caught by catcher on the frame 41. There the weft thread is freed from the shuttle which is then carried back to the picking mechanism. After change of shed, the weft thread is severed near the picking side 40 of the loom and is then attached to a new gripper shuttle for the next pick.

The bobbins 18a are connected with each other in the rack or stand 46, the tail end of the thread on each bobbin being knotted to the head end of the thread on the next. In this way, the thread drawn off the free end of the bobbin is not affected in operation of the picking mechanism by change of bobbins.

To permit a continuous operation, a bobbin is withdrawn from one of the spindles 1 on the changing device 31 every time one of the bobbins 18a in the rack 46 is exhausted. The bobbin so removed from the changing device is positioned on the frame 46 and its thread is knotted to the tail end of the other of the bobbins 18a then serving the loom.

The rack 46 may support several bobbins. In weaving operations including several types of weft thread the rack will support for each thread type two bobbins 18a whose threads are knotted together.

In a modified embodiment of the invention illustrated in FIG. 8, the spindles 1 are hung by means of their heads 3 on hooks 50 having a forked-shaped end 51. The hook constitutes part of a suspension device including a strap or bracket 52 connecting with a chain conveyor system not shown. The suspension device includes a bolt 53 fastened to the bracket 52 and a hub 54 which is rotatable about this bolt, the hub being prevented from slipping off by means of a retaining ring 55. A shaft 56 fastened to the hook 50 is provided on the hub, roller 57 being supported rotatably on the end of the shaft and being likewise prevented from slipping off by a retaining ring 58.

At a specified location in the chain conveyor system not shown, there is provided a stationary guide element 59 forming part of a set of sliding rails 60 indicated in FIG. 9. Specifically, FIG. 9 shows two rails 61 between which bobbin-supporting spindles 1 can be hung at the heads 3 thereof.

The chain conveyor system not shown makes a closed loop path connecting a winding machine not shown with a number of thread operating or working stations. The bobbins 18 filled at the winding station are engaged on spindles 1 and these are hung each by its head 3 in a hook 50 of the chain conveyor system and thus enter the circular flow. The sliding rail pairs 60 lead off from the chain conveyor to the individual processing stations. The distribution of the spindles from the chain conveyor to the rail pairs 60 is effected by means of selecting devices not shown which may, for example, be electromagnetic in operation. Release of a spindle 1 hanging from a hook 50 is achieved by passage of the roller 57 over a guiding element 59 so arranged that the roller is lifted so as to rotate the hook 50 about the support bolt 53 thereof. The spindle then comes up against a stop and is carried off of the hook so that it can be engaged on one of the rail pairs. These are so disposed as to guide the spindles to specified working stations. There the spindles can be removed and inserted into the changing devices 31 of the individual looms or into the support elements 20 of the truck.

It will thus be seen that the invention provides apparatus for the transport and storage of thread bobbins comprising a spindle, bobbin abutment means such as the support 10 slidably movable lengthwise of the spindle, and elastic means coupled between the spindle and abut-

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ment means. The spindle may comprise a hollow tube having a slot extending lengthwise thereof, the abutment means taking the form of a sleeve engaged about that tube. In the embodiment illustrated, the bobbin support or abutment further comprises a pin extending through the slot in the tube of the spindle to the interior thereof, the elastic means being disposed within that tube. The thread transport and storage apparatus of the invention may further comprise an apertured base for reception of the spindle at the lower end thereof, and the base may be provided with wheels. Alternatively, the apparatus may comprise an apertured base pivotally supported adjacent a loom, or means for suspension of the spindle such as a pair of rails.

While the invention has been described herein in terms of a number of preferred embodiments, the invention itself is not limited thereto; rather, the invention comprehends all modifications of and departures from those embodiments properly falling within the spirit and scope of the appended claims.

I claim:

1. Apparatus for the transport and storage of thread bobbins comprising a spindle adapted to be supported upright from its lower end, bobbin abutment means slideably movable lengthwise of the spindle, a stretchable elastic cord coupled between the upper end of the spindle and the abutment means urging the abutment means toward the upper end of the spindle, and means to limit motion of the abutment means toward the upper end of the spindle.

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2. Apparatus according to claim 1 wherein said spindle includes means for the suspension thereof disposed adjacent the upper end thereof.

3. Apparatus for the transport and storage of thread bobbins comprising a hollow tube having a slot extending lengthwise thereof, a sleeve engaged about and slideably movable lengthwise of the tube, a pin affixed to the sleeve and extending through the slot to the interior of the tube, elastic means disposed within the tube coupled between the pin and tube urging the sleeve toward one end of the tube, and means to limit motion of the sleeve toward said one end of the tube.

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U.S. Cl. X.R.

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