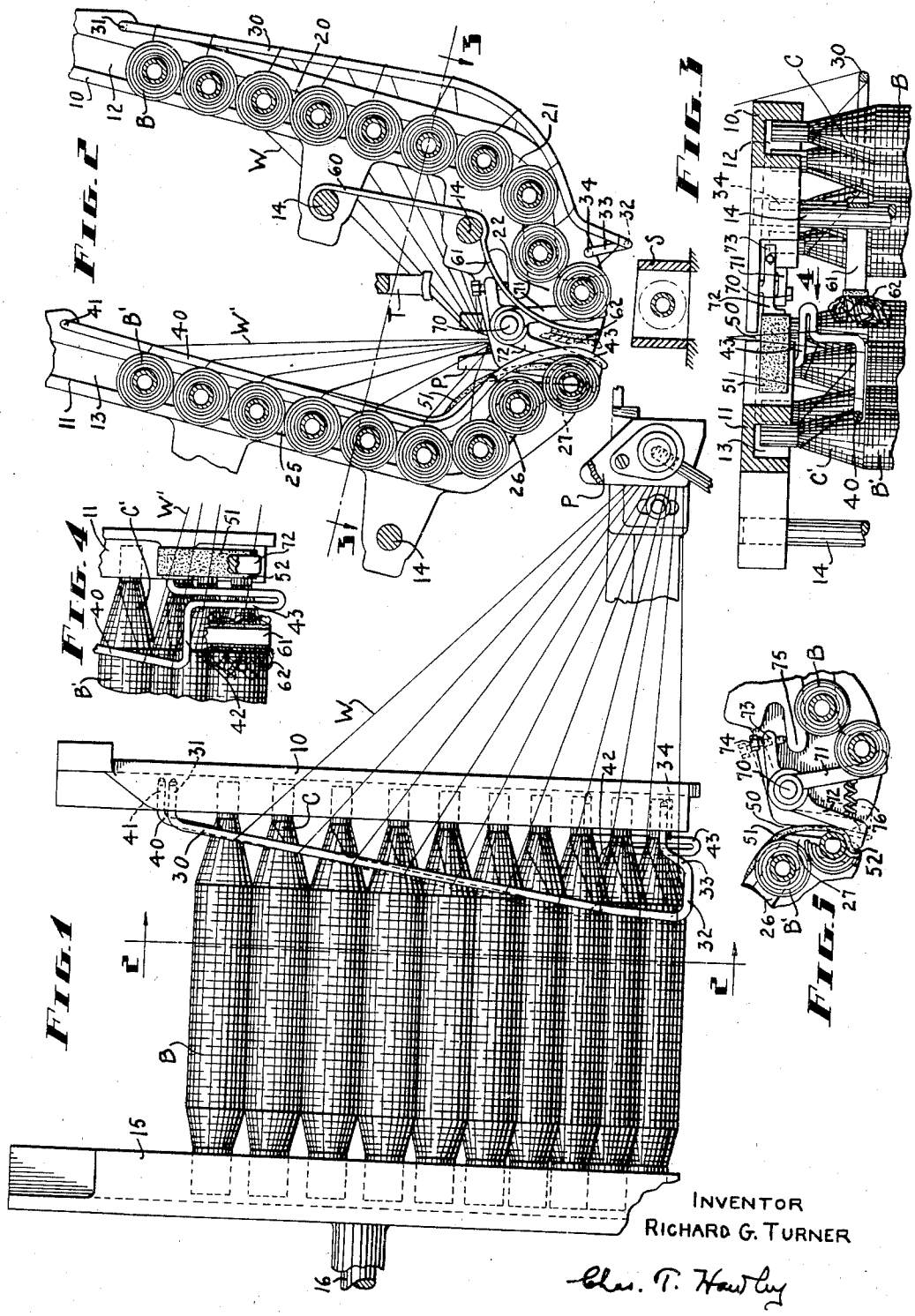
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BOBBIN SUPPORT FOR WEFT REPLENISHING LOOMS

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BOBBIN SUPPORT FOR WEFT REPLENISHING LOOMS

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This application is a division of my co-pending application Serial No. 328,482, filed April 8, 1940.

This invention relates to improvements in weft replenishing looms and it is the general object of the invention to provide an improved thread guide means for the bobbins as they move down the magazine toward transfer position.

In weft replenishing mechanisms more particularly of the multicolor type the reserve bobbins are stored in vertical stacks and descend by gravity to transfer position one at a time. In order that the shuttle may be threaded automatically on a pick after transfer it is customary to provide a holder for the weft ends which extend from the reserve bobbins in a direction over the eye of the shuttle. As the bobbins await transfer they have a tendency to roll or vibrate in such a direction as to slacken weft. In certain types of weft there is a tendency for the first coils to slip off the yarn mass toward the tip of the bobbin. It is an important object of my present invention to provide guide means which require the weft ends to traverse a path leading from the conical tip part of the weft mass toward the opposite end of the bobbin before being led to the thread holder. In this way the thread is subjected to a tension drawing it away from the bobbin tip with reduced tendency for the first coils to slip.

At the instant of transfer the bobbin is moved down from the magazine into the shuttle with a rapid motion and there is a tendency for the thread to break if it is held too tightly. It is another object of my present invention to provide thread guides so constructed that as the bobbin moves from the magazine into the shuttle the path traversed by the weft ends is shortened, thereby temporarily providing sufficient slack to prevent thread breakage.

In reserve bobbin magazines more particularly of the type set forth hereinafter the lower parts of the bobbin compartments are curved and terminate in a short vertical section below the curved part. This short vertical section will ordinarily hold the reserve bobbin next to be transferred from the associated stack and it is another object of my present invention to provide a friction surface over which the weft ends from the lower bobbin in the stack are led to keep them in proper spaced relation.

It is a further object of my present invention to provide a mass of yieldable material positioned to engage the conical mass of weft of the bobbin in lowest position to prevent unravelling of the first coils of the bobbin.

The bobbin in transfer position is customarily held by yielding supports which yieldingly hold it under the transferrer arm but move out of the downward path of the bobbin during transfer. In the form of magazine set forth hereinafter the weft threads from one stack of bobbins are led from the bobbin between the guide compartments to the thread holder and must therefore pass downwardly along the yielding support for the bobbin tip at the time of transfer. It is a further object of my present invention to provide an improved form of bobbin tip support so mounted and constructed as to facilitate passage of the weft end of a bobbin being transferred.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a front elevation of a magazine made according to my present invention,

Fig. 2 is a vertical section on line 2—2, Fig. 1,

Fig. 3 is a horizontal section on line 3—3 of Fig. 2,

Fig. 4 is a detail front elevation of the lower end of the rear stack of bobbins looking in the direction of arrow 4, Fig. 3, and

Fig. 5 is a detailed view of the lower part of Fig. 2 with parts removed to show the yieldable bobbin tip supports.

My present invention relates more particularly to the type of magazine set forth in Patent No. 2,128,974 to which reference may be had for certain controls for rocking the magazine in time with the shifting of the drop boxes at the end of the loom opposite the magazine not shown herein. The magazine has front and back guide sections 10 and 11, respectively, having bobbin tip guideways or compartments 12 and 13, respectively. These sections 10 and 11 are held by tie rods 14 to an inner frame 15 which is mounted on a pivot 16 as set forth in the aforesaid patent. Extending between the inner plate 15 and the outer guides are two groups of reserve bobbins B and B' located, respectively, in the front and rear guides.

The bobbins B and B' have weft ends W and W', respectively, extending from them and they are drawn into a pneumatic thread holder desig-

nated generally at P in Fig. 1. The particular type of thread holder forms no part of my present invention and may be as set forth in my copending application Serial No. 166,571. It is thought sufficient for present purposes to state that the action of the thread holder is to hold the weft ends W and W' taut during the time their bobbins await transfer in the magazine.

A transferrer arm T may be of the usual form and is normally in raised position but is acted upon by mechanism not set forth herein to descend on replenishing beats of the loom to move the lowest bobbin in one or the other of the stacks into the shuttle S. The transferrer arm moves in a fixed path and the magazine is rocked so that the lowest bobbin in either the front or the back stack will be under the transferrer arm, depending upon the position of the shifting shuttle boxes not shown at the opposite end of the loom. While one shuttle is shown in Fig. 2 it will be understood that the loom operates with two shuttles which are alternately active and when in transfer position will occupy the position indicated in Fig. 2.

The matter thus far described of itself forms no part of my present invention and may if desired be made as set forth in the aforesaid patent and application.

Considering the guideways in more detail, the front guide **12** has a substantially vertical elongated section **20** the lower part of which is curved rearwardly as at **21** and then downwardly as at **22**, and the front bobbins follow the path suggested in Fig. 2 as they move toward transfer position. The rear guide **11** also has an elongated substantially vertical guide **25** the lower end of which is curved forwardly as at **26** and then terminates in the downwardly directed section **27**. The front section **12** is provided with a guide wire **30** the upper end of which is attached to said section as at **31** while the lower part is inclined downwardly and toward the inner plate **15** of the magazine, see Fig. 1. The bottom of this wire **30** is bent horizontally to extend outwardly as at **32** and then upwardly as at **33** to be fastened to the lower part of the guide **12** as at **34**. As seen in Fig. 2 this wire lies in front of the section **10**, the right side of the magazine as shown in Fig. 2 being at the front. The weft ends W leading from the conical parts C of the bobbins B are led to the left as viewed in Fig. 1 around the wire **30** and then toward the right to the thread holder P. It will be seen from Fig. 1 that the wire **30** lies between the ends of the yarn masses of the several bobbins in the front stack and that the weft ends W traverse a path which starts in a direction toward the head end of the bobbins and then is reversed at the wire **30** to be directed toward the thread holder. The bottom horizontal section **32** is above the shuttle S when the latter is in transfer position under the magazine and as the lowest bobbin is inserted into the shuttle its weft end slips under the horizontal section **32** of wire **30**. Under these conditions the length of the path for the weft end from the conical end of the mass to the thread holder is shortened appreciably to provide a temporary slackness in the thread preventing its breakage during transfer.

The rear section **11** is provided with a wire **40** similar in purpose to the wire **30** and secured to the section as at **41**. Wire **40** is also inclined downwardly and toward plate **15** and then extends horizontally as at **42**, see Fig. 4. Beyond section **42** the wire has a depending U-shaped guide **43** terminating substantially at the same level as the straight section **32**. Wire **40** serves the purpose of causing the weft ends W' led around it from the conical part of the weft mass to the thread holder to traverse a reversed path.

During descent the bobbins B' in the rear stack reach a position where their weft ends will slip off the inclined part of the wire **40** and move under the horizontal section **42** thereof to be held by the vertical part **43**. The latter is so positioned that it requires the weft ends of the lower bobbins in the rear stack to traverse an angular path before reaching the thread holder P. As described in connection with the front section, the lowest bobbin B' of the rear stack will during its descent at the time of transfer release its thread from the bottom of wire **40** and thereby provide sufficient slack to prevent thread breakage.

From the matter thus far described it will be understood that the guide wires are so placed as to require the weft ends to traverse angular or reversed paths on their way to the thread holder and also that these paths lead the weft ends from those parts of the conical mass of lesser diameter toward the large end of the weft cones C and C', thereby preventing the thread from slipping endwise toward the tip of the bobbin. This control of the thread makes it possible to provide slack at the time of transfer to prevent thread breakage.

In order that the weft ends W' may move downwardly between sections **10** and **11**, the latter are spaced to define a thread passage **50** shown in Fig. 5. The weft ends of the lower bobbins in the rear stack should be held in vertically spaced relation, and to accomplish this result I secure a strip of friction material **51** to the rear section **11** and extend it forwardly across the plane of passage **50** but to one side thereof, see Figs. 3 and 5, so that the lower end thereof will be in front of the adjacent bobbin tips. The weft ends from the bobbins in the rear stack as shown in Fig. 5 lead across this friction material on their way to the thread holder and are thereby held frictionally in vertically spaced relation to prevent entanglement. The bottom **52** of strip **51** terminates above the shuttle S and thus is unable to interfere with the weft end of the lowest bobbin B'.

Another feature of my invention relates to means for engaging the cone C' of the lowest bobbin B' with a mass of deformable material to provide additional assurance that the thread of that bobbin will not unwind. In carrying this feature of my invention into effect I provide a leaf spring steel holder **60** which is snapped over two of the tie rods **14** associated with the front section **10**, as shown in Fig. 2. The lower part of this spring holder **60** extends downwardly and rearwardly as at **61** and has secured thereto a pad **62** of soft material such as wool so positioned as to engage the conical part of the mass of weft on the lowest bobbin. This relationship is shown more particularly in Figs. 3 and 4 from which figures it will be understood that this mass of material lies under the horizontal section **42** of wire **40** and to the left of the vertical U-shaped section **43**. The principal reason for forming the lower end of wire **40**, as shown in Fig. 4, is to accommodate the pad **62**.

The head or left ends of the lowest bobbins as shown in Fig. 1 may be held in any approved manner, or as suggested in Patent No. 2,128,974,

and such supports are not shown herein. For the tip ends of the bobbins, however, I provide an improved form of tip support set forth more particularly in Figs. 2, 3 and 5. This tip support mechanism comprises a stud 70 secured to the bottom of the section 10 in front of thread passage 50 and extending horizontally to afford pivotal support for front and back arms 71 and 72, respectively, positioned for engagement with the tips of the lowest bobbins B and B', respectively. The arm 72 has a finger 73 carrying an adjusting screw 74 for engagement with a lug 75 on section 10. A small compression spring 76 is located between the arms 71 and 72 tending normally to spread them apart. The front arm 71 may engage the tip of its bobbin directly, but I prefer to mount the rear arm 72 so that it engages the previously described friction material 51. Arm 72 under these conditions does not directly engage its bobbin tip, but serves nevertheless to hold the associated bobbin yieldingly in transfer position by forces transmitted through the friction material 51. Lug 75 is placed as shown in Figs. 2, 3 and 5 to act as a stop for arm 71 when the latter is moved by spring 76.

In operation, the transferrer arm T effects periodic transfers of the low bobbins into the depleted shuttle under the magazine. With each transfer the bobbins of the corresponding stack descend, thereby causing slackness in the associated weft ends W and W'. The pneumatic thread holder promptly absorbs the excess length of weft ends and quickly reestablishes the original tension. As the bobbins move out of the magazine the weft ends move to positions below the corresponding guide wires to produce temporary slackness for the reasons already specified.

When a bobbin is transferred from the front stack the arm 71 is pushed rearwardly against the action of spring 76 and the latter is held at its left end as viewed in Fig. 5 by the arm 72 and the stop screws 74. When transfer occurs from the rear stack the bobbin tip passes down behind the adhesive strip 51 and the arm 72, rocking about the stud 70, moves forwardly against the action of spring 76 to the dotted line position of Fig. 5 as the stop screw 74 moves upwardly away from lug 75. The arm 72 extends downwardly in the same general direction as does the thread passage 50 and therefore offers a minimum of interference and opportunity for entanglement with the weft end of the bobbin being transferred. It is to be understood that the strip 51, in addition to being adhesive, is also sufficiently flexible to permit unobstructed downward movement of the bobbin tip therebehind and that as the bobbin continues downwardly into the shuttle its weft end will move to a position below the bobbin 52 of the strip 51.

From the foregoing it will be seen that I have provided guides for the weft ends so placed as to require the threads to traverse a reverse path from the reserve bobbins to the thread holder, thereby tending to draw the weft ends upwardly toward the larger part of the conical ends of the weft masses. It will also be seen that as the lowest bobbin is moved out of the magazine its weft end becomes slack to prevent breakage. Further, the pad of wool or the like, as seen more particularly in Figs. 3 and 4, engages the conical end of the lowest bobbin in the rear stack to prevent unravelling of the wound thread. Also, the adhesive strip 51 serves to hold the weft ends of the two rear bobbins shown at the left of Fig. 5 in properly spaced vertical relationship. The yielding tip support arms 71 and 72 are controlled by a single spring and arm 72 extends downwardly to permit passage of the weft end between said arm and the forward face of the strip 51 when a replenishing operation of the loom occurs.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a weft replenishing loom having a pair of spaced stacks of reserve bobbins from which extend weft ends, guide means to maintain said weft ends in two spaced groups and cause said weft ends to descend progressively along spaced paths as successive replenishing operations of the loom occur, a magazine frame defining two separate paths for the tips of the reserve bobbins, a pair of yieldable bobbin supports, one for each stack, located between said paths of the bobbins and also between said paths of the weft ends, a single yielding means urging the supports toward their respective paths, and a thread holder to hold the weft ends extending from the reserve bobbins, the weft ends of one stack passing downwardly on one side of said yielding supports while the weft ends of the other stack pass downwardly on the opposite side of said supports as the bobbins descend by gravity in their stacks.

2. In a weft replenishing loom having two spaced stacks of reserve bobbins, a magazine frame defining two separate descending paths for the bobbins of said stacks, a pair of yieldable supports for the reserve bobbins, one for each stack, means defining a common pivotal mounting carried by the magazine frame for said supports between said paths, a single yieldable element urging the supports toward their respective paths, a thread holder to hold weft ends extending from the reserve bobbins, and guide means for said weft ends to cause the weft ends of one of said stacks to move downwardly on one side of said yieldable supports and cause the weft ends of the other stack to move downwardly on the opposite side of said yieldable supports when the bobbins descend in the magazine by gravity.

3. In a weft replenishing loom having two spaced stacks of reserve bobbins, a magazine frame defining two separate descending paths for the bobbins of said stacks, a pair of yieldable supports for the reserve bobbins, one for each stack, means defining a common pivotal mounting carried by the magazine frame for said supports between said paths, a single yieldable element urging the supports toward their respective paths, said supports extending downwardly from said common pivotal mounting to position the lower ends of said supports for engagement with the lowest bobbins in the corresponding stacks, and a thread holder for weft ends extending from the reserve bobbins, the weft ends of one of said stacks extending downwardly on one side of said supports when the corresponding bobbins descend by gravity and the weft ends of the other stack moving downwardly on the opposite side of said yielding supports when the bobbins of the last named stack descend by gravity, the weft ends of said last named stack moving downwardly between the path of the bob-

bins therefor and the corresponding yielding support.

4. In a weft replenishing loom having a pair of spaced stacks of reserve bobbins from which weft ends extend, a magazine frame defining two separate spaced paths for the tips of the reserve bobbins as the latter move toward transfer position, a pair of yieldable bobbin supports, one for each of the spaced paths, located between the aforesaid paths, a single yielding means urging the supports toward their respective paths, and a thread holder to hold the weft ends extending from the reserve bobbins, the weft ends of the bobbins in one stack passing downwardly between said paths on one side of said yielding supports while the weft ends of the bobbins in the other stack pass downwardly on the opposite side of said supports and outside of the space between said stacks as the bobbins descend by gravity in their stacks.

5. In a weft replenishing magazine having a pair of spaced stacks of reserve bobbins, a magazinc frame providing two separate and spaced guides for the tips of the reserve bobbins, the tips of the bobbins moving downwardly by gravity along two separate spaced paths defined by the guides, a pair of yieldable bobbin supports located between said paths, there being one bobbin support for each stack of bobbins, a single yielding means urging the supports toward their respective paths, and a thread holder to hold the weft ends extending from the reserve bobbins, the weft ends of one stack passing downwardly with their respective bobbins between the two guides and between one of said supports and the guide corresponding thereto while the weft ends of the other stack of bobbins pass downwardly in the opposite side of said supports and outside the space between said guides.

6. In a weft replenishing loom having a pair of spaced stacks of reserve bobbins, a movable magazine having two separate guides for the tips of the reserve bobbins, one guide for each stack of reserve bobbins, the lowest bobbin in each stack being movable by motion of the magazine to transfer position, a pair of yieldable bobbin supports located between the lowest bobbins of the two stacks, a single yielding means urging said supports toward their respective bobbins in lowest position in the stacks, and a thread holder to hold the weft ends extending from the reserve bobbins, the weft end of the lowest bobbin in one of said stacks passing to the thread holder along a line lying between one of the supports and its corresponding guide while the weft end of the lowest position in the other stack passes to the thread holder along a line on the opposite side of said supports from the first named support and outside of the space between said bobbins in lowest position.

7. In a weft replenishing loom having a pair of spaced stacks of reserve bobbins, a movable magazine having a pair of separate spaced guides for the tip of the reserve bobbins, one guide for each stack of bobbins, a pair of yieldable bobbin supports located between said guides, a single yielding means interposed between said supports and acting to move one of said supports into holding relation with respect to the lowest bobbin in one of said guides and holding the other support against the lowest bobbin in the other guide, and a thread holder to hold the weft ends extending from the reserve bobbins, the lowest bobbin in each stack being movable by motion of the magazine to transfer position and each support being movable independently of the other support, the thread from the lowest bobbin in one of said stacks extending to the thread holder along a line lying between said one support and the corresponding guide and the weft end of the other bobbin in lowest position in the other stack extending to the thread holder along a line outside the space between said guides and on that side of said other support opposite said one support.

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