Aug. 7, 1945. R. G. TURNER 2,381,790

BOBBIN MAGAZINE FOR WEFT REPLENISHING LOOMS

Filed April 15, 1944 3 Sheets-Sheet 1

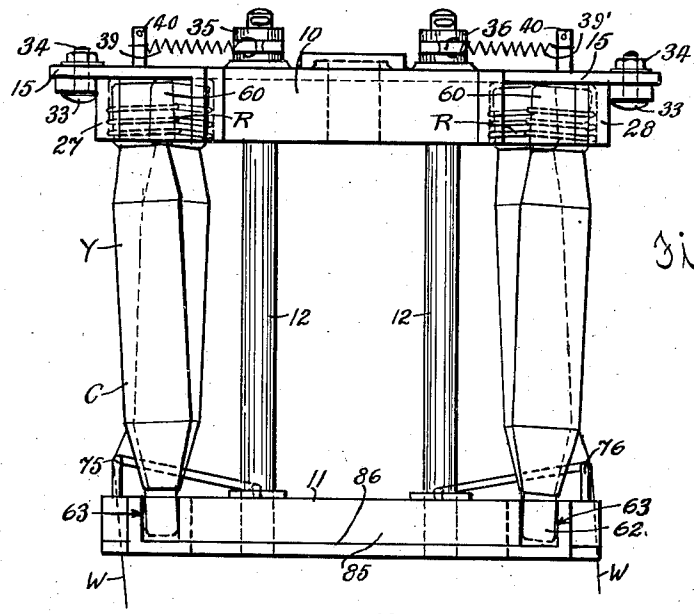


Fig. 2.

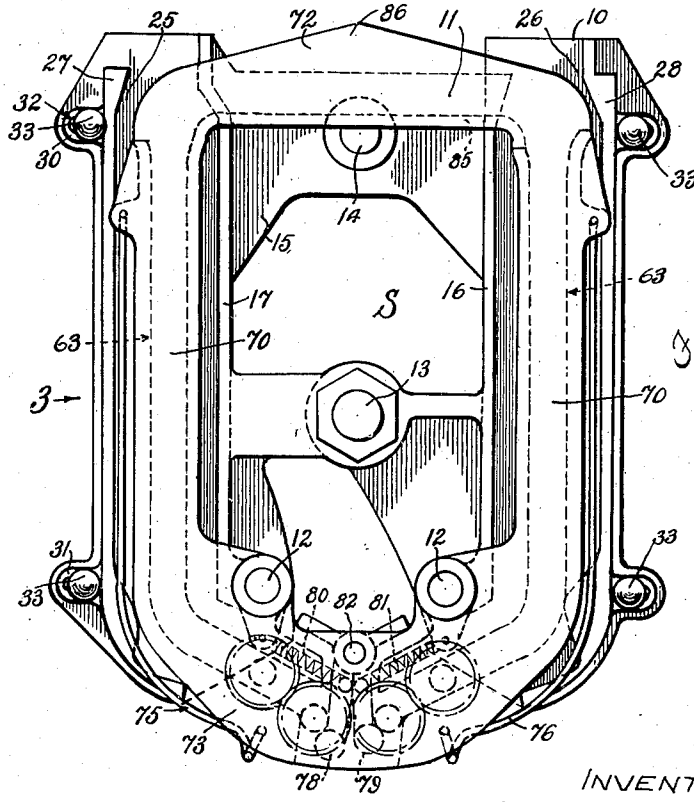


Fig. 1.

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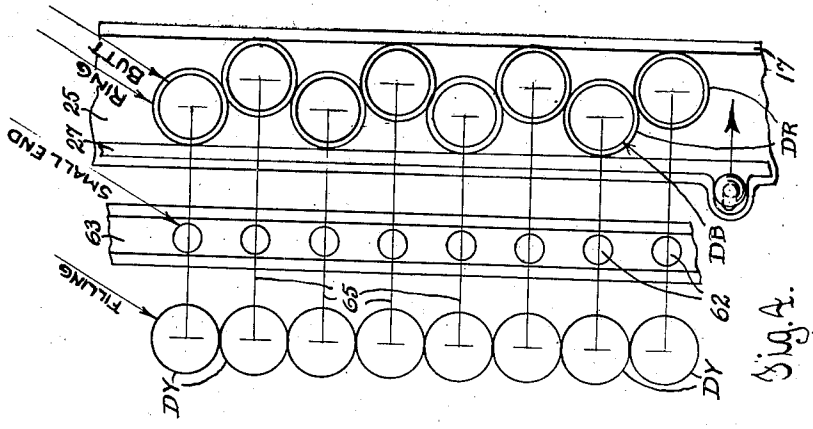


Fig. 4.

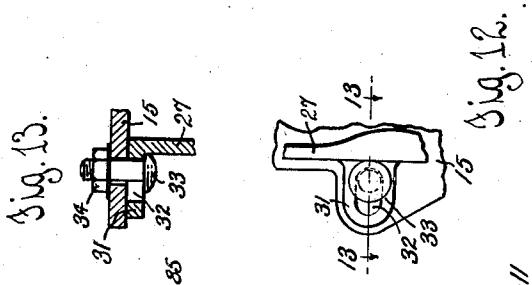


Fig. 13.

Fig. 12.

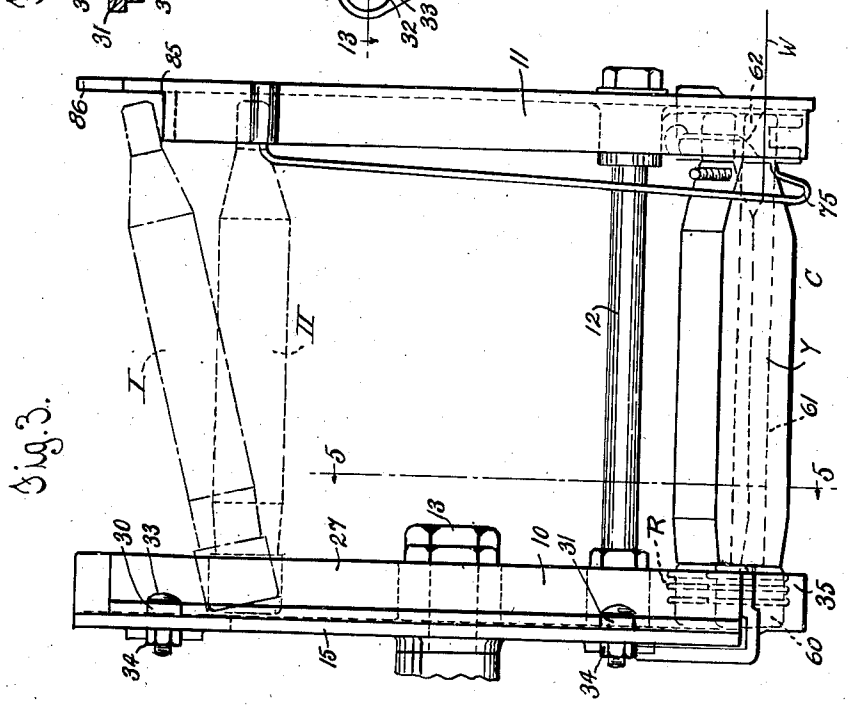


Fig. 3.

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Fig. 5.

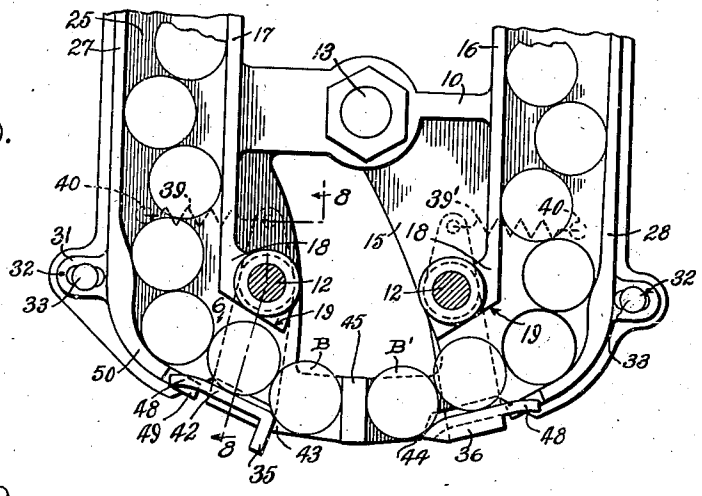


Fig. 6.

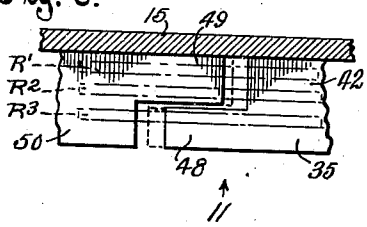


Fig. 7.

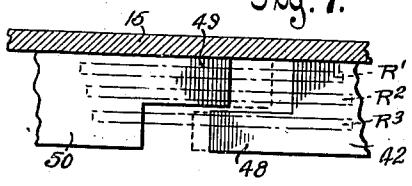


Fig. 9.

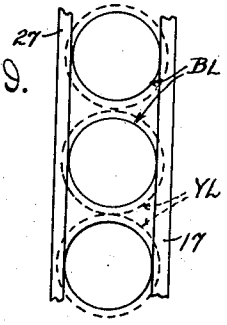


Fig. 10.

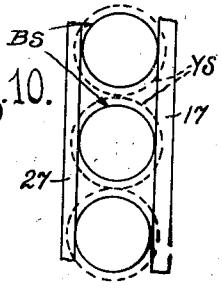


Fig. 8.

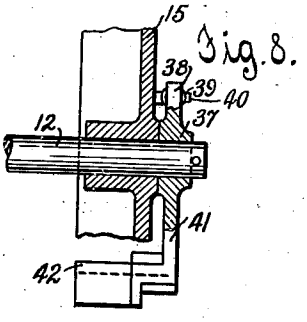
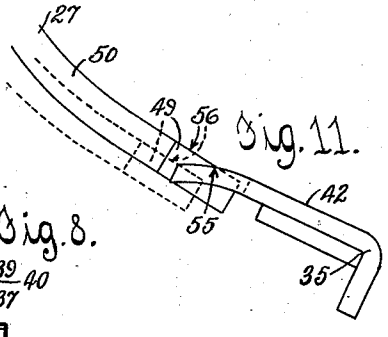


Fig. 11.



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UNITED STATES PATENT OFFICE

2,381,790

BOBBIN MAGAZINE FOR WEFT REPLENISHING LOOMS

Richard G. Turner, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application April 15, 1944, Serial No. 531,218

9 Claims. (Cl. 139—245)

This invention relates to improvements in bobbin magazines for weft replenishing looms and it is the general object of the invention to provide a magazine so constructed as to adapt it for use with various sizes of bobbins.

Bobbins used in weft replenishing looms ordinarily have a barrel with a butt on one end around which lie three steel rings which are held by the spring jaws of the shuttle. The other end of the bobbin is rounded to form a tip over which the weft reeves during the weaving operation. The yarn is wound on the barrel between the butt and the tip and usually comprises a mass of yarn the central portion of which is more or less cylindrical but the end portions of which are tapered toward the butt and the tip. Bobbins used in weft replenishing looms have butts the diameters of which are ordinarily one or the other of two standard sizes, the so-called No. 3 and No. 5, the former being larger than the latter.

In the usual multicolor weft replenishing mechanism the stacks of bobbins are held between end members or plates each having guideways formed by walls on the plates. The inner plate near the center of the loom has guideways for the bobbin butts, while the outer plate has guideways for the tips. It has been customary in the past to make the butt guideways only slightly wider than the diameter of the butts of the bobbins to be used in the magazine and this has necessitated the use of different patterns for the different sizes of butts. It is an important object of my present invention to provide a magazine constructed in such manner that the guideways for the butts can be varied as to width to accommodate butts of different diameters.

The yarn diameter of bobbins may be equal to, larger than or smaller than the butt diameter. When the yarn diameter is substantially equal to the butt diameter the bobbins lie more or less horizontal in the magazine with adjacent butts engaging each other and with a substantial amount of contact between the cylindrical portions of the yarn. When the yarn diameter is greater than that of the butt the cylindrical portions of the yarn masses engage each other but the bobbin butts are out of contact with each other. In either of these two conditions there is no appreciable difficulty experienced except that with the larger yarn diameters there is some vibration of the bobbins due to the fact that their butts are not in contact.

When the yarn diameter is less than the butt diameter, however, considerable difficulty is experienced due to the fact that the bobbins do not lie horizontal in the magazine. The upper bobbins in a stack have their butt ends higher than their tips and slant downwardly with the result that the bobbins are not held very securely in their guideways. Another result of this condition is the fact that there is very little contact between adjacent masses of yarn, the latter for the most part contacting only at the end of the cylindrical part of the yarn near the bobbin tip. Because of this fact there results a considerable amount of rolling and vibration of the bobbins which disturb the weft ends which extend to a thread holder.

It is another object of my invention to provide means usable under this last condition to vary the width of the butt guideways to permit a larger amount of contact between the cylindrical portions of the wound yarn. To accomplish this result I make the magazine in such a way that the butt guideways can be made wider than the diameter of the bobbin butts to effect a staggering of the butts in the guideway. This staggering results in a shortening of the vertical distance between centers of the butts and the guideways can be so adjusted that this shortened distance may be equal substantially to the diameter of the wound mass of weft.

It has been proposed heretofore to alter the bobbin butt guideways for the purpose of preventing rotation of the bobbins as they await transfer, but to my knowledge it has not been previously proposed to construct the magazine in such a way that the bobbins will lie with the greater part of the cylindrical part of their yarn masses in contact when the yarn mass diameter is less than the butt diameter. Guideways formed of inclined walls do not accomplish this result because of the uneven vertical distances between adjacent bobbins, this being particularly noticeable in the upper part of those guideways which are wider at their tops than at their bottoms.

In bobbin magazines of the type illustrated herein a resiliently mounted bobbin support or giveway is provided to support a bobbin in transfer position. It is another object of my present invention of construct the adjustable wall with a lower part thereof curved toward the bobbin support and so constructed that the bobbins can move freely from the adjustable wall to the support as they roll downwardly by gravity toward transfer position. This result may be accomplished by having the wall and support formed with overlapping parts which extend in the direction of travel of the bobbin butt.

Bobbin magazines of multicolor looms have cus-

tomarily been made with outer plates the lower ends of which have been formed with a slot through which the weft end of the transferred bobbin passes. This weft end necessarily has some contact with the yielding supports on which the bobbin tips rest, and there is resultant abrasion or breakage. It is another object of my present invention to make the outer plate of the magazine solid across its lower end and lead the weft ends from the bobbin stacks outwardly around appropriate guides so that these weft ends are not required to engage the yielding bobbin support.

It is another object of my invention to construct the top of the outer end member of the magazine with a guide rail and flange for the bobbin tips to facilitate insertion of the bobbins in the magazine.

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 drawings, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a side elevation of a magazine as viewed from the right end of the loom and having my invention applied thereto,

Fig. 2 is a plan view of the structure shown in Fig. 1,

Fig. 3 is a front elevation of the magazine looking in the direction of arrow 3, Fig. 1, and indicating the manner of inserting a fresh bobbin in one of the bobbin stacks,

Fig. 4 is a diagrammatic view showing the relation of one of the adjustable walls with respect to the bobbin butts when the diameters of the latter are larger than the yarn diameters of the bobbin,

Fig. 5 is a vertical section on line 5—5 of Fig. 3 showing the adjustable walls and bobbin supports, the bobbin butts being indicated by circles,

Fig. 6 is an enlarged plan view looking in the direction of arrow 6, Fig. 5, showing a bobbin support and the associated adjustable wall relatively close to each other,

Fig. 7 is a view similar to Fig. 6 but showing the wall moved outwardly away from the bobbin support,

Fig. 8 is a vertical section on line 8—8 of Fig. 5,

Figs. 9 and 10 are diagrammatic views showing different positions of the adjustable wall for different sizes of bobbin butts,

Fig. 11 is a diagrammatic view looking in the direction of arrow 11, Fig. 6, and showing the overlapping portions of the adjustable wall and bobbin support,

Fig. 12 is a detail showing the adjustment of the lower end of one of the adjustable walls, and

Fig. 13 is a horizontal section on line 13—13, Fig. 12.

I have illustrated my invention as applied to a weft replenishing mechanism having a two-color rocking magazine of the type shown in my prior Patent No. 2,128,974. A magazine of this style is ordinarily mounted over the lay at one end of the loom in position to permit transfer of the lowermost bobbin in one or the other of the bobbin stacks by a transferrer arm not shown when the lay is on front center. Referring more particularly to Figs. 1, 2 and 3, inner and outer magazine end plates or members 10 and 11, respectively, are held together by tie rods 12. The inner end plate 10 has provision as at 13 for pivotal mounting on a fixed support not shown, and a stud 14 affords means for connection with rocking mechanism not shown but actuated to swing the magazine when necessary in the operation of the loom.

The inner end member 10 is provided with a substantially flat plate or web 15 cast integral with right and left hand bobbin guide walls 16 and 17, respectively, see Figs. 1 and 5. These walls extend vertically and are immovable with respect to the magazine. The lower ends of these walls may be enlarged as at 18 to provide suitable hubs for the tie rods 12, and the lower surfaces 19 of the hubs assist in guiding the bobbins. The matter thus far described is of common construction and may be made and operated in the usual manner.

The end plate member 10 is provided with front and back bobbin guideways 25 and 26, respectively, the outer sides of which with respect to the center of the magazine are defined by movable walls 27 and 28, respectively. These walls are similar and wall 27 only will be described in detail. The guideways are for the purpose of holding stacks of reserve bobbins, as indicated in Fig. 5.

It will be seen particularly in Fig. 1 that I have provided wall 27 with upper and lower feet or lugs 30 and 31, respectively, which are slotted as at 32 to receive bolts 33 extending through the slots and held as at 34 to the web 15, see Figs. 12 and 13. The slots 33 are preferably horizontal and permit the wall 27 to assume a number of different positions at different distances from the adjacent fixed wall 17. The bolts are also capable of holding the adjustable wall 27 parallel to the wall 17 and this is the arrangement which I prefer to employ, although a slight obliquity of the wall is not detrimental.

Located at the bottom of each of the guideways 25 and 26 is a yieldable bobbin support, the front and back bobbin supports being designated at 35 and 36, respectively. These supports are substantially alike, and I have particularly illustrated the front support 35 in Figs. 5 and 8. This support has a hub 37 pivoted on an extension of one of the rods 12 and has an upright arm 38 to which is attached a spring 39 extending forwardly to a pin 40 on web 15. The support extends downwardly as at 41 from its hub and is formed with a lateral run 42 over which bobbins pass on their way to the transfer position. A stop 43 limits movement of run 42 to the right, Fig. 5. Appropriate front and back stops 43 and 44 limit movement of the lower ends of supports 35 and 36, respectively, toward the center of the magazine, and spring 39 permits movement of the lower end of support 35 to the left at the time of bobbin transfer. Support 36 has a stop 44 and a spring 39' similar in function to spring 39. Thus, as viewed in Fig. 5, when bobbin B is moved downwardly into a shuttle not shown the support 35 will move to the left, and in similar manner bobbin B' when being inserted into its shuttle not shown will push the support 36 rearwardly or to the right. A lug 45 extending from the web 15 separates the bobbins B and B'.

In order that the bobbins may travel uninterruptedly along their guideways toward transfer position no matter what the position of the walls 27 and 28 may be, I provide overlapping parts on each support and adjacent adjustable wall. This feature of the invention will be described with particular reference to wall 27 and support 35. Projecting from run 42 toward wall 27 is an extension 48 spaced from web 15 to define a space for a second extension 49 on the lowest

part of the curved lower end 50 of wall 27, see Figs. 5, 6 and 7.

Referring particularly to Fig. 6 it is assumed that wall 27 is in one of its nearer positions with respect to wall 17 and there is therefore a considerable amount of overlapping of extensions 48 and 49. The pairs of dot and dash lines R', R2 and R3 designate the paths traversed by the rings R of the bobbin butts, and it will be noted from Figs. 5 and 6 that as a bobbin moves along the lower part of guideway 25 which extends laterally and downwardly toward transfer position it rolls along lower part 50 of wall 27 on to the support 35 and will have its rings in contact with both extensions 48 and 49 as it moves toward run 42. A bobbin will therefore move properly to the position occupied by bobbin B in Fig. 5 without engaging an abrupt edge of support 35. In Fig. 7 it is assumed that wall 27 has been moved to its extreme position away from wall 17 and there is correspondingly less overlap of the extensions 48 and 49, but there will be sufficient overlap, however, to avoid any abruptness in the movement of the bobbin butt. In any setting of wall 27 there will be room for the support 35 to move to the dotted line position of Figs. 6 and 7 when transfer occurs.

Fig. 11 further indicates the relation between support 35 and the extension 49 of wall 27. In this figure the parts in full lines are in the position they occupy in Fig. 6, while the dotted line position of extension 49 in Fig. 11 corresponds to Fig. 7. As shown in full lines in Fig. 11 the upper curved surface 55 of extension 48 on support 35 extends from a position above to a position below the top surface 56 of extension 49, and a bobbin will pass smoothly from wall 27 to run 42. When extension 49 is moved to the position shown in dotted lines in Fig. 11, surfaces 56 and 55 will still provide a smooth guideway for the bobbin.

Thus it will be seen that the adjustable wall 27 and the corresponding support 35 are so related by reason of their overlapping parts as to afford a smooth path of the movement of the bobbins toward transfer position. It is to be understood that a similar relationship exists with respect to the rear wall 28 and the bobbin support 36, but it is not thought necessary to explain the details of these latter parts since they are similar to those shown and described in connection with Figs. 6, 7 and 11.

The reason for making the outer walls 27 and 28 adjustable with respect to their corresponding fixed walls is to permit the use of bobbins of different sizes with respect both to their butt and yarn diameters. One condition requiring adjustment of movable wall 27 is shown in Fig. 4 with respect to conditions found in the front guideway 25, and assumes that the yarn diameter is less than the bobbin butt diameter. The bobbin is shown more particularly in Figs. 2 and 3 and has a butt 60 on which are located the previously described rings R. Extending from the butt is a barrel 61 wound with yarn Y and terminating in a tip 62 received by a tip guideway 63 in the outer magazine end plate 11.

In Fig. 4 the circles DR and DB represent the diameter of the bobbin rings and butts, respectively, designated "Ring" and "Butt," and the circles DY represent the smaller diameter of the yarn Y on the bobbins, designated "Filling." The circles 62 represent the tips or small ends of the bobbins in guideway 63, designated "Small end." It is desirable to have as much contact between the yarn of adjacent bobbins as possible in order to keep them from rolling and vibrating to preserve desirable conditions in the magazine. The column of circles DY at the left of Fig. 4 indicates that the right ends of the cylindrical part C of the yarn Y as seen in Fig. 3 are in contact. In order to insure this contact along the length of the cylindrical part C of the yarn the butts should be staggered so that the vertical distance between the axes of adjacent bobbin butts will be substantially the same as the diameter of circles DY. This condition is shown in Fig. 4 in which the horizontal lines 65 represent the axes of the bobbins and it will be noted from this figure that the axes are horizontal due to the fact that wall 27 has been placed the proper distance from wall 17 to effect the requisite degree of staggering of the bobbin butts.

As already stated bobbin butts are of different sizes, two sizes being shown in Figs. 9 and 10. In these figures it is assumed that the yarn diameter of the bobbin is greater than the butt diameter. In Fig. 9 the circles BL shown in full lines represent bobbin butts of the larger size, and the dotted circles YL represent the yarn diameters. In Fig. 10 the full line circles BS represent the smaller butts and the dotted line circles YS represent the smaller yarn diameters. In both instances the wall 27 will be adjusted relatively to the wall 17 to permit proper downward movement of the bobbins by gravity without allowing undue lateral vibration of the bobbin butts. Thus in Fig. 10 wall 27 is nearer wall 17 than is the case in Fig. 9. The relation between walls 17 and 27 and the bobbin butts shown in Figs. 9 and 10 would also be used if the yarn diameter was equal to the butt diameter.

It is to be understood that the diagrammatic arrangement shown in Fig. 4 illustrates how the invention is used with respect to a bobbin of any of the standard butt diameters, and it is also to be understood that other deviations between the yarn and butt diameters than that indicated in Fig. 4 can be used when a proper adjustment of wall 27 is made.

Another feature of my invention relates to the outer end plate 11 of the magazine, shown more particularly in Figs. 1, 2 and 3. Heretofore it has been customary to make the outer end of the magazine of separate parts with a thread slot between them and requiring several of the tie rods 12. As shown in Fig. 1, however, I have made plate 11 in a single piece having vertical side walls 70, a solid top wall 72 and a solid bottom wall 73. Because of this construction I find that two of the tie rods 12 are sufficient. The plate 11 when made as shown in Fig. 1 affords a large space S through which the operator may place his hands for manipulating the bobbins in the guideways, particularly those at the bottom of the magazine.

With the outer plate made in one piece with a solid bottom, however, it is necessary to make some provision for permitting the threads of the bobbins in the stacks or guideways 25 and 26 to pass under the magazine at the time of transfer of their corresponding bobbins. This result I accomplish by the use of front and back guide wires 75 and 76 which direct the weft ends W from the conical parts of their corresponding bobbins outwardly away from the center of their magazine and then permit them to be led to a thread holder not shown.

According to previous constructions the lower part of the plate has had a slot therethrough to

permit the weft ends to move downwardly when their corresponding bobbins are transferred. By using the guide wires **75** and **76**, however, necessity for this slot is obviated and the lower part of the magazine can be made solid. Front and back bobbin tip supports or giveways **78** and **79**, respectively, are provided for the bobbin tips and springs **80** and **81** to hold the supports normally in position to locate the bobbin tips in proper position as they await transfer. The supports **78** and **79** are pivoted to bottom wall **73** at **82**.

Another feature of the plate **11** is illustrated more particularly in Fig. 1 where it is seen that the top **72** is provided with a horizontal rail **85** and an upstanding guard flange **86**. The rail is located below the top of guard **86** and serves as a guide for the tips of bobbins when they are placed in the magazine. This relationship is shown more particularly in Fig. 3 where the bobbin in position I has its tip in engagement with the rail **85** along which it is moved until the bobbin assumes the position shown in Fig. 2 with its tip in one of the guide slots **63**, after which the bobbin is released and falls to the bottom of the magazine to occupy the position shown in full lines in Fig. 3. The guard **86** prevents the bobbin tip from moving beyond the plate **86** and thus prevents damage to the yarn when the bobbin is being placed in the magazine.

From the foregoing it will be seen that I have provided simple means by which bobbin guideways in the magazine can be made adjustable to accommodate various conditions of bobbin butt and yarn diameters. It will further be seen that when the yarn diameter is less than the butt diameter the adjustable wall can be moved to afford a degree of staggering of the butts which will permit the yarn part of the bobbins to have substantial contact with each other. This relationship is achieved when the staggering causes the vertical distance between adjacent butts to be substantially the same as the yarn diameter. It will also be seen, as indicated in Figs. 9 and 10, that the movable wall can be adjusted to accommodate bobbin butts of different diameters. By the use of the movable walls **27** and **28** I have greatly simplified the manufacture of weft replenishing mechanisms and provide one set of parts which can be adjusted to accommodate a variety of bobbin conditions. Again, the overlapping parts of the adjustable walls and the corresponding bobbin butt supports permits location of the adjustable walls in several positions while preserving a smooth guide for the bobbins. Furthermore, the outside end plate **11** has the lower part thereof solid and the yarns from the two stacks of bobbins are led around their respective guide wires **75** and **76** to a thread holder. It is also noted that rail **85** and guard flange **86** facilitate filling the magazine with fresh bobbins and protect the yarn as the bobbin tips are moved toward guide slots **63**.

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 mechanism operating with a stack of bobbins the yarn diameter of which is less than the bobbin butt diameter, the mechanism having a guide for the bobbin tips, a guideway for the bobbin butts down which the bobbins fall by gravity and comprising a wall in fixed position on said mechanism and a second wall, and means securing said second wall to said mechanism substantially parallel to the first wall and at such distance from the latter as to cause the bobbin butts to be staggered in said guideway with the axial distance between adjacent butts measured parallel to said walls substantially equal to the yarn diameter of said bobbins.

2. In a weft replenishing mechanism operating with a stack of bobbins the yarn diameter of which is less than the bobbin butt diameter, the mechanism having a guide for the bobbin tips, a plate forming part of said mechanism and adjacent to the bobbin butts, a wall integral with said plate and foming one side of a guideway for the bobbin butts, a second wall forming the other side of said guideway, and means securing said second wall to said plate substantially parallel to the first named wall and at a distance from the latter such as to cause the bobbin butts to be staggered in said guideway with the axial distance between adjacent bobbins measured in a direction parallel to said walls substantially equal to the bobbin yarn diameter.

3. In a weft replenishing mechanism operating with a stack of bobbins the yarn diameter of which is less than the bobbin butt diameter, the mechanism having a guide for the bobbin tips, a plate forming part of said mechanism and adjacent to the bobbin butts, a wall integral with said plate and forming one side of a guideway for the bobbin butts and extending from one side of said plate, a second wall extending laterally from said one side of said plate and forming the other side of said guideway, lugs on said second wall extending along said plate, and securing means passing through said lugs and into said plate and holding said second wall on said plate substantially parallel to the first named wall and at a distance from the latter such as to cause the bobbin butts to be staggered in said guideway with the axial distance between adjacent bobbins measured in a direction parallel to said walls substantially equal to the bobbin yarn diameter.

4. In a weft replenishing mechanism capable of operating with stacks of bobbins having different bobbin butt diameters, a plate forming part of said mechanism, a wall integral with and extending laterally from one side of said plate and forming one side of a bobbin butt guideway, a second wall forming the other side of said guideway and having feet extending along said plate, and means passing through said feet and into said plate to hold said second wall on said mechanism parallel to the first wall and at different distances therefrom to accommodate bobbin butts of different diameters.

5. A bobbin butt guideway for a weft replenishing mechanism having a plate, a wall integral with said plate and extending laterally from one side thereof and forming one side of the guideway, a second wall forming the other side of the guideway and extending laterally from said one side of said plate, feet on said second wall extending along said plate, and means extending through said feet and into said plate and capable of holding the second wall parallel to the first wall and at different distances therefrom.

6. A bobbin butt guideway for a weft replenishing mechanism, the upper part of the guideway extending downwardly from the top of the mechanism and the lower part of the guideway extending downwardly and laterally from the upper part toward a bobbin transfer position, a wall in fixed position on said mechanism and forming one side of said guideway, a second wall forming the

other side of the upper part of the guideway and a portion of the other side of the lower part of said guideway, means capable of holding the second wall on said mechanism with the upper part of said second wall parallel to the upper part of the first wall and at different distances therefrom, and a bobbin butt support resiliently mounted on said mechanism and extending from said bobbin transfer position toward the lower end of said second wall and so constructed as to cooperate with the lower end of said second wall and provide a smooth guide for the bobbins for all positions of said second wall relatively to the first wall.

7. In a weft replenishing mechanism operating with a stack of bobbins the yarn diameter of which is less than the bobbin butt diameter, the mechanism having a guide for the bobbin tips, a guideway for the bobbin butts down which the bobbins fall by gravity and including a wall in fixed position on said mechanism, and a second wall in fixed position on said mechanism and substantially parallel to the first wall and at such a distance from the latter as to cause the bobbin butts to be staggered in said guideway with the axial distance between adjacent butts measured parallel to said walls substantially equal to the yarn diameter of said bobbins.

8. In a weft replenishing mechanism operating with a stack of bobbins movable toward transfer position along a guideway, a wall secured to the mechanism and forming one side of said guideways, a second wall forming the other side of said guideway and comprising two parts one of which can be held at a plurality of distances from said first mentioned wall to vary the width of the guideway and the other part of which is held to said mechanism and remains at a substantially fixed distance from the first named wall, and one of said parts having the end thereof constructed to overlap the adjacent end of the other part to provide a smooth guideway from the bobbins for all positions of the first named part of the second wall.

9. In a weft replenishing mechanism operating with a stack of bobbins which move downwardly toward transfer along the guideway, a wall fixed to said mechanism and defining one side of said guideway, a second wall forming the other side of said guideway spaced from the first wall and comprising upper and lower parts, means to hold the upper part at a plurality of different distances from the first wall to vary the width of the upper part of the guideway, the lower part of said second wall remaining at a substantially fixed distance from the first wall for all settings of said upper part of the second wall, and the adjacent ends of said upper and lower parts of said second wall overlapping for all positions of said upper part to provide a smooth guideway for the bobbins.

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