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W. H. BANKS
BOBBIN MAGAZINE

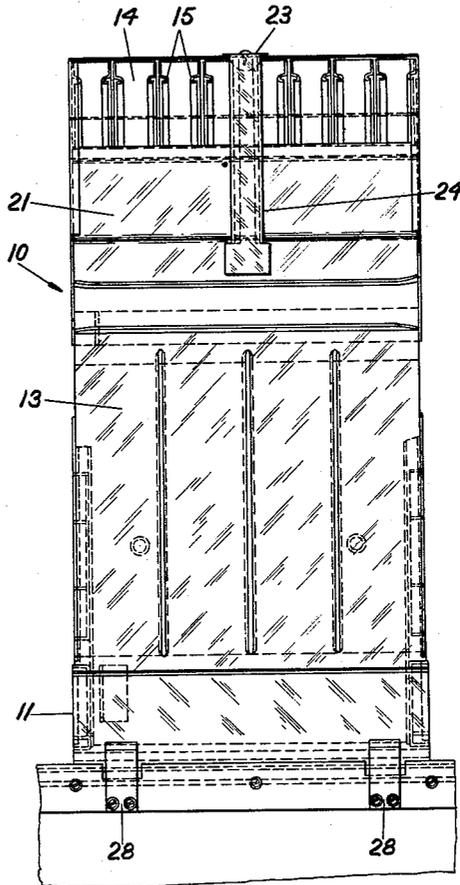
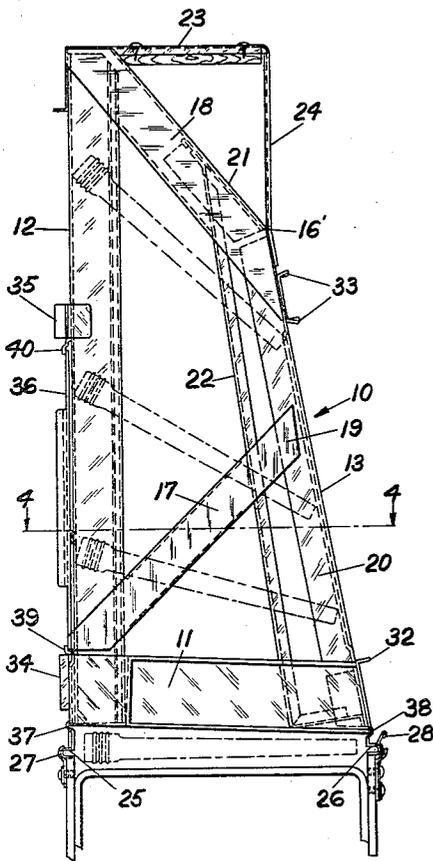
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2 Sheets-Sheet 1

FIG. 1

FIG. 2



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BOBBIN MAGAZINE

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This invention pertains to a bobbin magazine and, more particularly, to that type of magazine utilized to feed empty filling bobbins to a combined donning and doffing apparatus such as that shown and described in application Serial No. 152,407, now United States Patent No. 3,077,725.

It is a general object of the invention to provide a bobbin magazine capable of retaining a large number of oriented filling bobbins that will automatically provide and position said bobbins on the conveying chain of the aforementioned apparatus' donning mechanism.

It is a further object of the invention to provide a bobbin magazine of sturdy and light weight construction which lends itself to easy handling and which is easily assembled on the donning and doffing mechanism.

It is a further and more specific object of the invention to provide a bobbin magazine that will accurately receive a plurality of empty filling bobbins therein and discharge the same as required without mispositioning them or creating a jamming condition which would prevent said magazine from receiving its full complement of bobbins or permitting them to be discharged therefrom at the required time.

Further objects and advantages will become apparent from the following more detailed disclosure.

Prior to the instant invention, the method employed for furnishing a supply of empty bobbins to the prior donning and doffing mechanisms required excessive handling and utilized a receptacle which was positioned above and formed a part of the complete donning and doffing unit. This receptacle is inclined toward the donning mechanism and has a bottom provided with grooves corresponding to the shape of the empty bobbins. The empty bobbins have to be placed and oriented by hand into this receptacle which utilizes a rotating drum member that partially protrudes through a cutout provided in the bottom of said receptacle. This rotating drum assists in the moving of the bobbins in the direction of a guiding chute where they are then caused to slide toward, and be fed to the donning mechanism.

According to the instant invention a novel bobbin magazine can now be provided which will dispense with the excessive handling and time-consuming method of loading empty filling bobbins used in the combined donning and doffing apparatus. This magazine is formed in such a manner that, in addition to being quickly and easily placed in operating position on the donning and doffing unit, it is adapted to be indexed along a loading frame, where, by a means which forms no part of the instant invention, an automatic bobbin loader orients and feeds a predetermined number of empty filling bobbins into said magazine. One or more such magazines are then positioned on the aforementioned unit directly above the conveyor belt which carries the bobbins to the donning mechanism.

The conveyor belt is comprised of a plurality of interconnected link members with provisions in each link member for receiving and carrying an empty bobbin. The bobbins within the magazine are oriented and positioned in such a manner that they readily drop into the link members as the conveyor belt passes beneath said magazine and where a bobbin is present in the link member it restricts discharge of another bobbin from said magazine. Discharge of bobbins from the magazine in this manner will exhaust the supply of bobbins from the first

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magazine of a particular group of two or more before taking bobbins from the second magazine and so on.

The invention will be described in detail by reference to the specific embodiments thereof which are illustrated in the accompanying figures of drawing, wherein:

FIG. 1 is a view of the bobbin magazine showing the means of attachment to a donning and doffing unit and the positions assumed by the bobbins within the magazine.

FIG. 2 is a view in front elevation of the device shown in FIG. 1.

FIG. 3 is a view similar to that of FIG. 1 but showing the magazine on the bobbin loading frame and the required angle at which it must set for automatic reception of empty filling bobbins therein.

FIG. 4 is a cross-sectional view of the magazine looking in the direction of the indicating arrows of line 4—4 in FIG. 1.

Referring to FIGS. 1, 2 and 3, the bobbin magazine of the instant invention is indicated generally by numeral 10, and includes a base portion 11 with a first side wall 12 extending in a substantially perpendicular direction therefrom. In opposed relationship to the first side wall, a second side wall 13 of lesser length extends from the base portion and is inclined toward said first side wall. Side wall 12 is comprised of a plurality of juxtaposed U-shaped members 14 which extend the entire length of the magazine and the free ends thereof, being directed inwardly, have their tips reversely folded as at 15, FIGS. 2 and 4, forming retaining channels which are adapted to receive therein the butt portion of a filling bobbin 16. Side wall 13 being inclined toward and of lesser length than wall 12 terminates at a point below and in spaced relationship to the latter wall as at 16'.

In addition to the base portion 11, side walls 12 and 13 are interconnected by means of strip members 17 and 18 fixedly positioned on opposed sides thereof thus forming a box-like structure with two sides being of open construction. One end of strip member 17 is attached to the side of the outer U-shaped member 14 adjacent to the base portion 11 and the opposite end is attached to that portion of wall 13 as at 19 which is directed inwardly to form a supporting rib 20. One end of strip member 18 is attached to the side of the outer U-shaped member 14 at the upper extremity of said member, and being angularly directed in a downwardly direction its opposite end meets the upper portion of wall 13 where it is attached to the upper part of rib 20. The various components of the magazine thus far described and those to be described hereinafter are joined in any suitable manner such, for example, as spot welding. The top of the magazine is partially enclosed and includes a plate-like member 21 extending between and for a distance equivalent to approximately one-half the length of strip members 18 which interconnect the upper portion of side walls 12 and 13.

Inwardly of wall 13 the magazine is provided with a plurality of U-shaped strip members 22 that extend from the base portion 11 to the plate-like member 21 which encloses the lower portion of the top of the magazine. These strip members 22 have one end thereof formed at substantially a right angle to their overall length and they are attached at this point to that portion of base 11 from which wall 13 extends, thus positioning said strips in spaced relationship to said wall 13. The opposite ends of members 22 are bent to conform to the angular position of the top plate-like member 21 and are attached thereto in the aforementioned manner. The plurality of these U-shaped strip members 22 are attached in spaced relationship and the spaces formed therebetween are in alignment with the U-shaped members 14 and form guiding channels for the tip portions of filling bobbins 16.

A centrally disposed handle 23 extends inwardly from and at approximately a right angle to the uppermost por-

tion of the U-shaped members 14 which form the first side wall 12. It extends a distance equal to approximately the width of the upper part of the magazine and an integrally formed extension 24 of the handle being directed downwardly therefrom serves as a means for centrally locating and attaching said handle to the upper part of side wall 13.

That portion of base 11 from which side walls 12 and 13 extend are provided with integrally formed clip members 25 and 26, respectively, which extend below said base portion and serve as a means for quickly positioning the magazine and to prevent lateral movement thereof on the donning and doffing unit. This unit is provided with similar clip members 27 and 28 of conforming shape that are caused to bear against clip members 25 and 26 to firmly locate the magazine in operating position.

FIG. 3 shows the magazine 10 on a bobbin loading frame generally indicated by numeral 29 and the required angular setting of said magazine for proper reception of filling bobbins 16 therein. The distance between side walls 12 and 13 will vary with the various sizes of bobbins that exist.

The automatic loading means (not shown) utilized for orienting and feeding bobbins into the magazine permits the butt portion of the bobbin to enter the magazine ahead of the tip portion. The angular position which the magazine is caused to assume when placed on the bobbin loading frame 29, which in itself is angularly adjustable as shown in FIG. 3, has been predetermined and must be maintained to assure proper loading and orienting of the filling bobbins within said magazine.

It has been determined that for best bobbin loading results side wall 12 of the magazine should be positioned at an angle of approximately 30° to the horizontal and although this angle can be varied slightly, 30° has been found to be the most desirable.

The different sizes of loom bobbins which can be used will, of course, require different size magazines; however, the angular relationship of 11° between side walls 12 and 13 should be maintained irregardless of the bobbin length to assure satisfactory loading of the bobbins into said magazine and discharge therefrom when placed on the donning and doffing unit. The angular relationship of 11° between side walls 12 and 13 can be varied 2° to 3° maximum in one direction or the other, but the angular relationship of 11° has been found to be the most desirable. A departure from these limits will result in jamming of bobbins between the side walls during release from the magazine. The opening in the bottom of the container is slightly greater than the length of the bobbin and some clearance is provided there between the bobbin tip and inclined wall which facilitates the loading of bobbins and assures proper release of said bobbins therefrom when in operating position. The bobbin loading position shown in FIG. 3 is such that the butt portion of the bobbin is received into the magazine ahead of the tip portion. The tip portion then has a natural tendency to swing inwardly, but its travel is restricted by the angular relationship of wall 13 to wall 12. The angle at which the magazine is setting then causes the bobbin through the force of gravity to slide to its proper position within the guiding channels of said magazine.

As shown in FIG. 1, the base portion of the magazine which interconnects side walls 12 and 13 is disposed in such a manner that when placed in operating position on the donning and doffing unit, presents an angular opening above the unit's bobbin conveyor chain. This opening is higher on that side of the magazine which guides the butt portion of the bobbin and lower on that side which guides the tip portion. The inclination of the opening permits a new bobbin to assume its proper position on the conveyor chain and prevents the remaining bobbins within the magazine from dropping low enough to cause an interference with the continually moving chain having a full complement of bobbins thereon.

The handle 23 permits ease of handling by being centrally disposed and causes the magazine to hang in a substantially vertical position when being moved from one location to another.

The angular positions assumed by the filling bobbins within the magazine allow contact between the tip portions as well as the butt portions of the plurality of said bobbins that are placed within the various divided sections that form the internal structure of said magazine.

The bobbin loading frame 29 is provided with a number of rollers 30 and 31 situated at spaced intervals along the length of the frame which are caused to contact and guide the magazine as it is indexed to receive a predetermined number of bobbins in each of the divided sections. The loading frame in addition to being inclined laterally to position the magazine at an angle of 30° for loading purposes, is also inclined longitudinally so that when indexed, the weight of the magazine is sufficient to cause it to move on rollers 30 and 31 to a next loading position.

Side wall 13 is provided with laterally disposed track members 32 and 33 in which rollers 30 and 31, respectively, are caused to ride during the bobbin loading period. The indexing mechanism (not shown) is caused to act upon indexing lugs 34 and 35 which extend outwardly from the first side wall 12.

After a given magazine has received its full complement of filling bobbins and before removing it from the loading frame 29, a plate member 36 is adapted to assemble in formed depressions 37 and 38 provided in clip members 25 and 26, respectively. Assembly of the plate member 36 in this manner provides a temporary bottom for the magazine for retaining the bobbins therein while moving said magazine from the loading frame to the donning and doffing unit. When the magazine is placed in operating position, the plate member 36 is slidably removable to permit the discharge of bobbins from said magazine. Each magazine is provided with a plate member 36, and to facilitate the accessibility of these members they are positioned and held by retaining clips 39 and 40 horizontally attached to the side wall 12.

In operation, a magazine with a full complement of empty filling bobbins is placed in operating position on the donning and doffing unit directly above the means for conveying said bobbins to the donning mechanism. The plate member 36 is removed and the lowermost bobbins within the magazine will drop into the link members of the conveying chain. The manner of angularly positioning the bobbins in the magazine as shown in FIGS. 1 and 3 permits each bobbin to assume a next lower position within said magazine smoothly and without binding when the lowermost bobbin is discharged therefrom.

When a bobbin is present in the link member of the donning conveying chain, it restricts discharge of another bobbin until said conveying chain has moved a sufficient distance to position the next empty link member below and in alignment with a section of bobbins within the magazine.

The plurality of divided bobbin sections which form the internal structure of a magazine are of non-uniform spacing which presents a condition enabling the conveying chain to travel beneath the magazines smoothly and without the intermittent forces that would prevail if said sections were spaced uniformly.

The supply of bobbins within the magazine are gravity fed to the conveying chain and the lowermost bobbins within said magazine are in contact with the bobbins being carried by the chain member; therefore, if the aforementioned sections were evenly spaced, the entire bobbin supply would be raised and lowered simultaneously by the moving chain as the lower bobbins were caused to ride up on the bobbins being carried by said chain and thence lowered to the space between adjacent bobbins thereon.

Non-uniform spacing of the divided bobbin sections permits irregular positioning and contact of the lower

bobbins with those being carried by the conveyor means to the donning mechanism.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. A bobbin magazine having a base portion, a first outer side extending in a substantially perpendicular direction from said base, a second outer side member extending from said base in opposed relationship to and inclined from about 8° to 14° toward said first side, means for interconnecting said first and second members, and a top portion extending from said second side and inclined toward said first side, a plurality of aligned, opposed bobbin guiding and retaining channels being provided inwardly of said side members and extending the entire length thereof, a centrally disposed handle extending from said first side and in overlying relationship with said top portion, and a plate member removably inserted into said base for retaining a plurality of filling bobbins within said magazine.

2. The structure of claim 1 wherein said means for interconnecting said first and second side members includes spaced strip members extending therebetween.

3. The structure of claim 1 wherein said first side member includes outwardly directed indexing lugs for positioning said magazine during the loading of said filling bobbins therein.

4. The structure of claim 1 wherein said second side member includes outwardly directed track members for guiding said magazine along a platform utilized when loading said filling bobbins therein.

5. The structure of claim 1 wherein one of said side members includes a means for retaining said plate member when said magazine is placed in operating position.

6. The structure of claim 1 wherein said bobbin guiding and retaining channels are non-uniformly spaced.

7. A bobbin magazine which comprises a base portion, a first outer side member extending in a substantially perpendicular direction from the said base, a second outer side member extending from the said base in opposed relationship to and inclined about eleven degrees toward said first side, spaced interconnecting strip members extending between said first and second side members for maintaining the inclined relationship thereof, a top portion extending from said second side and inclined toward said first side, a plurality of aligned, inwardly directed, opposed bobbin guiding and retaining channels extending longitudinally of said first and second side members, a centrally disposed handle extending from said first side and in overlying relationship with said top portion, a plate member removably inserted into said base portion for retaining a plurality of bobbins within said magazine, means on one of said side members for retaining said plate member when removed from said base portion, track members outwardly directed from said second side member, and indexing lugs outwardly extending from said first side member, said track members and said indexing lugs cooperating in guiding and positioning said magazine during the loading of bobbins therein.

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