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BOBBIN DEPOSITING MECHANISM

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Fig. 1

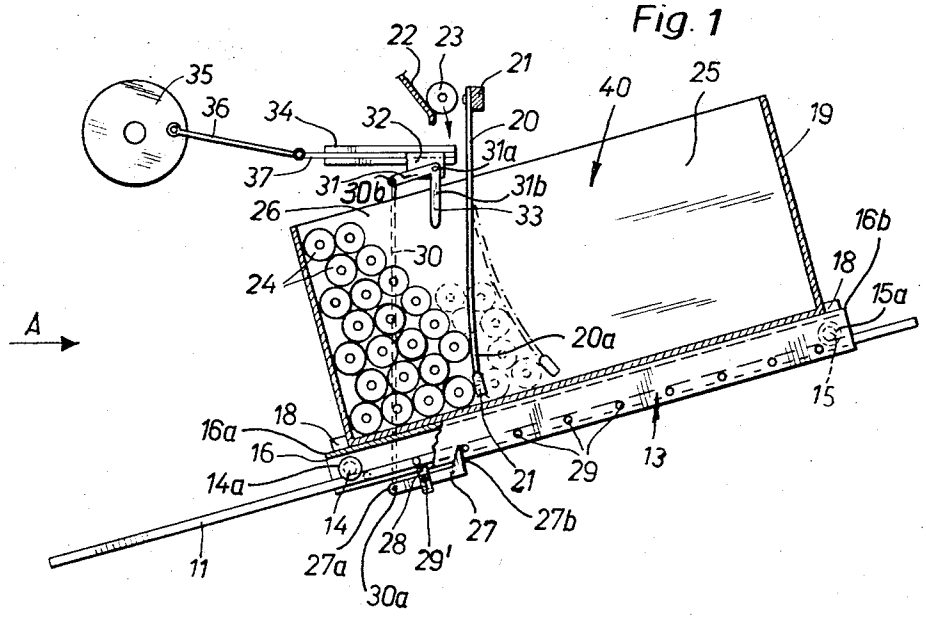
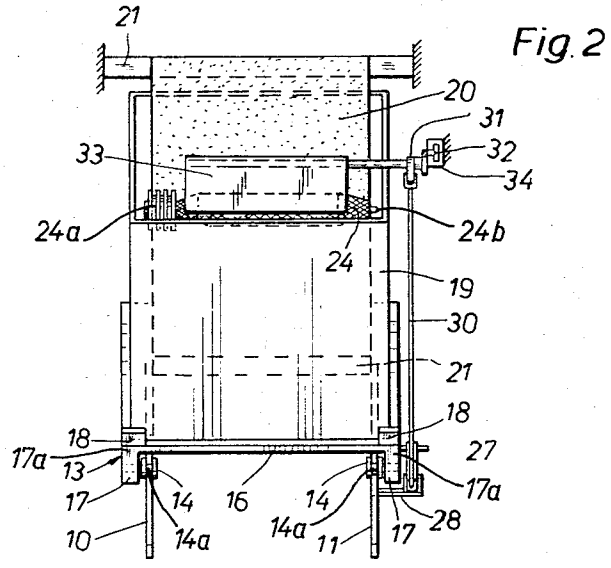



Fig. 2




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# BOBBIN DEPOSITING MECHANISM

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## ABSTRACT OF THE DISCLOSURE

A bobbin depositing mechanism for loading bobbins from a winding machine into a magazine comprised of a carriage for movably supporting the magazine and means for step-wise moving the magazine as it is filled with bobbins. A flexible wall is attached to a stationary support and depends downwardly into the magazine extending transversely of the direction of travel of the magazine. The flexible wall divides the magazine into a bobbin receiving compartment and another compartment and directs the bobbins in proper orientation into the bobin receiving compartment. The lower end of the flexible wall is unsupported and is free to move in the direction of the axis of travel of the magazine. A sensing device is positioned in the upper region of the bobbin receiving compartment for actuating an indexing means when the compartment is filled, which releases the carriage for a step-wise movement of the bobbin magazine. The carriage is disposed on an inclined support arrangement whereby it moves downwardly on the support under the effect of gravity.

The present invention has reference to an improved bobbin depositing mechanism for a winding machine in which the bobbins are ejected in substantially horizontal position from a winding station or location and allowed to fall into a bobbin magazine capable of receiving a plurality of layers or rows of bobbins.

It is a primary object of the present invention to provide a bobbin depositing mechanism incorporating simple means for ensuring that the bobbins during falling into the bobbin magazine are not able to position themselves transversely therein and without having to provide special guide rails in the bobbin magazine by means of which the bobbins are deposited in vertical rows in such bobbin magazine.

Another important object of the present invention has reference to an improved bobbin depositing mechanism which is relatively simple in construction, economical to manufacture, highly reliable in operation, ensuring for proper deposition of the bobbins in a bobbin magazine.

A further specific object of this invention concerns itself with an improved bobbin depositing mechanism for deposition of bobbins in orderly fashion in a bobbin magazine wherein the bobbin-receiving compartment of the magazine is sub-divided into two sections, one of which is being continuously filled, and as said one section becomes more and more filled with bobbins the bobbin magazine is automatically incrementally advanced such as to increase the volume of said one filled section at the expense of the other non-filled section.

Generally speaking, in order to implement these and still further objects of the invention the inventive bobbin depositing mechanism is characterized by the features that an elastic flexible wall is provided for orienting the bobbins, such wall extending into the bobbin magazine receiving the bobbins and dividing the bobbin-receiving compartment of such bobbin magazine into two sections or chambers. Means are provided in order that the section to be filled with bobbins in step-wise or incrementally increased. Such means incorporates a feeler member which extends into this section of the bobbin magazine which is to be filled and serves to actuate a stepping or indexing mechanism when the aforesaid section is substantially filled with bobbins, in order to increase the size of the filled section through one stepping or indexing increment at the expense of the empty section, and this procedure is repeated until the entire bobbin magazine is filled.



According to the teachings of the invention the bobbin magazine can be located upon a carriage capable of travelling upon an inclined guide track or rails and provided with a number of locking pegs or pins cooperating with a locking pawl actuated by the feeler member. Thus, when the locking pawl is actuated to release engagement with a given locking pin the carriage with the bobbin magazine located thereon moves through the spacing of one locking pin from the next neighboring one under the action of gravity, so that the filled section of the bobbin magazine is increased in size by one indexing or stepping increment at the expense of the non-filled section.

The elastic flexible wall providing a partition means for the subdivision of the bobbin-receiving compartment of the bobbin magazine into two sections or chambers can be suspended from a stationary support and hangs in curtain-like fashion into the bobbin magazine. In order to provide a certain tensioning of this flexible wall a weight is advantageously provided at its lower marginal edge.

Concerning the feeler member extending into the bobbin-receiving compartment of the bobbin magazine such can be guided for displacement in a guide groove and is operatively connected with an eccentric disk through the agency of a crank rod or the like in order to displace the feeler member in such guide groove. Moreover, this feeler member can be operatively connected with the locking pawl via an actuating rod in such a manner that the locking pawl is actuated by the feeler member in order to effect displacement of the bobbin magazine in the event that the feeler member is prevented from performing the movement imparted to it by the eccentric disk.

More specifically, the feeler member can exhibit a flap or plate extending into the bobbin magazine. This flap is connected to one arm of a double-arm lever pivotally mounted at its central region, the other arm of which is connected via the actuating rod with the locking pawl. The double-arm lever is pivotably hinged with a slide element or block displaceable in the aforementioned guide groove. This slide block is pushed to-and-fro by the eccenric drive i.e. eccentric disk within the guide groove, thus displaces the flap within the bobbin magazine, so that when the flap contacts a bobbin the locking pawl is properly rocked and the described step-wise displacement of the bobbin magazine is effected.

Other features, objects and advantages of the invention will become apparent by reference to the following detailed description and drawing in which:

FIGURE 1 is a side view, partly in cross-section, of a preferred embodiment of inventive bobbin depositing mechanism; and

FIGURE 2 is an end view of the bobbin depositing mechanism viewed in the direction of arrow A of FIGURE 1.

Describing now the drawing, it will be appreciated that two guide rails or tracks **10** and **11** are stationarily arranged beneath a non-illustrated winding location or station of a winder or winding machine. These guide rails **10** and **11** are downwardly inclined in the normal direction of transit of a bobbin magazine **19** movably supported thereon and which is to be filled with bobbins **24**. A car-

riage 13 provided with two forward wheels 14 visible in FIGURE 2 and two rear wheels 15, only one of which is visible in FIGURE 1, is located upon these inclined guide rails 10 and 11. Wheels 14, 15 are advantageously provided with grooves 14*a*, 15*a* respectively, which prevent carriage 13 from sliding laterally off the guide rails 10 and 11. Carriage 13 is composed of a platform 16 having a downwardly depending flange 17 at each lengthwise edge 17*a*. The wheels 14, 15 are rotatably mounted to these flanges 17. At each end 16*a* and 16*b* of the carriage 13 there is provided stop means 18 which prevent the bobbin magazine 19 placed directly upon the carriage 13 from inadvertantly sliding-off.

Bobbin magazine 19 possesses a hollow interior defining a bobbin-receiving compartment 40 which is to be substantially completely filled with the bobbins 24 or the like. The bobbin magazine 19 is shown open at its top end and an elastic yieldable partition wall 20 extends in curtain-like fashion into the bobbin-receiving compartment 40 to divide such into two sections or chambers designated 25 and 26. In the present situation the section 25 is empty and the section 26 is in the process of being filled with the bobbins 24. Partition wall 20 is shown connected to a stationary support or carrier 21 provided at the non-illustrated winding machine or at any other suitable location. At the lower end 20*a* of the partition wall 20 there is attached a weight 21 e.g. a beam which serves to keep taut the plastic partition wall 20. Partition wall 20 has the function of guiding the properly aligned bobbins into the bobbin magazine 19, specifically the chamber or section 26.

The bobbins which are not yet deposited in the bobbin magazine 19 are designated by reference character 23. They come from a winding station of the winding machine and arrive upon an inclined bobbin guide 22, whereafter they impact the partition wall 20 and freely fall into the section 26 of the bobbin magazine 19. In FIGURE 1 there is shown a bobbin 23 which is just in the process of falling from the bobbin guide 22 into the bobbin magazine 19. All of the bobbins 24 within the bobbin magazine 19 are deposited therein such that all the bobbin heads 24*a* are located at the same side of the aforesaid magazine, for instance at the left of FIGURE 2, whereas their tips 24*b* are located at the right. The considered partition wall 20 prevents each bobbin 24 during deposition into the bobbin magazine 19 from assuming an improper position, specifically prevents each such bobbin from orienting itself skew or transversely. As soon as the bobbin section or chamber 26 of the bobbin magazine 19 located to the left of the partition wall 20 of FIGURE 1 is substantially filled with bobbins 24, then, as will be described in detail shortly, the bobbin magazine 19 is displaced a certain distance in step-wise manner to the left of FIGURE 1. It should be obvious that such displacement of this bobbin magazine 19 increases the size of the bobbin chamber 26 at the expense of the non-filled chamber 25, so that bobbin chamber 26 is capable of receiving further bobbins, and this process of step-wise advance of the magazine 19 repeats until the entire bobbin-receiving compartment 40 is filled with bobbins 24.

Now in order to carry out the above-described operation, means are provided for the step-wise displacement of the bobbin magazine 19, and, as will be described in detail hereinafter such means cooperates with a feeler arrangement which initiates displacement of the bobbin magazine 19 as soon as its bobbin chamber 26 to the left of the partition wall 20 is substantially filled with bobbins 24.

In the exemplary embodiment illustrated the means for the step-wise displacement of the bobbin magazine 19 comprises a locking mechanism incorporating a locking pawl 27 cooperating with a number of locking pegs or pins 29 connected to the carriage 13. Locking pawl 27 is mounted to pivot about a shaft 29' of a pawl carrier 28 connected to the guide rail 11. Actuation of the locking pawl 27 is possible by an actuating rod 30 articulated at 30*a* to one end 27*a* of the locking pawl 27. Actuating rod 30 enables the locking pawl 27 to be pivoted in clockwise direction in order that its locking nose 27*b* comes out of engagement with one of the locking pins or pegs 29, whereas during the subsequent rocking of the locking pawl 27 in counter-clockwise direction its locking nose 27*b* comes into engagement with the following locking peg 29. When this happens the bobbin magazine 19 located upon the carriage 13 is moved downwardly to the left through one indexing step defined by the spacing between each two neighboring locking pegs 29. It will be appreciated that actual displacement of the carriage 13 with its bobbin magazine 19 located thereon is brought about thru the action of gravity which strives to displace such carriage 13 and the supported bobbin magazine 19 upon the inclined guide rails 10, 11 downwardly to the left of FIGURE 1.

In order to actuate the actuation rod 30 such is articulated at its upper and 30*b* to bobbin feeler means comprising an angle or double-arm lever 31 pivotally mounted at its center, at 31*a*, to a slide block or element 32. To one arm 31*b* of the double-arm lever 31 there is connected the actual feeler element which, in this instance, consists of a plate or flap 33 extending into the bobbin chamber 26 of the bobbin magazine 19 which is to be checked. The slide element 32 to which the angle lever 31 is pivotably mounted is displaceably guided in guide rail means 34. In order to displace the slide element 32 in the guide rail means 34 there is provided a suitable drive e.g. an eccentric disk 35 driven in accordance with the winding speed prevailing at the winder. It will be seen that the eccentric disk 35 is connected via crank rods 36, 37 with the slide element 32 in such a manner that, for each revolution of the eccentric disk 35 the slide element 32 carries out a to-and-fro movement. Due to this to-and-fro movement the feeler element 33 also carries out a to-and-fro movement within the bobbin magazine 19, and the actuating rod 30 is rocked about its hinge connection location 30*a* at the locking pawl 27 without pivoting the latter. Only when the feeler element 33 abuts against a bobbin 24 located in the bobbin chamber 26 and, thus, rocks the double-arm lever 31 either in clockwise or counterclockwise direction is the locking pawl 27 also rocked in corresponding direction.

The manner of operation of the previously described bobbin depositing apparatus is as follows:

The bobbins 23 wound at the winding location of the winder fall onto the inclined bobbin guide 22 and from this location they contact the partition wall 20 and fall into the bobbin chamber 26 of the bobbin magazine 19. Partition wall 20 ensures that all bobbins are properly aligned and arrive in parallelism with one another in the bobbin magazine 19. As soon as the bobbin section or chamber 26 of the bobbin magazine 19 to the left of the partition wall 20 of FIGURE 1 is filled or substantially filled with bobbins 24 then displacement of the bobbin magazine 19 to the left of FIGURE 1 takes place in the following manner:

Due to filling of the mentioned bobbin chamber 26 the feeler element 33, continuously moved to-and-fro by the eccentric disk 35, the rods 36, 37, the slide element 32 and the double-arm lever 31, impacts against a deposited bobbin 24 and is thus rocked for instance in clockwise direction. This rocking motion is transmitted from the double-arm lever 31 via the rod 30 to the locking pawl 27 which is likewise rocked in clockwise direction. Such rocking of the locking pawl 27 releases its locking nose 27*b* from engagement with the relevant locking peg 29, the latter is then released so that the carriage 13 together with the bobbin magazine 19 thereon is displaced upon the inclined guide rail 10, 11 to the left of FIGURE 1 under the action of gravity. Movement of the carriage 13 and its supported bobbin magazine 19 to the left takes place until the next locking peg 29 is engaged by the lock-

ing pawl 27 since the latter under the action of the to-and-fro movement of the slide element 32 likewise alternately moves in clockwise and counterclockwise direction when the feeler element 33 impacts a bobbin 24. In this manner, the bobbin magazine 19 is repeatedly step-wise or incrementally displaced to the left until its bobbin-receiving compartment 40 is filled with bobbins 24.

Quite obviously, in lieu of the illustrated locking pawl a locking mechanism incorporating two pawls can be provided in which alternately one pawl releases the carriage and the other pawl restrains the carriage, similar to the balance wheel of a clockwork. In fact, any locking mechanism capable of step-wise advancing the carriage 13 in response to actuation of a feeler can be used. Moreover, although the partition wall 20 is preferably formed of rubber, it can also be formed of another suitable material which is elastically flexible and does not have the tendency of damaging the yarn package wound upon the bobbins 24.

While there is shown and described present preferred embodiment of the invention it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practised within the scope of the following claims.

What is claimed is:

1. A bobbin depositing mechanism for a winding machine wherein bobbins are ejected from the machine and are arranged to fall into a bobbin magazine capable of receiving a plurality of bobbins in a selected orientation, comprising means arranged to support the bobbin magazine for movement in a predetermined direction of travel, a flexible wall dependently supported at its upper end and arranged to hang downwardly therefrom into the bobbin magazine wherein it is disposed transversely of the direction of travel of the magazine for dividing the magazine into a bobbin receiving section and another section and for properly positioning the bobbins deposited into the magazine, said flexible wall being unsupported at its lower end and being free to move in the direction of the axis of travel of the magazine, sensing means arranged to extend into the bobbin receiving section of the magazine, indexing means cooperating with said means arranged to support the magazine for moving the magazine a predetermined distance when the bobbin receiving section is filled to a predetermined level, said sensing means being said indexing means when said bobbin receiving section operatively connected to said indexing means for actuating is filled to its predetermined level whereby the said indexing means is arranged to move the magazine while it is being filled with bobbins.

2. A bobbin depositing mechanism as set forth in claim 1, wherein a weight is attached to the lower end of said flexible wall for keeping said wall substantially taut.



3. A bobbin depositing mechanism as set forth in claim 1, wherein a stationary support member is arranged to be positioned above the magazine, and said flexible wall attached to said stationary support member for depending downwardly therefrom into the magazine.

4. A bobbin depositing mechanism as set forth in claim 1, wherein said means for supporting the magazine comprises a carriage and an inclined guide means upon which the said carriage is positioned for movement.

5. A bobbin depositing mechanism as set forth in claim 4, wherein said indexing means includes a number of locking pins positioned on said carriage and a displaceable locking pawl engageable with said locking pins.

6. A bobbin depositing mechanism as set forth in claim 5, wherein said sensing means are interconnected with said locking pawl whereby when the bobbin receiving section is filled to its predetermined level, said sensing means actuates said locking pawl disengaging it from an associated locking pin, whereby said carriage is advanced under the action of gravity downwardly on the inclined guide means until the locking pawl engages the next adjacent locking pin.

7. A bobbin depositing mechanism as set forth in claim 6, wherein guide groove means are positioned above the bobbin receiving section in the magazine, a slide block positioned within said guide groove means for movement therethrough and connected to said sensing means, an eccentric disc, crank rod means connecting said slide block and said eccentric disc for to-and-fro displacement of said sensing means attached to said slide block.

8. A bobbin depositing mechanism as set forth in claim 7, wherein a rod member is connected at its upper end to said sensing means and at its lower end to said locking pawl for displacing said locking pawl in reaction to the interaction of said sensing means and the bobbins at a predetermined level within the bobbin receiving section.

9. A bobbin depositing mechanism as set forth in claim 8, wherein said sensing means comprises a pivotable hub section, a pair of angularly spaced arm members extending from said hub section, a flap member connected to one of said arms and extending into the bobbin receiving section of the magazine, and said rod means interconnecting said sensing means and said locking pawl extending from the other of said arms.


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