This invention relates to shuttle feeders for embroidering machines.

As is well understood, an embroidering machine comprises a number of aligned shuttle boxes which rest on a shuttle board. Each shuttle box sidewise supports a shuttle which is caused to reciprocate substantially vertically, during the operation of the machine, the shuttle contains a bobbin, the thread of which becomes exhausted as the embroidering operations continue. Accordingly, it is necessary to replace such bobbins periodically. In actual practice, instead of replacing the bobbin in a shuttle, a pre-loaded shuttle is substituted for the exhausted shuttle.

Shuttles are now replaced by lifting them out of the shuttle boxes and substituting a fully loaded shuttle. This involves a time consuming and tedious operation since a conventional fifteen year machine has more than 550 shuttle boxes. I am aware that some mechanisms have been introduced to effect feeding, but such mechanisms have not been successful because of inaccuracies and complexities and are not in wide use.

With the foregoing in mind, I have devised a shuttle feeding device which effectively feeds a large quantity of loaded shuttles to the shuttle boxes. The device is so constructed that the feed is positive with little, if any likelihood of a shuttle being misdirected. Means are provided to maintain a great number of bobbins aligned at an angle which insures the proper travel of the shuttle into the shuttle box. The device is further simple in operation and economical to produce and use.

The invention will be further understood from the following description and drawings in which:

Figure 1 is a top plan view of the improved shuttle feeding device.

Figure 2 is a side elevation view thereof;

Figure 3 is an end elevation view thereof, both ends being the same;

Figure 4 is a fragmentary bottom view of one end of the device;

Figure 5 is a cross-sectional view illustrating the operation of the device in feeding shuttles to the shuttle boxes of an embroidering machine (the embroidering machine being viewed as from the rear);

Figure 6 is a fragmentary view similar to Figure 5 and illustrating the operation of the device;

Figure 7 is a cross-sectional view as taken along the line 7—7 of Figure 6; and

Figure 8 is a cross-sectional view as taken along the line 8—8 of Figure 5.

The device comprises an elongated frame 10 which may be of wood or any other suitable material. Frame 10 is formed with a plurality of openings 11 extending therefrom from the top to the bottom thereof and running in transverse cross-section, the width thereof being slightly more than ⅛". The length of the openings from top to bottom of the frame, is about 1".

In the form shown, each row contains 36 openings so as to accommodate 36 shuttles. Thus, the combined capacity of the device is 72. Of course, the rows can be made longer or shorter as desired but the dimensions of the openings will remain substantially constant.

Referring to Figures 3 and 8 it will be noted that the frame 10 is T-shaped, the openings 11 being formed in the transverse arm or recess 12 and the top 14 of the T while the centrally depending arm 15 is provided to support the device at the proper height when it is positioned over aligned shuttle boxes for feeding shuttles therein. Each row or series of openings 11 have duplicate operating mechanisms so that the description of one of said mechanisms will also describe the other.

The underside of the transverse arm 14 is formed with a G-shaped slot 16. Within this slot a vertically disposed an elongated metal strip 17 which serves to retain and release the shuttles from the openings of the frame. Strip 17 has the appearance of a ladder with sides 18 and a series of cross bars 19. The cross bars 19 are spaced to an extent wherein they define openings 20 between them of substantially the same dimensions as the openings 11. As will be explained hereinafter, each strip 17 is normally spring biased to a position where the bars 19 close each opening 11 approximately half way across at the bottom so as to retain the shuttles in place in the openings. Means are also provided to move the bars to full open position so that the shuttles may fall gravitationally through the openings and into the shuttle boxes of the embroidering machine.

Each end of the device is provided with a metal retaining bar 20 which is of inverted T-sharp edge form, the central arm 21 serving as a terminal for the coil spring 22. The other end 23 of the spring 22 is hooked around end section 24 of strip 17. Accordingly, strip 17 is normally urged in one direction as illustrated in Figure 5 where the cross bars 19 substantially close the lower ends of the openings 11 about half way or, in any event, to a degree that the shuttles 25 extending vertically from the openings cannot fall through to the shuttle boxes 26. It will be understood that the shuttle boxes themselves are shown somewhat schematically, the illustration being merely to demonstrate the usage of the device.

Spring 22 is disposed within a concave cut-out 27 formed immediately above end bar 24 of section 24 of strip 17. In order to urge each strip 17 to an unobstructing position, an actuating lever 28 is pivotally attached at each end of the device, each serving the respective series of openings. As illustrated in Figure 6, lever 28 is pivoted on the pin 29 and is lower end slidable maintained in slot 30 of end section 31 of strip 17. The end sections 24 and 31 are opposite each other in strip 17. As will be recognized from Figure 5, when lever 28 is manually shifted in the direction indicated by arrow 29, the entire strip 17 is shifted to the left as viewed in Figure 5 and all the openings 11 become unobstructed at their lower ends so that the shuttles may drop through to the shuttle boxes.

Means are further provided to insure accurate positioning of the rows of openings with respect to each shuttle box. Thus, a guide member 32 having a depending tongue 33 is disposed between end section 31 and the first bar of strip 17 as illustrated in Figures 4 and 5, the tongue 33 depending downwardly through the opening of the G-shaped slot as illustrated in Figure 3. Tongue 33 is inclined away from the longitudinal axis of the elongated frame so as to complement the fixed angularity of the shuttle boxes as illustrated in Figure 5. Accordingly, when the tongue 33 is disposed against one shuttle box as illustrated in Figure 5, all the shuttles will be in proper position to drop into the shuttle boxes. It will further be noted in Figure 5 that the width of the frame section 34 which separate and define the openings 11, are the same as the effective cross-sectional width of the shuttle box structures 26.

The device is employed as follows:

Assuming that the bobbins in the shuttle boxes are near exhaustion, the machine is stopped and the shuttles are removed as is customary. Meanwhile, the device will have been filled with shuttles provided with fresh bobbins, the instant device accommodating 72 shuttles. The device is then placed lengthwise adjacent the shuttle boxes on the central arm 15 resting against such shuttle boxes while the tongue 33 is disposed against one shuttle box,
By means of the angular disposition of the openings, the shuttles 25 are in an angular alignment with the shuttle box openings. It is now only necessary to manually actuate the lever 28 in the direction of arrow 29 whereby all the openings become simultaneously unobstructed and 36 of the shuttles 25 fall into place. The user then reverses the device so as to present the other row, i.e., row 13 to the machine, following in succession the shuttle boxes accommodated by the first row. He then actuates the other lever 28 in the same direction and 36 more shuttles fall into place. Such feeding action is illustrated in Figure 6. The device is then removed from the machine which is then restored to operation.

It has been found that the device as above described is foolproof and has effected substantial economies in that less labor is required and the machines are incapacitated for much shorter time.

What is claimed is:

1. A shuttle feeding device for embroidery machines comprising a frame having a top section of substantially rectangular form, said top section being formed with a series of aligned openings therethrough, said openings being inclined from the upper face to the lower face of said top section, an elongated shuttle retaining strip disposed adjacent to and under said openings and normally closing at least a portion of said openings from the bottom, and actuating means for shifting said strip to an opening unobstructing position whereby shuttles disposed in said openings may be released for gravitational downward displacement from said openings and at an angle to said top section, said device including a spring on said frame and connected to one end of said strip for normally urging it to the opening obstructing position, said actuating means comprising a lever on said frame and connected to the other end of said strip for actuating it lengthwise against the action of said spring.

2. A shuttle feeding device for embroidery machines having shuttle boxes, said device comprising an elongated frame having a top section of substantially rectangular form, said top section being formed with at least one series of aligned openings therethrough from the upper face to the lower face thereof, a shuttle retaining strip slidably mounted in the frame and underlying said series of openings, said strip comprising cross bars normally obstructing the lower ends of said openings so as to prevent downward displacement of shuttles disposed in said openings, a spring on said frame for maintaining said strip in its normally obstructing position, a manually actuable lever connected to said strip for shifting it to an unobstructing position against the action of said spring, and a guide member protruding downwardly at one end of said frame and adapted to guide the positioning of said openers over the shuttle boxes of the embroidery machine.

3. A shuttle feeding device for embroidery machines comprising a frame having a top section of substantially rectangular form, said top section being elongated and formed with a first series of aligned, substantially square openings therethrough, the side walls of said openings being uniformly inclined from the upper face to the lower face of said top section, a shuttle retaining strip slidably disposed in said frame and underlying said first series of openings, said strip comprising cross bars normally obstructing the lower ends of said openings, manual actuating means for shifting said strip to an opening unobstructing position whereby shuttles disposed in said openings may be released for gravitational downward displacement from said openings and at an angle to said top section, a second series of openings disposed parallel to said first-named series of openings, the openings of said second series being inclined oppositely from the first series inclination, said second series of openings being provided with a retaining strip, manually actuating means substantially duplicating those of said first series, said frame being T-shaped with both of said series of openings being formed completely through the transverse arm of the T, and a guide tongue protruding downwardly from the underside of the respective ends of the frame, each of said guide tongues being in alignment with one retaining strip.

4. A device according to claim 3 wherein the inclination of said openings is 15° from vertical and said guide tongue being also inclined 15° from vertical and in the same direction.

5. A device according to claim 3 and including a spring for each strip, said spring having one end connected to the frame and the other end connected to one strip for normally urging the strip to its obstructing position, said manual actuating means comprising two levers respectively connected to the other ends of the strips for actuating the strips lengthwise against the action of the springs.

6. A device according to claim 5 wherein the underside of said transverse arm of the frame is formed with two C-shaped slots in which the respective strips are slidably disposed, said guide tongues extending through the openings of the C-shaped slots.

7. A device according to claim 6 wherein said cross bars of the strips form openings between them having substantially the same dimensions as the transverse dimensions of the frame series of openings.

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