May 5, 1936. W. REINERS ET AL 2,040,023

WINDING MACHINE WITH MECHANICAL CHARGING OF BOBBINS

Original Filed Sept. 14, 1932 6 Sheets-Sheet 1

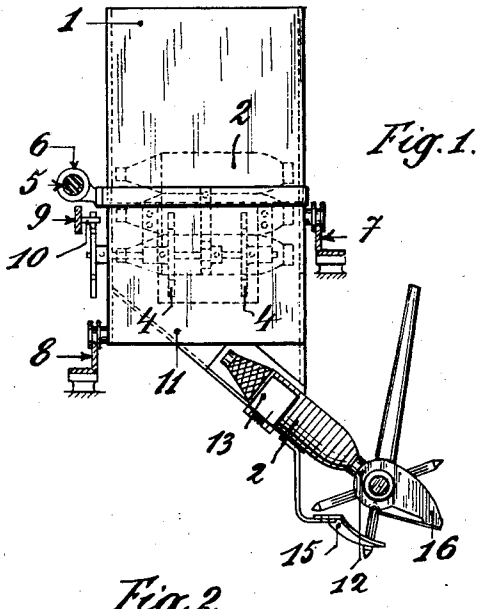
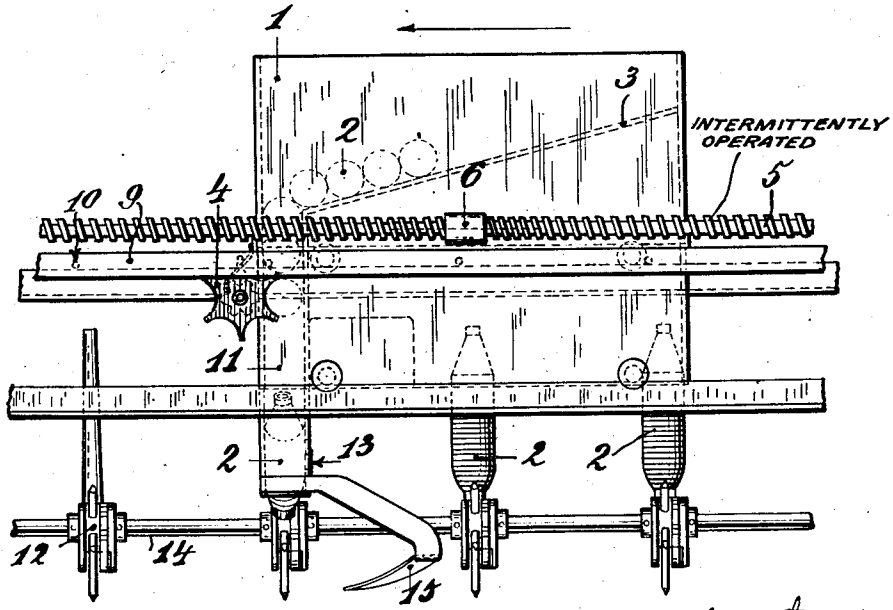


Fig. 1.

Fig. 2.



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Fig. 3

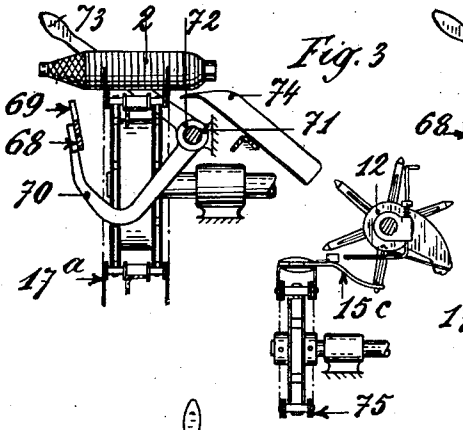


Fig. 5

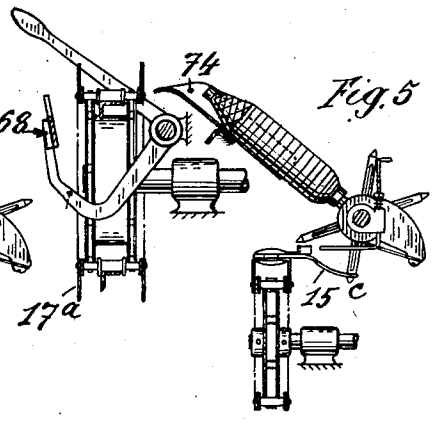


Fig. 4.

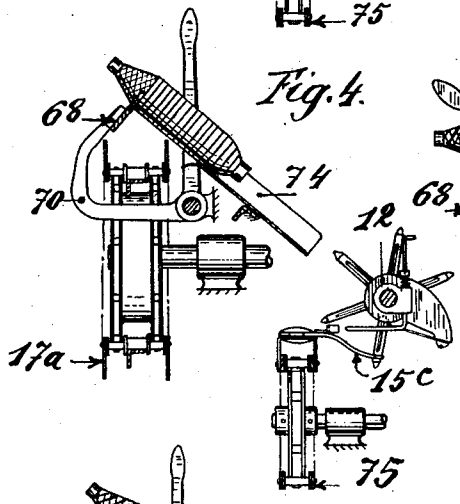


Fig. 6.

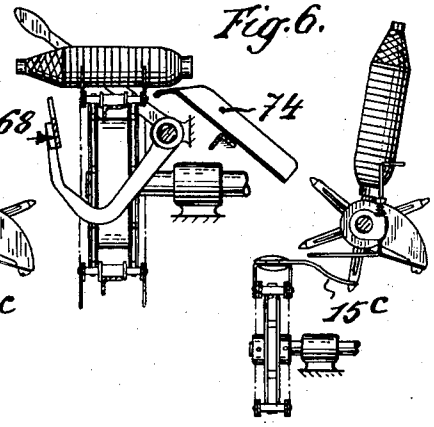
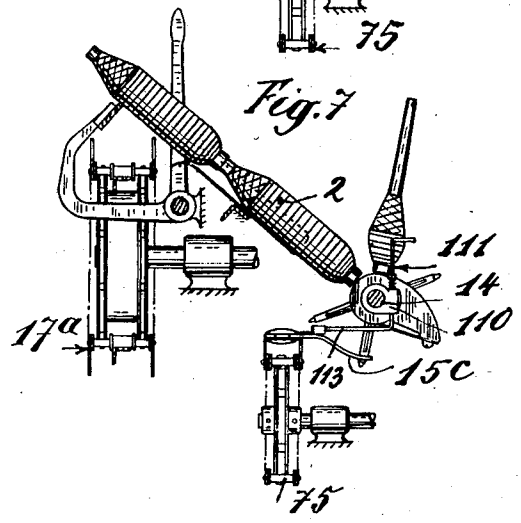


Fig. 7



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Fig. 8.

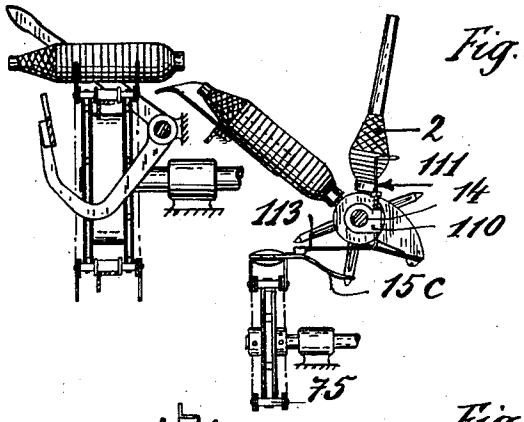
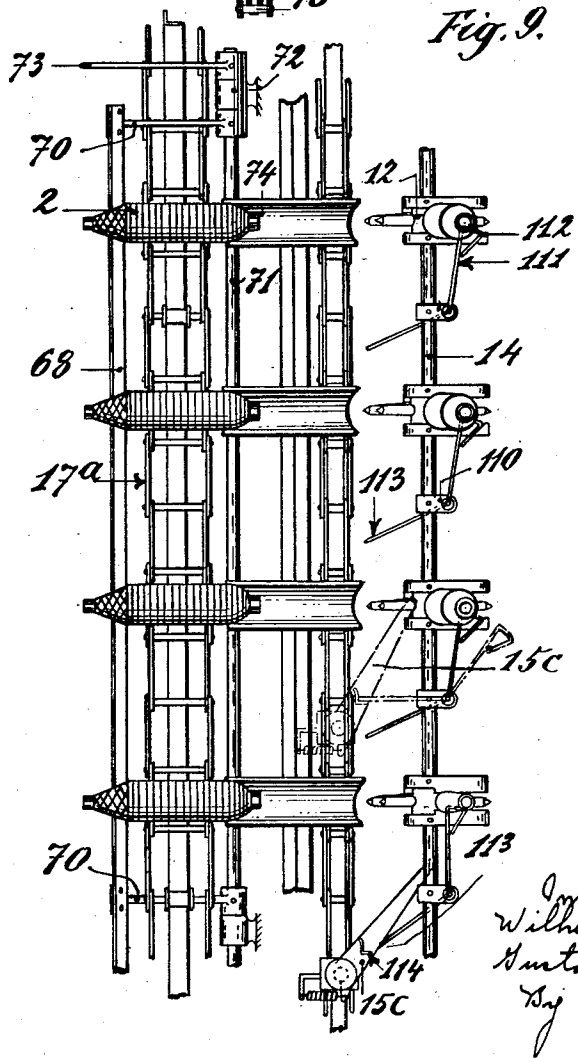


Fig. 9.



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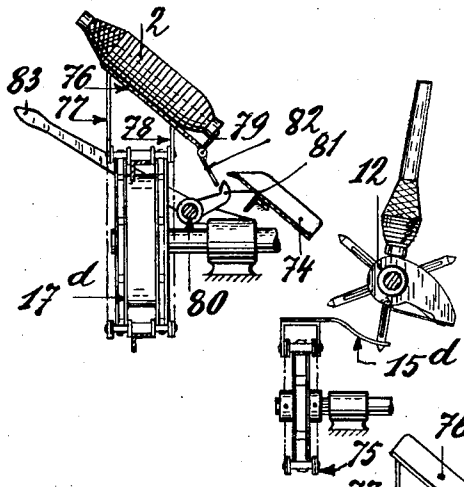


Fig. 10.

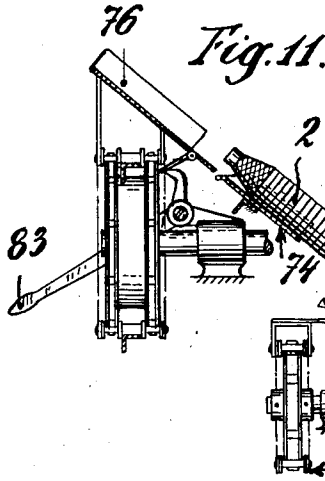


Fig. 11.

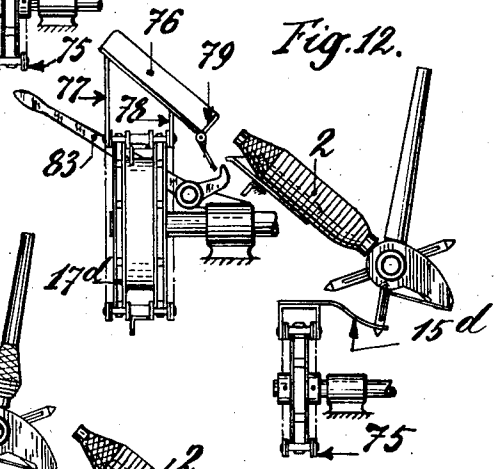


Fig. 12.

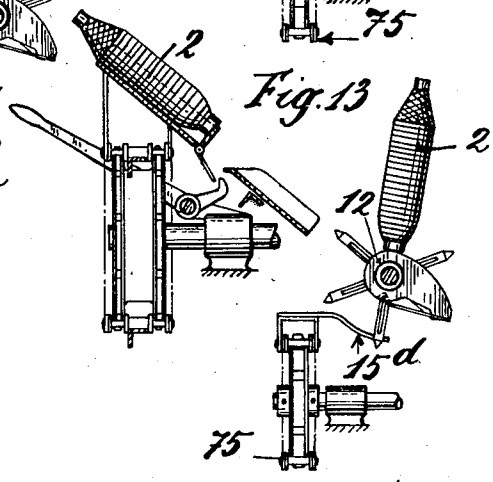


Fig. 13

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WINDING MACHINE WITH MECHANICAL CHARGING OF BOBBINS

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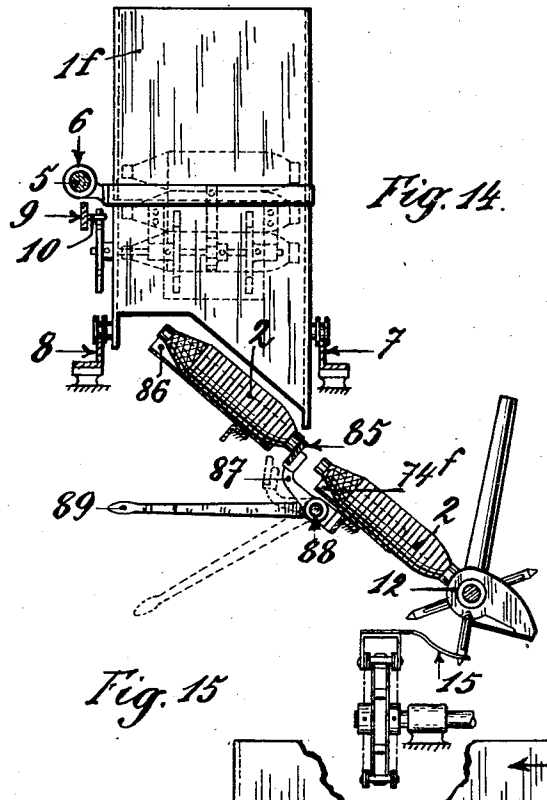
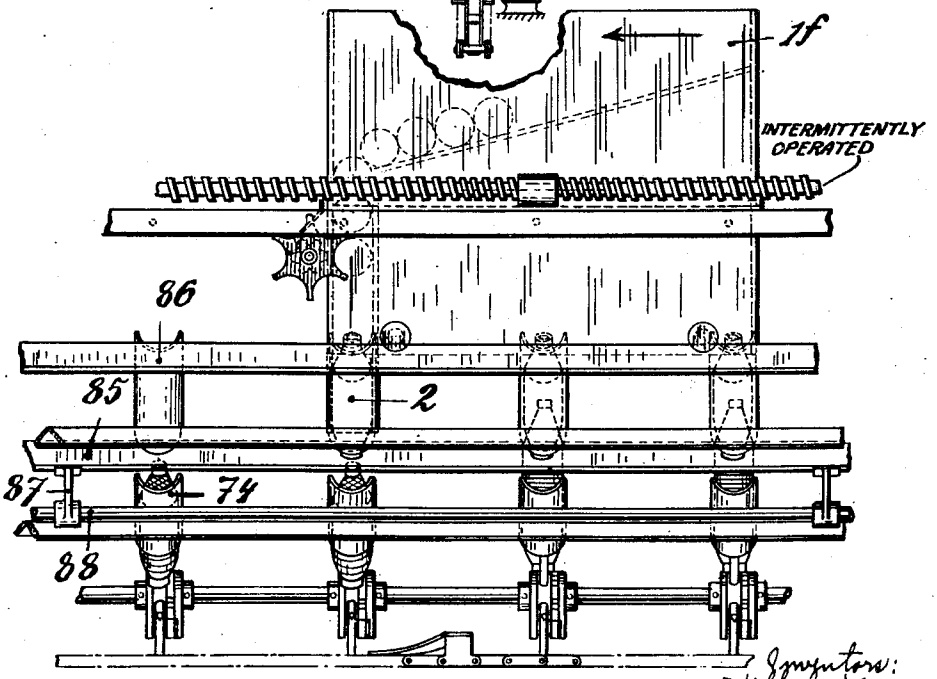


Fig. 14.

Fig. 15

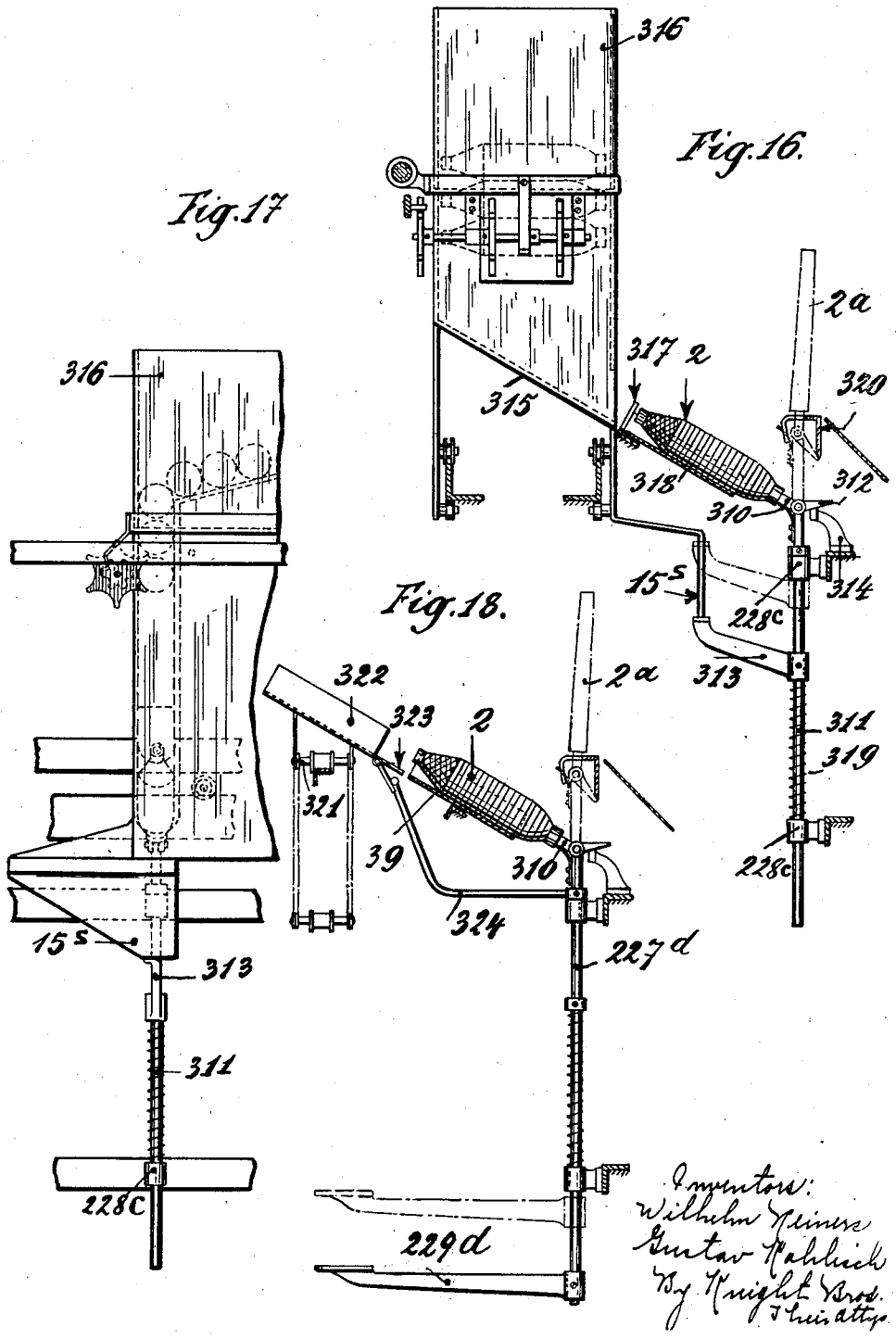


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WINDING MACHINE WITH MECHANICAL CHARGING OF BOBBINS

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UNITED STATES PATENT OFFICE

2,040,023

WINDING MACHINE WITH MECHANICAL CHARGING OF BOBBINS

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Original application September 14, 1932, Serial No. 663,196, now Patent No. 1,970,188, issued August 14, 1934. Divided and this application August 19, 1933, Serial No. 685,952. In Germany October 8, 1931

9 Claims. (Cl. 242—35.5)

This application is a division of our copending application, Serial No. 633,196, filed September 14, 1932, now Patent No. 1,970,188, issued August 14, 1934.

The invention relates to a machine having a plurality of winding stations in which a plurality of supply holders are charged with bobbins to be unwound for the purpose of forming cheeses or spools of long lengths of thread. The invention concerns an arrangement of a bobbin feeding device travelling past said supply holders at a higher elevation than the supply holders themselves, and the provision of means for transferring the bobbins from said feeding device down to said supply holders, and means for releasing the bobbins so as to allow them to drop or slip onto the supply holders.

The bobbin feeding device may consist of a carriage having trough-shaped chutes with means for automatically releasing a bobbin in front of every supply holder so as to allow it to drop or slip down on to the latter. As an alternative, the bobbin feeding device may consist of a travelling endless conveyor formed by a chain, belt, or the like, to convey the bobbins in horizontal position to the various unwinding stations, where they are brought by means of a separate device into the position of readiness for them to drop or slip down freely on to the empty supply holders.

The travelling conveyor may be fitted with trough-shaped holders for the separate individual bobbins to be arranged on the conveyor in slanting position so that the bobbins lie from the very first in readiness for dropping. In these rests the bobbins are retained by suitable means until they have arrived at the individual unwinding stations whereupon the means retaining the bobbin are released, thus allowing the bobbins to drop or slide down onto the supply holders by means of stationary chutes.

The invention is best illustrated by the following description thereof, in conjunction with the accompanying drawings, wherein

Fig. 1 is a sectional view along the machine showing the side of the traveling bobbin magazine, and a supply holder,

Fig. 2 is a front view of the machine corresponding to Fig. 1,

Figs. 3–6 are sectional views of a modified machine having a bobbin charging device with an endless conveyor chain, bobbin holders, and a mechanism for raising the full bobbins to falling position, these views showing the apparatus in different operative positions,

Figs. 7–9 show the same machine illustrating its operation in respect to incompletely unwound bobbins, Figs. 7 and 8 showing vertical sections in two different operative positions, and Fig. 9 showing a plan view,

Figs. 10–13 are sectional views of another form of machine having an endless chain conveyor upon which the full bobbins are supported from the start in position to fall onto their respective bobbin stations, the several views showing four different operative positions,

Fig. 14 is a sectional view of a machine having a traveling bobbin magazine and stationary bobbin rests beside the bobbin holders, which receive the bobbins and hold them in position to fall onto the bobbin holders,

Fig. 15 is a front view corresponding to Fig. 14,

Fig. 16 is a vertical section of one form of the invention in which the bobbin is received in inclined position upon a tilting peg and is thereupon moved by the latter into the upright position,

Fig. 17 is a front view corresponding to Fig. 16, and

Fig. 18 is a sectional view of a slightly modified form of the type of machine shown in Fig. 16.

Figs. 1 and 2 show the first embodiment of the invention. In these figures, 1 is a magazine for the full bobbins, which travels along past the unwinding stations. 2 are the full bobbins which are urged toward a star-shaped single feed device 4 by an inclined bottom 3 of the magazine. The magazine 1 is moved past the unwinding stations by means of a screw spindle 5 driven by suitable means, not shown, and engaged by an internally threaded bush 6 on the magazine. In place of the screw spindle 5 there can, of course, be used any other suitable transmission means for imparting motion to the magazine. The magazine 1 can be guided by means of rollers riding upon tracks 7 and 8. The periodic advancement of the star-shaped single feed device 4 is accomplished by lugs 10 on a stationary rail 9, the single feed device being advanced one position for each unwinding station. On the magazine 1 is a second inclined plane or drop chute 11, upon which the bobbins 2 released from time to time by the feed device 4 can slide down, impelled by their own weight, to be pegged upon the ready standing empty peg of the holder 12. In order that there may be sufficient time for the bobbin 2 to fall and mount itself upon the holder 12, the screw spindle 5 is driven intermittently, with an interruption each time the magazine reaches a positon in front of a holder 12. Since the bobbin 2 is now mounted upon its holder 12, it must be released from the holder 13

on the slide 11 as the magazine 1 continues to travel, and for this purpose the holder 13 is constructed as a spring flap. The bobbin holders 12 are made in the form of star-shaped supports, as in copending application Serial No. 516,448, filed February 17, 1931, now Patent No. 2,010,465, Aug. 6, 1935, which in this case also are free to rotate about an axis 14 and are held in their various positions by a retaining device. As in the above patent, there is a deflector 15 on the travelling magazine 1, which takes care of the advancement of the star-shaped bobbin holder 12 to its next working position, the empty bobbin being removed from its holder at the same time by a stripper 16.

The form of machine described above provides for the transfer of the unwinding bobbins to their holders simply by the weight of the bobbins themselves, without the use of any positively acting shifter.

Figures 3 to 9 show a different embodiment in which the full supply bobbins are taken from a preliminary magazine mounted at the end of the machine by a chain or the like for conveying them to the several unwinding stations. Here however the bobbins are not positively pushed upon the holders 12, but fall upon them by their own weight, as in the first embodiment. For this purpose, as soon as the bobbins 2 arrive at their bobbin stations, they are engaged at their pointed ends by a common rail or frame element 68 and raised to the preparatory position shown in Fig. 4, the bobbins being guided by fork-shaped recesses 69 provided in rail 68. Rail 68 is fastened to levers 70, which are rotatable together with a common shaft 71 mounted in bearings 72. The whole device is operated by hand lever 73. As soon as the bobbins 2 arrive in the raised position shown in Fig. 4, they fall together, sliding upon stationary chutes 74, down onto the holders 12. The revolving heads of the bobbin holders 12 are in this case provided with six pegs instead of with four.

In Figs. 3 to 13 there is also shown a special arrangement of the deflector 15c for turning the bobbin holders 12. Here the deflector 15c is mounted, not upon the bobbin conveyor 17a, but upon a separate conveyor 75.

Figs. 7–9 show an auxiliary device which has the purpose of preventing a charging and discharging of bobbin holders in which there are remnants of yarn not yet unwound, as occurs when the yarn breaks, the object being to permit this remnant to be completely unwound along with the others when the yarns of the next set of bobbins have been knotted to those on the winding packages. A separate stationary feeler is provided at each winding station. From Figs. 7 and 8 it can be seen that beside every bobbin holder 12 on the same bearing rod 14 is fastened a holder 110. On the latter is rotatably mounted an angularly bent feeler 111. The upper end of this feeler 111 is made in the form of a hook at 112 (Fig. 9), while the lower end 113 may be straight. Since the upper hook-shaped end 112, whenever there is no more yarn on the bobbin 2, rests against the foot of the bobbin, it is held in the position shown in full lines in the three upper unwinding stations of Fig. 9. Only when the bobbin 2 has completely run out does the feeler swing into the position shown in the lowermost unwinding station of Fig. 9. Now when the traveling deflector 15c comes to an unwinding station in which there is a remnant of yarn on the bobbin, because of breakage of the yarn, an angle-shaped lug 114 on the deflector 15c strikes against the end of feeler 113 presented toward it. Thereby the end 113 of the feeler is carried along to the position shown in dotted lines in the third unwinding station from the top of Fig. 9. By this movement of the feeler end 113 the deflector 15c is moved into the dotted line position at this station and thereby an advancement of the bobbin holder is prevented. The delivery of a new bobbin 2 (Fig. 19) is not prevented in this form of the invention, but with the next charging of the corresponding unwinding station the new bobbin nevertheless cannot slide down onto the holder, because the latter still supports the previous bobbin. The new bobbin will fall back upon the conveyor 17a and will fall therefrom into a collecting receptacle stationed at the opposite end of the machine.

Figures 10 to 13 show the third form of the invention.

Here the full bobbins 2 are brought to the unwinding stations by an endless chain 17d in position ready to drop off, but the bobbins fall from a stationary magazine arranged at the end of the machine upon the conveyor directly in the position ready to slide off, as is shown in Figs. 10 and 13. This is done by making the bobbin seats on the conveyor in the form of inclined troughs 76, which are secured to the conveyor chain 17d by means of supports 77 and 78 of different heights. At the lower ends of troughs 76 are provided spring flaps 79, which hold the bobbins 2 in position as they travel to the unwinding stations. After all the bobbins have arrived at their bobbin stations, the flaps 79 are moved by a common control device from the position shown in Fig. 10 to that shown in Fig. 11, whereby the bobbins 2 immediately fall upon the corresponding peg of the bobbin holder, sliding down upon the stationary chute 74 on the way. The operation of the flaps 79 can be accomplished by means of a through-going shaft 80 having fastened thereon individual levers 81, or corresponding through-going rails, which have noses to engage levers or projections 82 on the flaps and thereby release the flaps from their blocking position, as shown in Fig 11. The actuation and control of the shafts can take place by hand lever 83, as in the previous embodiments.

In Fig. 10 the bobbin stands prepared to drop, in Fig. 11 it has dropped down upon the bobbin holder, in Fig. 12 the flap 79 has returned to its blocking position, and in Fig. 13 the bobbin 2 has been moved by the deflector 15d into operative position, the unwound empty bobbin tube having been stripped off at the same time.

Figs. 14 and 15 show a form of the invention which uses in part the idea of the first embodiment (Figs. 1 and 2), and in part that of the third embodiment (Figs. 10 to 13). In this case the travelling magazine 1f lets the full bobbins 2 fall directly upon stationary rests 86, which bring the bobbins to the inclined positions, as in the case of Figs. 10 to 13. On these rests the bobbins are retained by a common rail 85. The rail 85 controlling a plurality of bobbins simultaneously is brought from the blocking position to the position indicated by dotted lines in Fig. 14, either by a hand lever 89 or automatically, whereupon the bobbins slide down onto the holder 12 by their own weight. Stationary intermediate troughs 74f are also provided to guide the bobbins 2 accurately onto the bobbin holders 12 as they slide down.

In the embodiments illustrated in Figs. 16–18, the peg 310 is tiltable and the bobbin glides down upon it. The bobbin peg is pivoted to the upper

end of a rod 311 vertically slidable in bearings 228c. For imparting a swinging motion to the peg, it is provided with an arm 312. This motion of the peg occurs upon the downward pull of rod 311 caused by the action of deflector 15s upon its arm 313. As the peg supporting rod moves downward from the dotted line position to the full line position in Fig. 16, the peg is tilted by the arm 312 striking against an abutment 314. Thereby the peg 310 is tipped to the inclined position shown in full lines in Fig. 16. At the moment the peg or holder 310 has reached this inclined position, bobbin 2 falling freely upon the inclined chute 315 of the travelling magazine 316 arrives opposite an opening in the stationary angle iron 317, so that the bobbin slips down through this opening over the inclined trough 318 and upon the bobbin peg 310. After the deflector 15s mounted on the magazine 316 has moved on and left the arm 313 of rod 311, the latter rod flies up under the action of spring 319 to the position shown in dotted lines. The dotted lines show how arm 312 has struck against the lower edge of angle iron 320 in its upward movement and has thereby swung the bobbin holder 310 into the vertical working position. The stripping off of the empty bobbin tube is accomplished simply by the downward movement of rod 311 impelled by deflector 15s.

In Fig. 18 there is used in place of the travelling magazine an endless conveyor band 321 upon which the bobbins lie on rests 322 in the inclined position required for their downward sliding. In this position the bobbins are held during the travel of the conveyor band by a spring flap 323. Just at the instant when the bobbin holder 310 has come to receiving position by the operation of pedal 229d on rod 227d, the arm 324 fastened on rod 227d opens flap 323 of the bobbin rest 322, so that the bobbin 2 can slide down freely onto the waiting bobbin peg. The other charging motions are the same in this embodiment shown in Fig. 18 as those shown in Figs. 16 and 17.

We claim:

1. In a device of the class described, a plurality of holders for supporting bobbins to be unwound, means for distributing a plurality of bobbins respectively opposite and slightly above said holders, guide means positioned between said distributing means and said holders, and means for simultaneously disposing the bobbins on said guide means for causing the simultaneous dropping thereof by gravity onto said holders.

2. In a device of the class described, a plurality of supply holders, a traveling bobbin magazine adapted to move past said holders at a higher elevation, means for guiding bobbins from said magazine onto said holders, and means for releasing bobbins from said magazine onto said guide means.

3. In a device of the class described, a plurality of supply holders, a plurality of stationary bobbin rests positioned respectively opposite and inclined towards said holders, a traveling bobbin magazine adapted to move past said holders above said bobbin rests, means for depositing full bobbins from said magazine onto said rests, means for retaining said bobbins on said rests, and means for removing said retaining means simultaneously to release said full bobbins for mounting on said holders.

4. In a device of the class described, a plurality of holders for supporting bobbins to be unwound, means for distributing a plurality of bobbins respectively opposite and slightly above said holders, and means for causing said bobbins simultaneously to drop by gravity onto said holders comprising a plurality of rests to hold said bobbins horizontally, and means for simultaneously tilting said bobbins to an angle sufficiently steep to cause them to slide down onto said holders.

5. In a device of the class described, a plurality of supply holders, a conveyor chain having horizontal bobbin rests spaced at intervals corresponding to the distance between said supply holders, a frame element having surfaces adapted to engage the ends of said bobbins, and means for rocking said frame element simultaneously to tilt said bobbins to an angle sufficiently steep to cause them to slide down onto said holders.

6. In a device of the class described, a plurality of supply holders, a conveyor chain having horizontal bobbin rests spaced at intervals corresponding to the distance between said supply holders, a plurality of stationary inclined rests between said supply holders and said conveyor chain, and means for tilting up said bobbins to transfer them onto said inclined rests for mounting on said holders.

7. In a device of the class described, a plurality of bobbin holders for supporting bobbins to be unwound, means for bringing full bobbins opposite and slightly above said holders in substantially horizontal position, and means for tilting up said bobbins to cause them to slide down onto said holders.

8. In a device of the class described, a plurality of supply holders, a conveyor chain having bobbin rests spaced at intervals corresponding to the distance between said supply holders, said bobbin rests being slightly above said holders and inclined towards them, retaining means for holding the bobbins on said rests, and means for removing said retaining means simultaneously to release said bobbins for mounting on said holders.

9. In a device of the class described, a plurality of supply holders, said holders being movable from unwinding position to bobbin receiving position and from bobbin receiving position to unwinding position, means for distributing full bobbins to preparatory positions opposite said holders, means for causing said bobbins simultaneously to drop by gravity onto said holders, and separate traveling means for moving said holders from receiving to unwinding position and vice versa.

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