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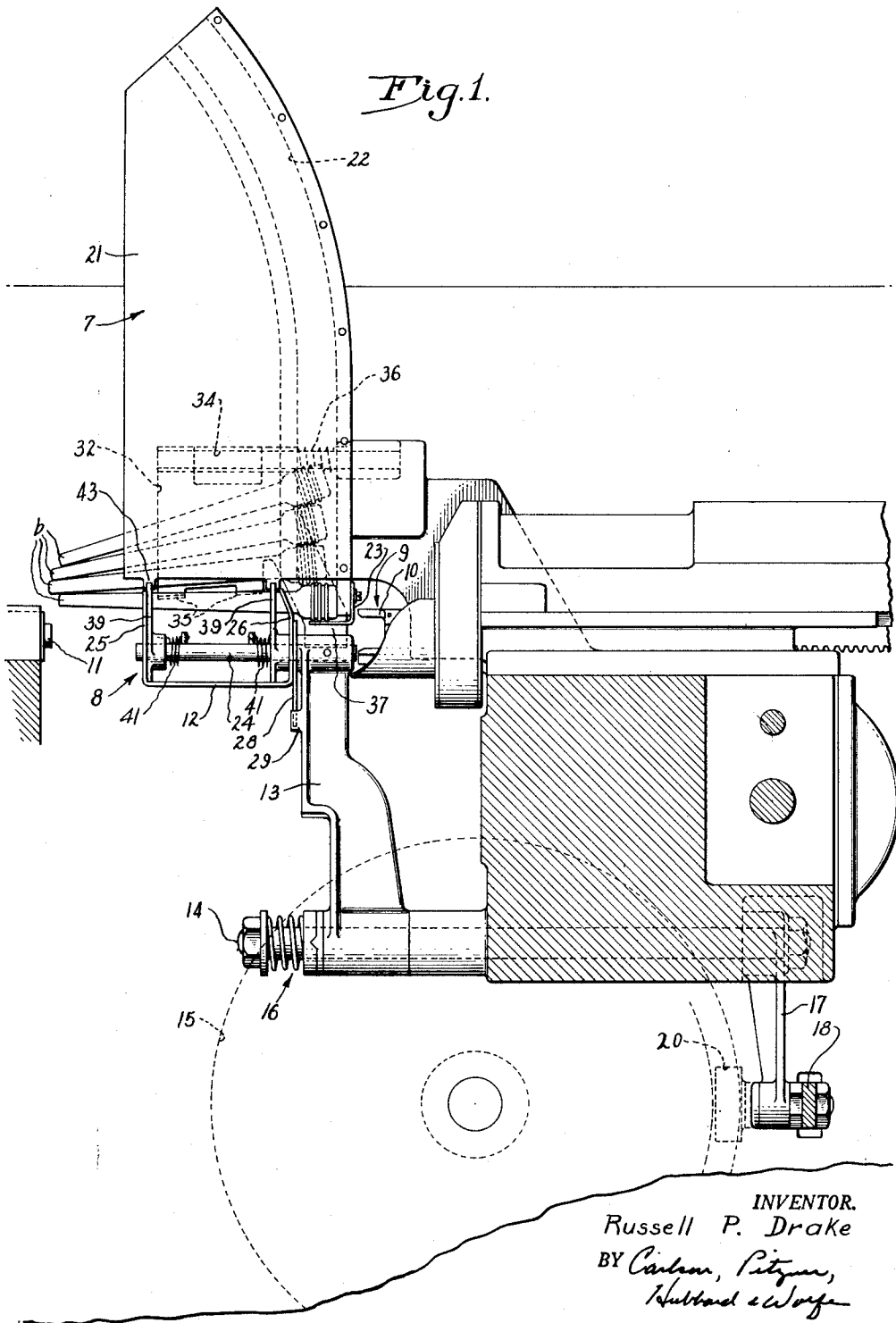
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DONNING MECHANISM FOR BOBBIN HANDLING MACHINES

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2 Sheets-Sheet 1



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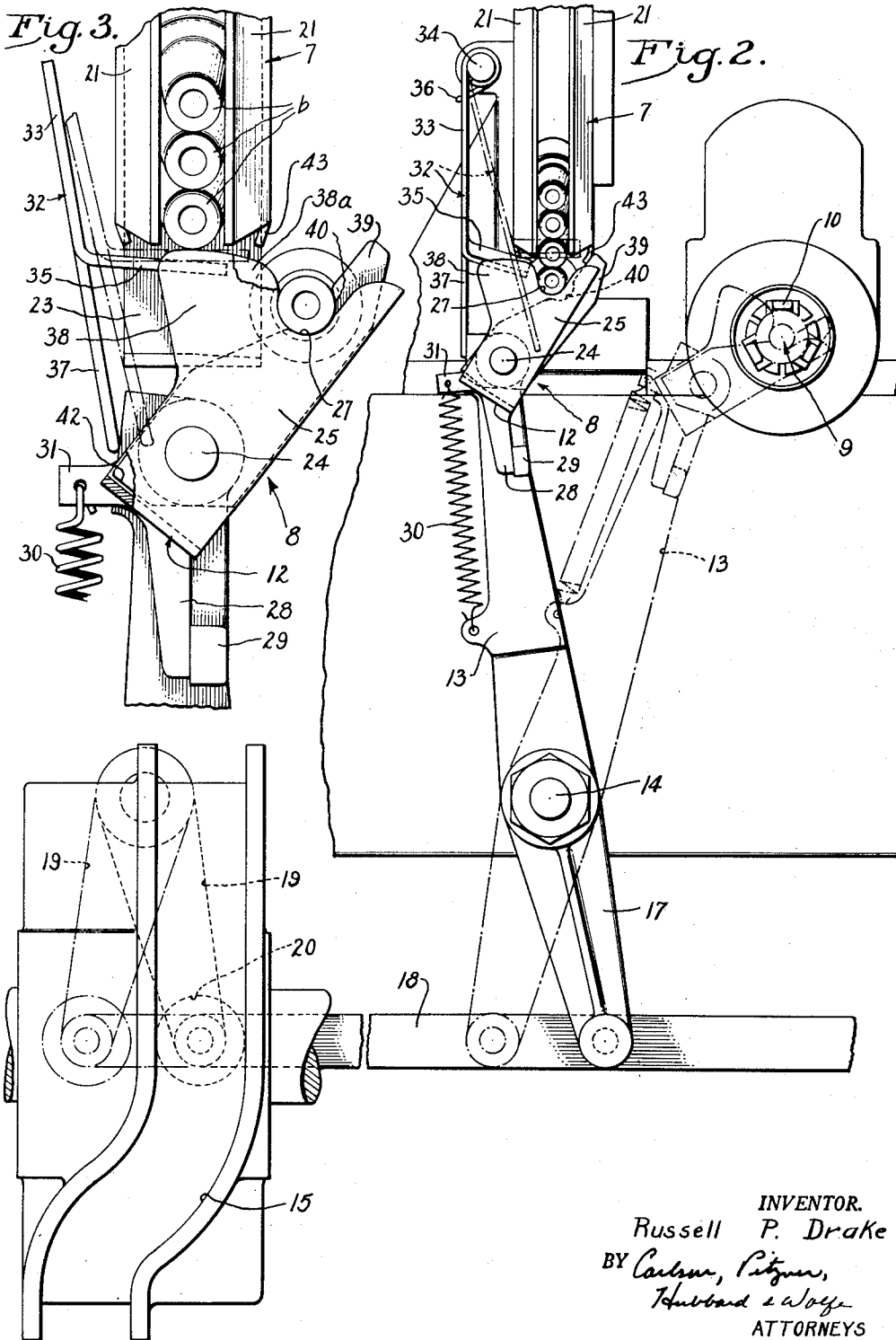
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## UNITED STATES PATENT OFFICE

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DONNING MECHANISM FOR BOBBIN  
HANDLING MACHINES

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7 Claims. (Cl. 242—1)

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The invention pertains to donning mechanism for use with bobbin winding machines of the type disclosed in my copending application, Serial No. 553,507, filed September 11, 1944, now Patent No. 2,445,998 dated July 27, 1948, and concerns more especially an improvement upon the donning mechanism of said application.

The invention has for its general aim the provision of a donning mechanism of simple construction which is effectual in operation.

One object is to provide a bobbin carrier of the character indicated embodying cam means for engaging the bobbins while positioned in the magazine for lifting the same to permit of the entry of a simple escapement device operative during the movement of the carrier to deliver an empty bobbin to the winding spindle, to retain the remaining bobbins in the magazine.

Another object is to provide a bobbin carrier having means of simple construction operating automatically to grip and hold the empty bobbin during its transfer from the magazine to the winding spindle.

The objects of the invention thus generally set forth, together with other and ancillary advantages, are attained by the construction and arrangement shown by way of illustration in the accompanying drawings, in which:

Figure 1 is a transverse sectional view through a winding machine of the type disclosed in my said prior patent and showing the improved donning mechanism in association with an empty bobbin magazine.

Fig. 2 is a fragmentary front elevational view illustrating the bobbin carrier in position beneath the magazine and showing in dot-dash lines the position of the carrier in effecting transfer of the bobbin to the winding spindle.

Fig. 3 is a fragmentary elevational view on a somewhat enlarged scale and illustrating the lifting of the bobbins with a cam action when the carrier moves from its normal position beneath the magazine.

In the present illustrative embodiment of my invention, a stack of empty bobbins *b* are retained in a magazine 7 open at its upper end for receiving the empty bobbins and at its lower end for the discharge of the bobbins one by one onto a carrier 8 for transfer thereby into operative relation to a winding spindle 9, the latter being equipped with a gripping device 10 for engaging the head or butt end of the bobbin and a tail center 11 for engaging the tip end of the bobbin. The carrier comprises a receptacle or cradle 12 mounted upon a movable support such

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as a lever arm 13 pivoted at 14 and arranged for actuation by a cam 15 in proper timed relation to the winding mechanism. The pivotal support 14 for the arm 13 is in the form of a rockshaft, and the arm is connected to the shaft through the medium of a yieldable overload device 16. The rear end of this shaft carries a depending arm 17 connected by a link 18 with a pivotally supported arm 19, the latter having a roller follower 20 for engagement with the cam.

The magazine 7 has opposed side members 21 with suitable guide means 22 for the head or butt ends of the bobbins, the side members being spaced apart a distance sufficient to accommodate the bobbins with the tip ends thereof projecting forwardly from the side members as shown in Fig. 1. At its lower rear edge the magazine is equipped with a bracket 23 constituting a stop for engagement by the lowermost bobbin upon release from the magazine into the cradle 12, the purpose of this stop being to prevent the relatively heavy bobbin head from causing the bobbin to tilt or tip backwardly out of the cradle. Preferably, the bracket stop is adjustably fastened to the magazine.

As best shown in Fig. 1, the cradle 12 is generally U-shaped in form. It is pivotally supported upon the rod 24 fixed in the upper end of the arm 13, and it provides upwardly extending front and rear arms 25 and 26 suitably notched as at 27 to receive the bobbin and to support the same at spaced points lengthwise thereof, the arms being adapted to engage the bobbin at spaced points with the arm 26 adjacent the head end thereof.

Rigid with the cradle is a depending arm 28 (Fig. 2) held against a stop 29 on the arm 13 by a contractile spring 30, one end of the latter being attached to the arm 13 and the other to a lug 31 rigid with the cradle. It will be appreciated that the length of stroke imparted to the arm 13 by the cam 15 is such as to carry the cradle from the position shown in full lines in Fig. 2 into operative association with the spindle 9 with an empty bobbin mounted on the cradle positioned in alignment with the spindle. The purpose of the yieldable mounting of the cradle is to permit the latter to disengage from the bobbin after the latter has been clamped in position between the chuck 10 and tail center 11.

During the movement of the carrier to transfer an empty bobbin from the magazine to the winding spindle, the remaining bobbins are retained in position within the magazine by means of an escapement device 32. The latter comprises an

upright portion 33 pivotally mounted at its upper end on a rod 34 and having laterally projecting portions or fingers 35 spaced apart in a direction lengthwise of the bobbins. A coiled torsion spring 36 encircling the pivotal support 34 acts upon the escapement device to swing it in a direction toward the magazine.

Normally the fingers 35 underlie the lowermost one of the stack of bobbins in the magazine to support the same. To release the lowermost bobbin from the stack, the cradle is utilized to actuate the escapement device to withdraw it from its position beneath the stack of bobbins as an incident to the return movement of the cradle to its normal position. For this purpose, the escapement device has a depending finger 37 disposed in the path of movement of the arm 13 so as to be engaged thereby in the return stroke of the arm and carried against the action of the spring 36 into the position shown in Fig. 2. In this position, the cradle underlies the magazine and the lowermost bobbin is permitted to drop into the notched portions 27 of the cradle. Upon movement of the cradle in its forward or delivering stroke, the spring 36 swings the escapement device 32 into position beneath the next lowermost bobbin thereby supporting the stack of bobbins during the delivering stroke.

To facilitate entry of the escapement fingers 35 into active position, power actuated cam means is employed operative in the movement of the cradle from its normal position to engage with the lowermost bobbin supported upon the escapement device. In the present instance, this cam means is provided by portions integral with the side arms 25 and 26 of the cradle and constituting cam members 38 and 38a engageable with the bobbin at longitudinally spaced points. The cams are shaped to impart a lifting movement to the stack of bobbins in the magazine as illustrated in Fig. 3. In addition to assuring entry of the escapement device under the force of a relatively light spring, such lifting of the bobbins in the magazine serves to dislodge any bobbins which may have become stuck accidentally in the magazine.

It may occasionally happen that bobbins received in the cradle will become dislodged therefrom due to the vibration of the machine or for other reasons. To preclude this, the cradle incorporates a gripping means coacting with the notched portions 27 to form a bobbin pocket and operative in the movement of the cradle away from the magazine to hold the bobbin during its transfer to the winding spindle. This means preferably takes the form of a pair of gripping fingers 39 pivoted on the rod 24 and appropriately notched as at 40 for coaction with the notched portions 27 of the cradle in holding the bobbin therein. Torsion springs 41 (Fig. 1) act on each of the fingers to move them into engagement with the bobbin, such movement being limited by a stop 42 on each finger engageable with the base of the cradle. As shown in Fig. 2, the tip of each finger 39 is adapted to engage with a stop 43 on the lower end of the magazine as the cradle moves into position beneath the magazine. Thus pivotal movement of the fingers relative to the cradle is accomplished, having the effect of opening up the bobbin receiving pocket of the cradle or receptacle.

Summarizing the operation of the improved donning mechanism, the bobbin carrier normally occupies the position shown in Fig. 2, it being observed that in this position the escapement de-

vice 32 has been moved into a position to permit the lowermost bobbin to drop into the arms 25 and 26 of the cradle and that the remaining bobbins of the stack are supported by the cradle through the medium of the released bobbin. Actuation of the carrier arm 13 by the cam 15 causes the cradle to move out from its position beneath the magazine and into operative association with the spindle 9 to deliver the bobbin thereto, and when the latter has been gripped between the chuck 10 and tail center 11, the carrier returns, the cradle yielding in its disengagement from the bobbin as permitted by the spring 30.

As the cradle moves away from its position beneath the magazine, the cam members 38 and 38a engage with the lowermost bobbin camming it upwardly and with it the remaining bobbins in the stack so that the escapement fingers 35 are free to enter under the action of the spring 36 into holding position beneath the then lowermost bobbin. Such movement of the escapement device is of course permitted by the movement of the upper end of the carrier arm 13 away from the depending finger 37 of the escapement device.

Also incident to the movement of the carrier arm away from the magazine 7, the gripping fingers 39 are released to the action of their springs 41, the tip ends of the fingers 39 moving away from the stops 43 and the fingers themselves moving into gripping engagement with the bobbin in the cradle. In returning from its delivery position in association with the spindle, the fingers 39 yield so as to become disengaged from the bobbin in the same general way as the cradle itself yields as permitted by the spring 30; and upon the return movement of the cradle to a position beneath the magazine the tip ends of the fingers engage the stops 43 to open up the cradle pocket for the reception of the next bobbin.

I claim as my invention:

1. In a winding machine having a magazine for supporting a stack of empty bobbins and a winding spindle at one side of the magazine, a bobbin donning mechanism comprising a cradle normally positioned beneath the magazine and serving to support the stack of bobbins therein with the lowermost bobbin received in the cradle, said cradle being mounted for movement from its normal position to carry a bobbin to the winding spindle, an escapement device normally positioned out of the path of downward movement of the stack of bobbins in the magazine and operative as an incident to the movement by said cradle of the lowermost bobbin toward the spindle to engage and hold the next lowermost bobbin whereby to support the remaining bobbins in the magazine, and cam means movable with the cradle and engageable with said next lowermost bobbin to lift the same together with the bobbins above it to permit entry of said escapement device into position beneath the lowermost bobbin.

2. In a bobbin winding machine having a winding spindle with means for clamping a bobbin in position on said spindle and a magazine disposed at one side of the spindle and adapted to contain a supply of empty bobbins, a donning mechanism comprising a power actuated pivotal support, a bobbin receptacle mounted on said support, an escapement device operatively associated with the magazine, and cam means on said receptacle operable to engage with the next lowermost bobbin to lift the same relative to said escapement device whereby the latter may move into holding

relation to the remaining bobbins in the magazine.

3. In a bobbin winding machine having a winding spindle with means for clamping a bobbin in position on said spindle, a donning mechanism comprising a pivoted arm, a cradle pivotally supported on said arm and movable therewith from a normal position at one side of the spindle, a spring acting upon said cradle, and interengaging stop means for limiting movement of the cradle by said spring, said cradle being shaped to form a receptacle for receiving a bobbin when in said normal position, and a member pivoted with respect to the cradle and movable into gripping engagement with said bobbin as an incident to the movement of the cradle away from said normal position.

4. In a bobbin winding machine having a winding spindle with means for clamping a bobbin in position on said spindle and a magazine disposed at one side of the spindle and adapted to contain a supply of empty bobbins, a donning mechanism comprising a receptacle, means for supporting said receptacle for movement from a position beneath the magazine into operative relation to the winding spindle, an escapement device pivotally mounted at one side of the magazine and engageable by said supporting means to move said device out of holding relation to the bobbins in the magazine, said receptacle being operative through the medium of the released bobbin to support the remaining bobbins, spring means acting on said escapement device and operative upon the transfer of the lowermost bobbin to the winding spindle to move said escapement device into holding relation to the remaining bobbins, and cam means on said receptacle engageable with the next lowermost bobbin to lift the same in the movement of the receptacle away from the magazine whereby to permit entry of the escapement device beneath the next lowermost bobbin by said spring means.

5. In a bobbin winding machine having a winding spindle with means for clamping a bobbin in position on said spindle, a donning mechanism comprising a movable support and a bobbin receptacle mounted on said support and movable therewith from a normal position at one side of the spindle into operative association with the spindle, said receptacle having a gripping member movable relative thereto, spring means for moving the gripping member into engagement with a bobbin received in the receptacle as the latter moves out of its said normal position, and stop means engageable by said gripping member in the return movement of the receptacle to shift the gripping means into an inactive position.

6. In a bobbin winding machine having a winding spindle with means for clamping a bobbin in position on said spindle and a magazine disposed at one side of the spindle and adapted to contain a supply of empty bobbins, a donning mechanism comprising a movable support and a bobbin receptacle mounted on said support and movable therewith from a position beneath the magazine into operative association with the spindle, said receptacle having a gripping member movable relative thereto, spring means for moving the gripping member into engagement with the bobbin in the receptacle as the latter moves out of position beneath the magazine, an escapement device operatively associated with the magazine and movable in the return stroke of the receptacle into position to release the next lowermost bobbin from the magazine into the receptacle, and stop means engageable by said gripping means as a receptacle moves into position beneath the magazine whereby to shift the gripping means against the action of its spring means into position to permit delivery of a bobbin into the receptacle.

7. In a bobbin winding machine having a winding spindle, a bobbin donning mechanism comprising a bobbin receiving and transporting cradle with a bobbin receiving recess therein, means for moving said cradle from a normal position at one side of said spindle, with said recess opening upwardly for the reception of a bobbin, into operative association with the spindle, with the recess opening laterally, a locking element pivoted relative to said cradle and notched for engagement with a bobbin supported in said recess, and spring means acting upon said locking element and operative as an incident to the movement of the cradle away from its said normal position to move said element into locking engagement with the bobbin therein.

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