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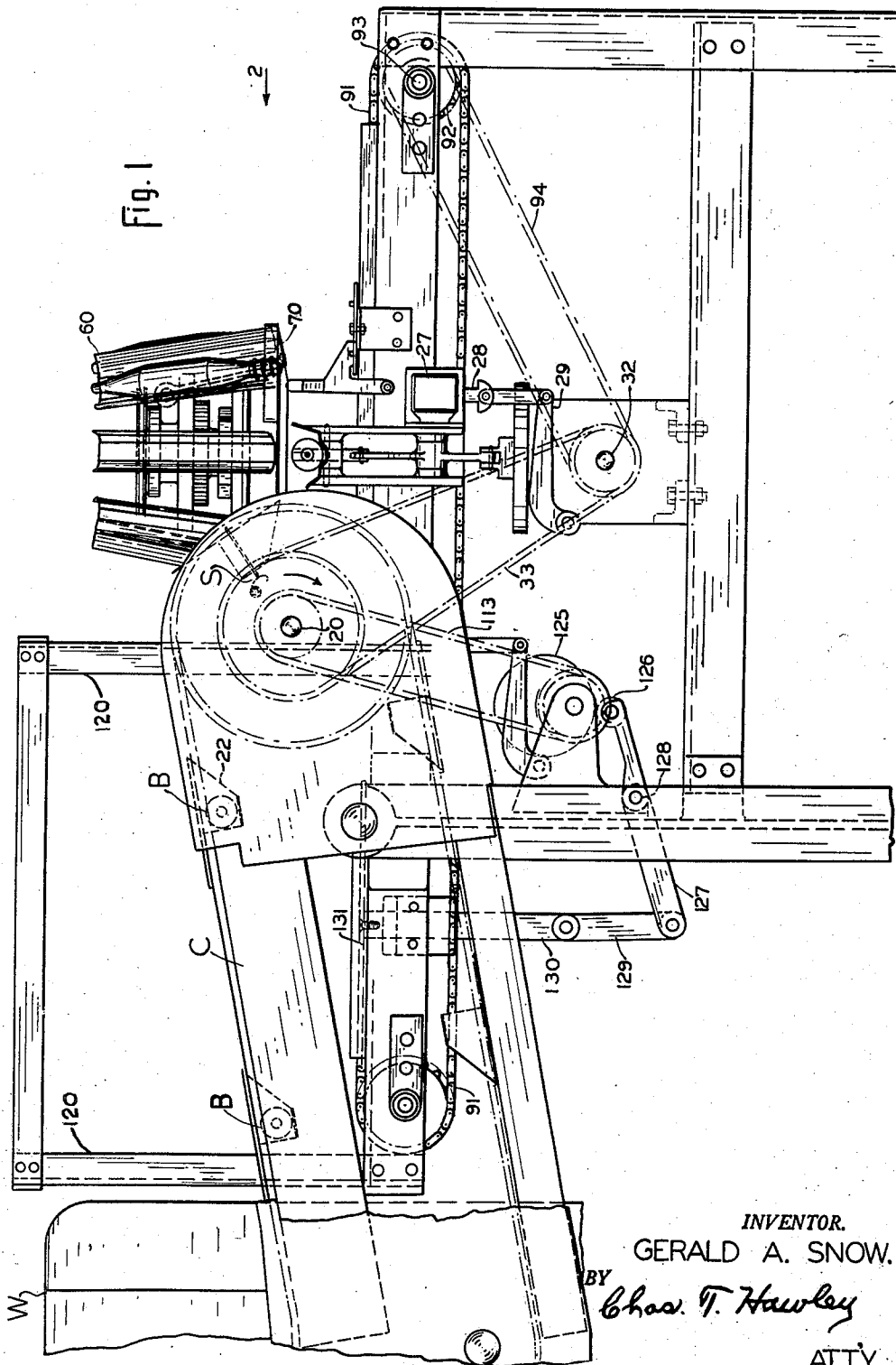
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2,846,833

APPARATUS FOR LOADING BOBBINS ON PIN-BOARDS

Filed March 25, 1953

6 Sheets-Sheet 1



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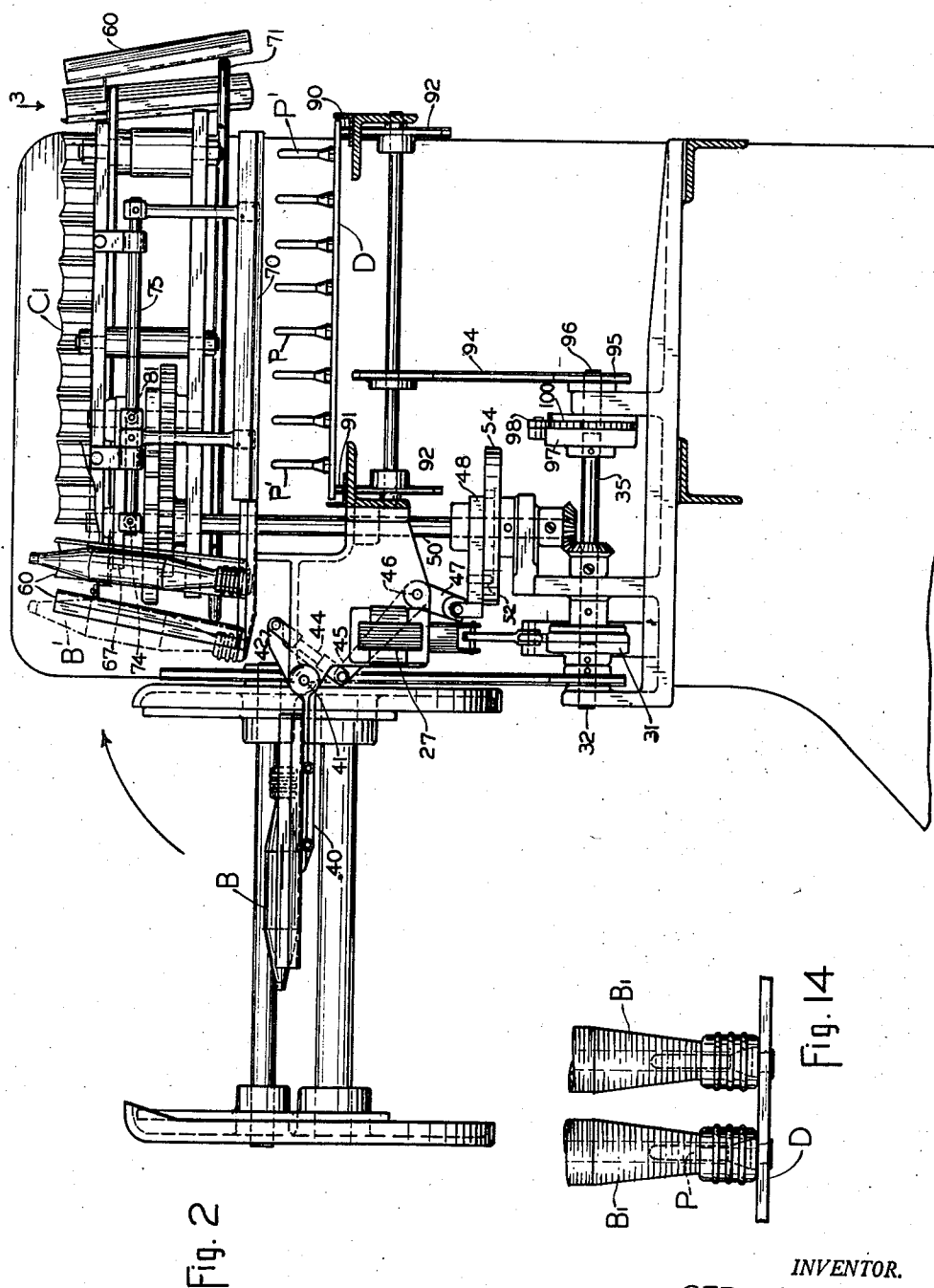
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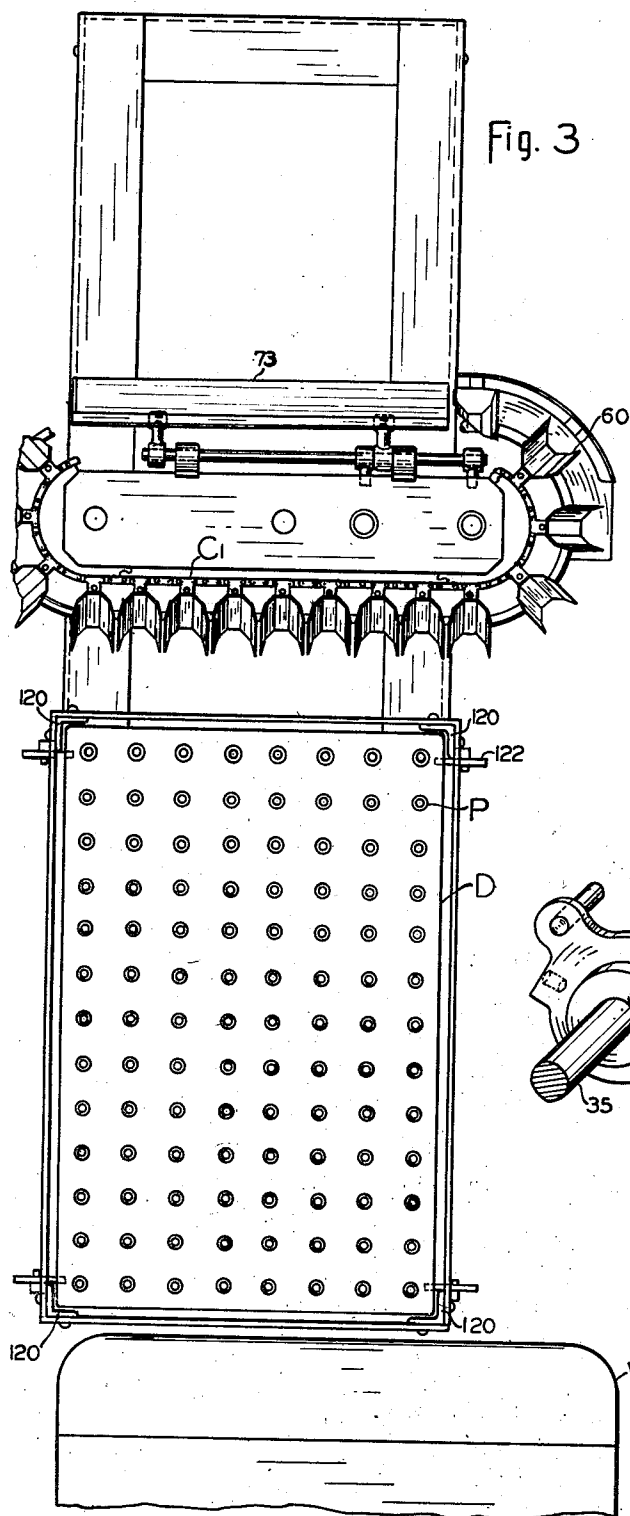


Fig. 3

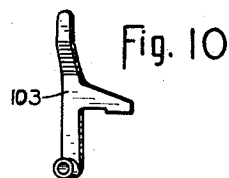


Fig. 10

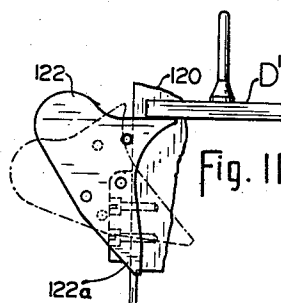


Fig. 11

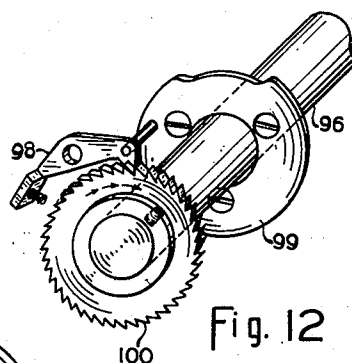


Fig. 12

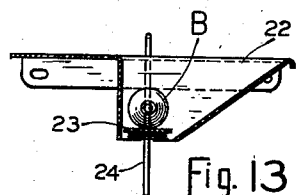
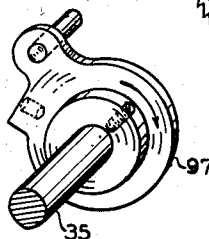


Fig. 13

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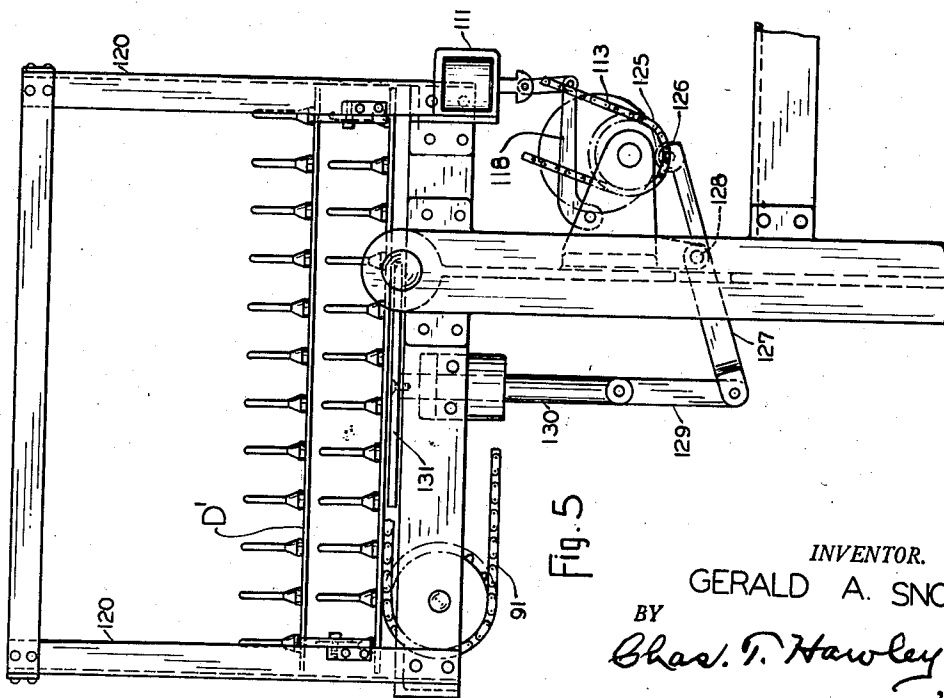
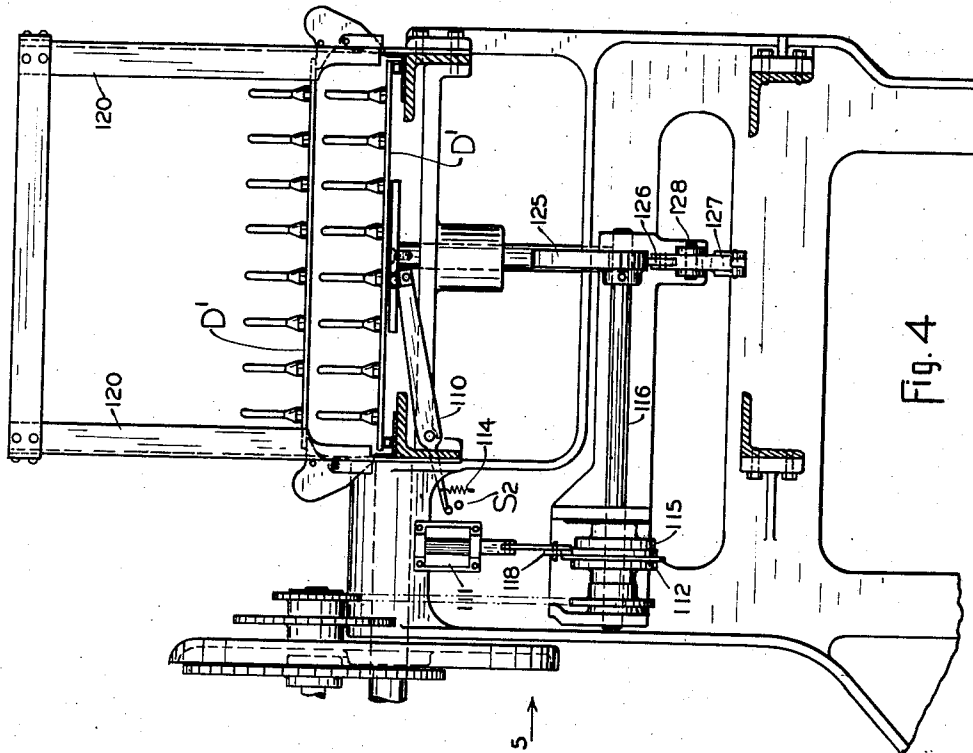
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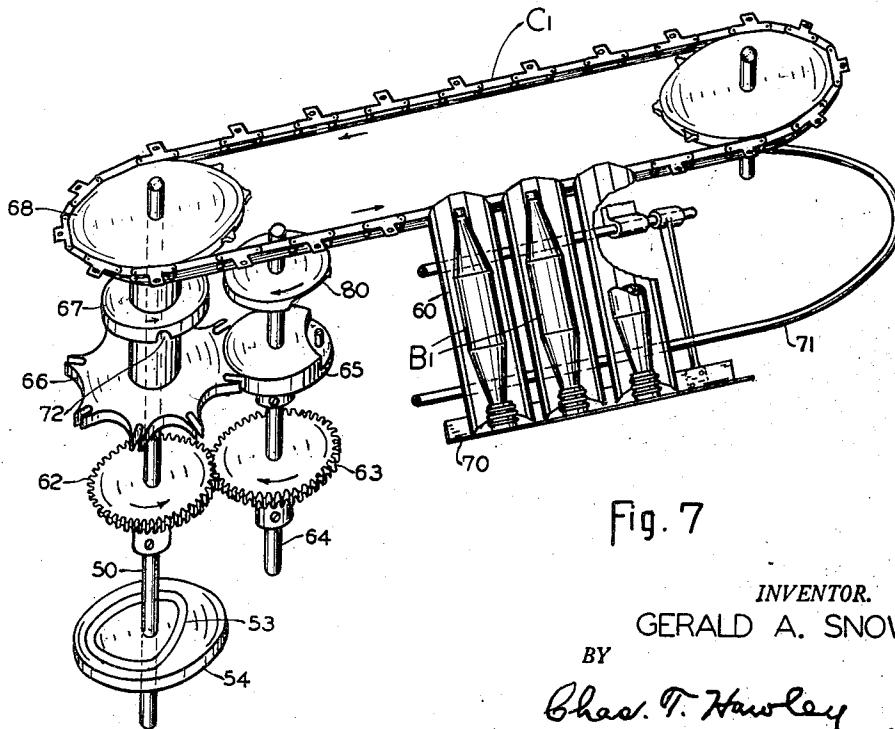
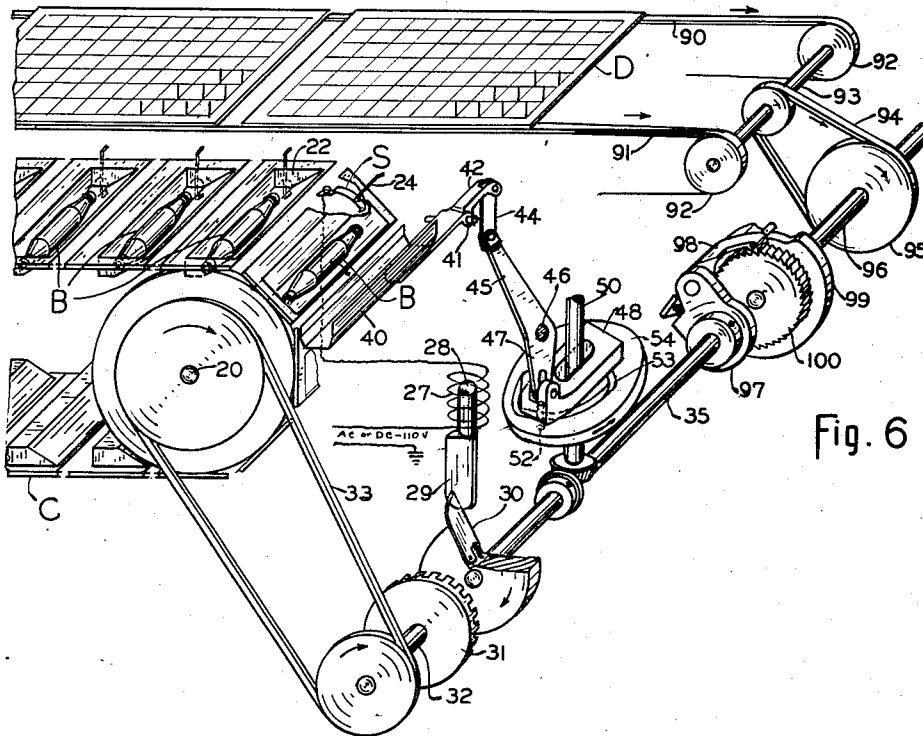


Fig. 7

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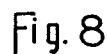
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APPARATUS FOR LOADING BOBBINS ON PIN-BOARDS

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Application March 25, 1953, Serial No. 344,627

3 Claims. (Cl. 53—160)

Apparatus is known in the winding art by which bobbins or other weft carriers may be wound on a plurality of adjacent winding units and by which the full bobbins from all units may be deposited on a conveyor for transfer to a common delivery or discharge point.

In the case of bobbins wound with silk or with any synthetic thread resembling silk, it is desirable that each wound bobbin be placed promptly on a separate upright pin in a so-called "pin-board," which latter may hold upward of a hundred bobbins. This storage arrangement prevents injury to delicate threads by accidental contact.

It is the general object of this present invention to provide improved automatic apparatus for placing the full bobbins successively on the pins of a pin-board, and for removing and replacing each pin-board as it is fully loaded.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a front elevation of my improved pin-board loading apparatus, together with a portion of a coacting bucket conveyor;

Fig. 2 is an end view, looking in the direction of the arrow 2 in Fig. 1;

Fig. 3 is a partial plan view, looking in the direction of the arrow 3 in Fig. 2;

Fig. 4 is an end view, partly in section, of certain pin-board replacing mechanism to be described;

Fig. 5 is a partial side elevation, looking in the direction of the arrow 5 in Fig. 4;

Fig. 6 is a diagrammatic and partially perspective view of certain parts of the mechanism for removing full bobbins from the bucket conveyor and for transferring these bobbins to the carrier conveyor best shown in Figs. 2 and 7;

Fig. 7 is a perspective view of certain mechanism for intermittently advancing the carrier conveyor;

Fig. 8 is a perspective view of certain mechanism for transferring a group of filled bobbins from a series of carrier conveyor units to an associated group of pins in a pin-board, and for thereupon releasing the pin-board for an advance or feeding movement;

Fig. 9 is a perspective view of mechanism for replacing a filled pin-board by an empty pin-board from storage;

Fig. 10 is a detail view of a holding latch shown in Fig. 8;

Fig. 11 is a detail view of a holding latch shown in Fig. 9;

Fig. 12 is an exploded view of certain intermittent feeding mechanism shown in Fig. 6;

Fig. 13 is a detail sectional view of a conveyor bucket to be described; and

Fig. 14 is a fragmentary detail of a portion of a loaded pin-board.

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Referring to Fig. 1, the fully-wound bobbins B from a series of associated winding units W are deposited on a chain-type bucket conveyor C which is continuously advanced by a winding shaft 20. Each conveyor bucket comprises a trough 22 (Fig. 13) having a depressible bottom plate 23 provided with an upright pin 24.

When a full bobbin B is deposited in the trough 22, the plate 23 and pin 24 are depressed. As the bucket thereafter approaches bobbin-discharge position, the pin 24 closes a switch to complete a circuit which initiates operation of certain mechanism provided for receiving the full bobbin and for transferring the full bobbin to the carrier conveyor, all as best shown in Figs. 2 and 6.

Bobbin transfer to carrier conveyor

Referring to Fig. 6, the depressed pin 24 engages and closes a switch S in a power circuit which contains a solenoid coil 27. This coil, when energized, raises a plunger 28 having a wedge member 29 associated therewith. When the switch S is open, the wedge member 29 holds a swinging latch 30 out of engagement with a notched clutch disc 31 on a shaft 32 which is connected by a chain 33 to the conveyor shaft 20. The shaft 20 is continuously rotated as previously explained.

When the switch S is closed to withdraw the wedge 29, the latch 30 engages the clutch disc 31 and the associated shaft 35 is given a single revolution. During this revolution the switch S is again opened. Also the full bobbin B is dropped on a trough-like transfer member 40 (Fig. 2) which is then swung upward about its fixed pivot 41 by the following mechanism.

An offset portion or arm 42 (Fig. 2) of the member 40 is connected by a link 44 to an arm 45 pivoted at 46 and having an associated arm 47 which has a pin-and-slot connection to a slide 48. The slide 48 (Fig. 6) is slotted to embrace an upright shaft 50 which is gear-driven from the shaft 35 previously described. A pin 52 in the slide 48 extends into a cam groove 53 in a disc cam 54 (Fig. 7) secured on the shaft 50.

With these connections, it will be clear that each time the shaft 35 makes a single revolution, the shaft 50 will make a similar revolution, and the cam disc 54 will move the slide 48 to rock the transfer member 40 to shift a full bobbin B from the horizontal position shown in Fig. 2 to a substantially upright position in one of the carrier units 60 on the carrier conveyor C' and as shown at B' in Fig. 2. The cam groove 53 then retains the transfer member 40 in its normal vertical position from which it will thereafter be again moved to horizontal position when another full bobbin approaches transfer position.

Carrier conveyor feed

The means for intermittently advancing the carrier conveyor C' is best shown in Figs. 6 and 7. The intermittently-advanced shaft 50 is extended above the disc cam 54 and is provided with a gear 62 (Fig. 7) which meshes with an equal gear 63 on a parallel shaft 64.

A Geneva pinion 65 is secured to the shaft 64 and intermittently advances a Geneva gear 66 which is loose on the shaft 50 and which has a disc 67 and a sprocket 68 associated therewith. The carrier units 60, mounted to swing on the conveyor C' associated with the Geneva gear 66, are intermittently-advanced by the sprocket 68.

The shaft 64 (Fig. 7) receives one full revolution each time a full bobbin B is dropped onto the transfer member 40, and the associated parts 66, 67 and 68 are advanced $\frac{1}{8}$ of a revolution or 45°.

The conveyor C' is thus advanced one space at each operation of the transfer member 40, so that successive carrier units 60 with full bobbins B' move across the front of the carrier assembly as viewed in Fig. 2 until eight adjacent carrier units 60 have been filled and ad-

vanced and are in transverse alignment. The bobbins B' in these aligned carrier units rest on an angle iron or cross bar 70 (Figs. 1 and 8), which normally supports the full bobbins B' in the position shown in Fig. 2. The lower ends of the swinging carrier units 60 are positioned by a fixed guide bar 71.

Bobbin release mechanism

Mechanism best shown in Fig. 8 is provided for depositing a row of bobbins B' on a row of pins P in a pin-board D. For this purpose, the disc 67 (Figs. 7 and 8) is provided with a notch 72 in its under side. The disc 67 normally holds down an arm 74 (Fig. 8) on the shaft 75 which supports the cross bar 70. Once in each revolution of the disc 67, the notch 72 allows the arm 74 to swing upward, and the cross bar 70 is then moved backward by a spring 73 and gravity to release the bobbins B' resting thereon. These eight bobbins thereupon slide downward and are received and held upright by the pins P on an operatively-positioned pin-board D, as shown in Fig. 14.

A cam disc 80 (Fig. 8) is mounted on the upper part of the Geneva pinion shaft 64 and rotates above an arm 81 on the shaft 75 which supports the cross bar 70. The cam disc 80 rotates once with every revolution of the Geneva pinion 65, and on each rotation it swings the cross bar 70 back to supporting position if it has been displaced therefrom. Consequently, when the cross bar is released by the notch 72 and is moved back to discharge its load, it is promptly thereafter returned to holding position by the action of the cam disc 80.

Pin-board release and feed

The pin-boards D rest upon a pair of conveyor chains 90 and 91 (Fig. 6) driven by sprockets 92 on a cross shaft 93 which is connected by a chain 94 and sprocket 95 to a shaft 96 aligned with the shaft 35 previously described. The shaft 35 has an arm 97 supporting a pawl 98 (Fig. 12) which rotates about a fixed annular disc 99. This disc is cut away for a relatively short segment to uncover certain teeth of a ratchet wheel 100 secured on the end of the shaft 96. At each revolution of the shaft 35, the pawl 98 thus advances the ratchet wheel 100 a limited number of teeth and correspondingly advances the chains 90 and 91 which support the pin-board D.

There is no positive connection between the pin-board D and the chains 90 and 91, and the board is normally held from forward movement by the chains by engagement of the end pins P' on the board D with star wheels 102 mounted on fixed pivots and normally held from rotation by latches 103 (Figs. 8 and 10).

When the bar 70 is swung backward to release a load of bobbins, the bar 70 disengages the latches 103 from the star wheels 102, so that the pin-board D may be frictionally advanced one space by the conveyor chains 90 and 91. As the cross bar 70 is returned to supporting position, the latches 103 are released and again lock the star wheels 102.

Pin-board replacement

I will now describe the mechanism for replacing a loaded pin-board D. As above described, the pin-board D is released for a limited forward movement each time a row of pins P is filled. When the full pin-board D is thus released after the last row of pins has been filled, it continues to travel forward with the chains 90 and 91, and an open space is left at the rear of the pin-board.

A lever 110 (Fig. 9) normally engages the under side of the pin-board but when this open space appears, the lever 110 is rocked by a spring 114 to close a switch S2 which controls a solenoid 111 (Figs. 4 and 5) associated with a one-revolution clutch similar in construction to the clutch 30-31 previously described.

This second clutch comprises a notched disc 112 (Fig. 9) continuously rotated by a chain 113 from the conveyor shaft 20 previously described. A disc 115 is mounted

on a short shaft 116 and has a swinging latch 117, normally held out of action by an arm 118. When the switch S2 is closed, the arm 118 is drawn upward, releasing latch 117, which then engages the disc 112. The shaft 116 thereupon makes a single revolution.

A stack of empty pin-boards D' (Fig. 9) are held in superposed storage between guide-bars 120, and the lowest board is held in slightly raised position by a plurality of latches 122 shown in detail in Fig. 11.

An eccentric 125 (Fig. 9) is mounted on the shaft 116 and engages a roll 126 on a lever 127 mounted on a fixed pivot 128. The lever 127 is connected by a link 129 to a plunger 130 which is provided with a plate 131 which underlies the lowermost pin-board D'.

As the plunger 130, the plate 131 and the stack of empty boards are raised by the eccentric 125, the latches 122 are freed, and these latches are so weighted that they then move out of operative position and no longer support the lowermost pin-board. As the plunger 130 thereafter moves downward, this lowermost pin-board is deposited on the conveyor chains 90 and 91 and is thereafter fed forward to bobbin-receiving position, as indicated by the pin-board D in Fig. 3.

As this lowermost pin-board moves down with the plunger 130, it engages the depending arms or tails 122a (Fig. 11) of the latches 122 and returns the latches to holding position, where they engage and support the next higher empty pin-board D' as it moves downward to reserve position just clear of the chains 90 and 91.

Operation

The general operation of my improved pin-board loading apparatus is as follows:

It is assumed that the parts are in the position indicated in Fig. 2, and with a filled conveyor bucket 22 (Fig. 11) approaching the discharge end of the bucket conveyor C.

The full bobbin B in the bucket 22 holds the pin 24 depressed (see Fig. 13), and as this bucket reaches discharge position, the pin 24 closes the switch S (Fig. 6) which withdraws the wedge 29 and permits the latch 30 to engage the clutch disc 31 and to thereby cause the shaft 35 to make one revolution.

The shaft 50 (Figs. 6 and 7) makes a corresponding revolution, and the cam disc 54 operates through the slide 48 to swing the transfer member 40 upward, thus placing the full bobbin B deposited from the bucket 22 in one of the carrier units 60 in the carrier conveyor C', the bobbin being shown at B' in Fig. 2.

The carrier conveyor C' is then advanced one space by the Geneva pinion 65 and Geneva gear 66 as indicated in Fig. 7.

The pin-board supporting chains 90 and 91 are also given an intermittent advance movement, but the pin-board is held from corresponding advance movement by the star wheels 102.

After eight successive advance movements of the carrier conveyor C', the arm 74 (Fig. 8) enters the notch 72, the cross bar 70 is withdrawn, and a row of full bobbins B' from the filled carrier units 60 is dropped on a transverse row of pins P in the pin-board D. The latches 103 (Fig. 8) are momentarily released by the backward movement of the bar 70, and the pin-board D is free to frictionally advance one step by the chains 90 and 91 but is held from further advance by return of the latches 103 to locking position.

This cycle of operations is repeated until the last row of pins in the pin-board D is filled. The next forward movement of the pin-board leaves an open space behind the board which allows the lever 110 (Fig. 4) to move upward and to thereby close the switch S2 (Fig. 9) which causes the shaft 116 to make one full revolution.

During this revolution, the eccentric 125 (Fig. 9) operates initially through the lever 127 to lift the plunger 130, the plate 31 and the stack of empty pin-boards D'. This stack of boards is lifted far enough to release the

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weighted latches 122, so that on the subsequent return downward movement of the stack, the lowermost pin-board is deposited on the chains 90 and 91. At the same time, the next higher pin-board in the stack is caught and supported in slightly raised position by the latches 122. 5

This deposited and empty pin-board is then frictionally advanced by the chains 90 and 91 until the first row of pins P is in position to receive bobbins dropped from the carrier units 60. Then the board D is locked and held in this position by the star wheels 102 until its first row of pins P is filled, after which it is advanced one space as previously described. 10

The operation of the mechanism is thus entirely automatic and the attendant merely removes the filled boards from the right-hand end of the conveyor chains 90 and 91 and sees that the stack of empty boards in storage is replenished from time to time. 15

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is: 20

1. Pin-board loading mechanism comprising a carrier conveyor having a plurality of bobbin-holding carrier units, means to advance said carrier conveyor step-by-step, a continuously-moving collecting conveyor having buckets to receive and transport full bobbins, a single means to transfer a full bobbin direct from a bucket to a carrier unit, a pin-board, friction chains supporting said pin-board beneath said carrier conveyor, and means to intermittently advance said chains, and said latter means including a normally-stationary but rotatable ratchet wheel, a concentric stationary shield having a limited cut-away portion, an arm supporting a pawl which yieldingly engages said ratchet wheel, and means to give said arm and pawl a single revolution each time said transfer means is operated. 25

2. Pin-board loading mechanism comprising a carrier conveyor having a plurality of bobbin-holding carrier units, means to advance said carrier conveyor step-by-

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step, movable transfer means, a continuously-moving collecting conveyor having buckets to receive and transport full bobbins and to present them separately and successively to said transfer means, and said movable transfer means separately receiving each full bobbin from a conveyor bucket as it reaches transfer position and in a horizontal position and separately raising and depositing said separate bobbin in a carrier unit in a substantially upright position.

3. Pin-board loading mechanism comprising a carrier conveyor having a plurality of bobbin-holding carrier units, means to advance said carrier conveyor step-by-step, movable transfer means, a continuously-moving collecting conveyor having buckets to receive and transport full bobbins and to present them separately and successively to said transfer means, and said movable transfer means comprising a pivoted transfer arm having a bobbin-receiving trough, means to swing said arm and trough from an upright bobbin-depositing position to a horizontal bobbin-receiving position, and means to thereafter raise said arm and trough from said horizontal bobbin-receiving position to said upright bobbin-depositing position while said carrier conveyor is at rest.

References Cited in the file of this patent

UNITED STATES PATENTS

584,818	Fleckenstein	June 22, 1897
1,062,250	Peterson	May 20, 1913
1,090,855	Jagenberg	Mar. 24, 1914
1,435,263	Soubier	Nov. 14, 1922
1,950,077	Benoit	Mar. 6, 1934
1,991,835	Axccl	Feb. 19, 1935
2,505,427	Peterson	Apr. 25, 1950
2,543,931	Peterson	Mar. 8, 1951
2,642,196	Vahle	June 16, 1953
2,675,184	Abbott et al.	Apr. 13, 1954
2,703,669	Voegelin	Mar. 8, 1955