Aug. 5, 1958 W. H. BANKS ET AL 2,845,957

AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Oct. 15, 1956 5 Sheets-Sheet 1

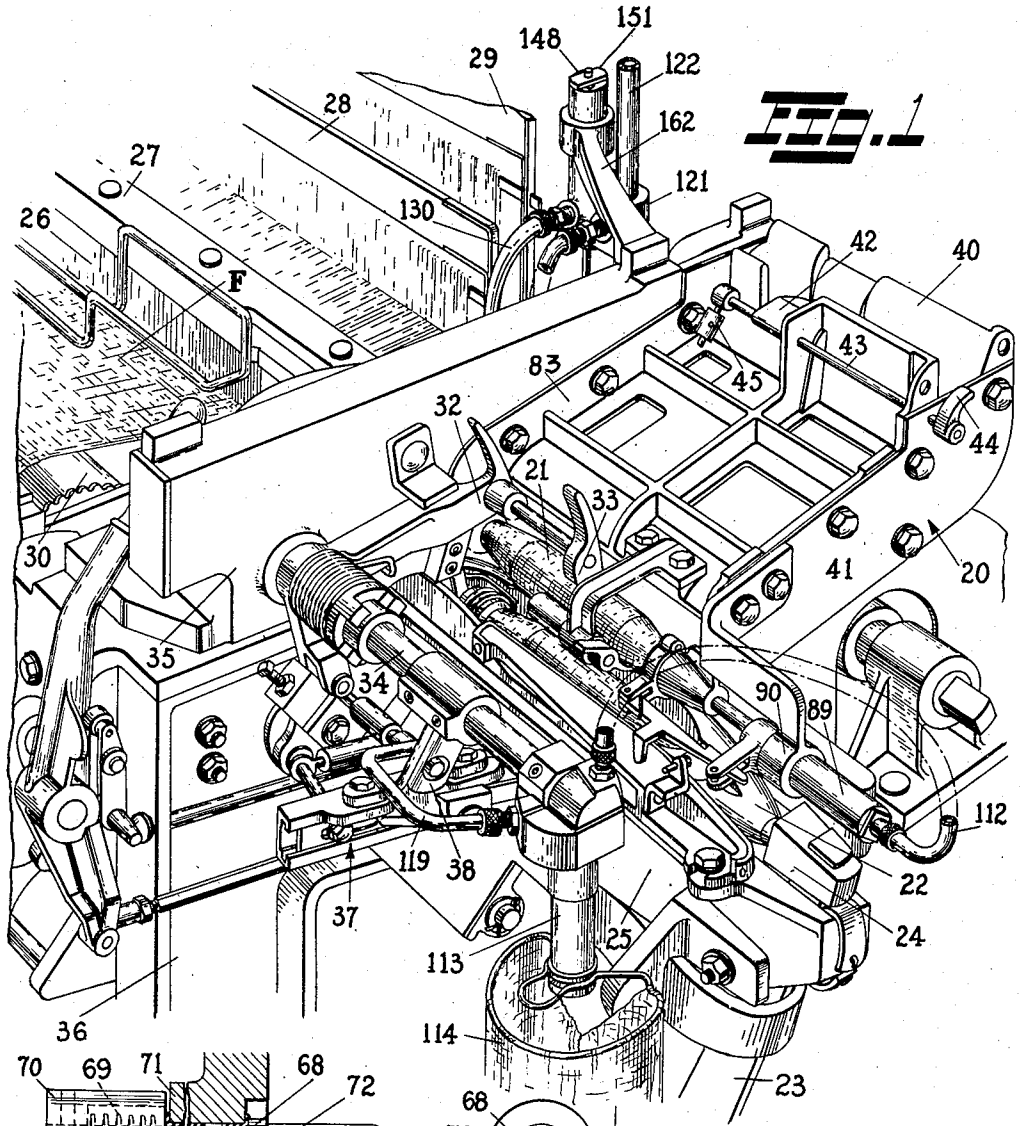


FIG. 1

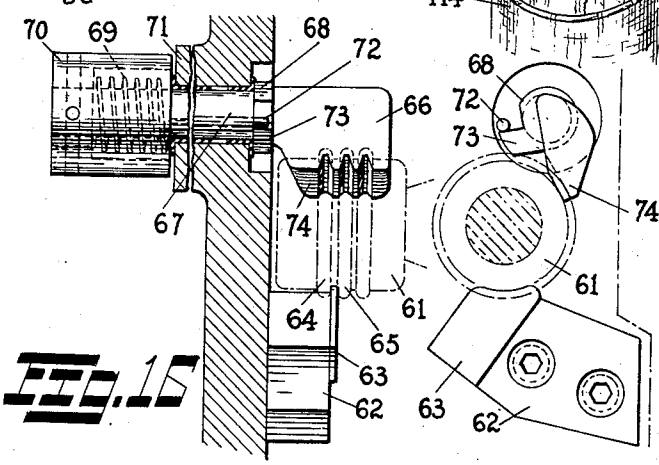


FIG. 15

FIG. 17

INVENTOR.
WALDO H. BANKS
HARRISON N. THIBAULT

BY Rodney C. Swinehart

ATTORNEY

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AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Oct. 15, 1956 5 Sheets-Sheet 2

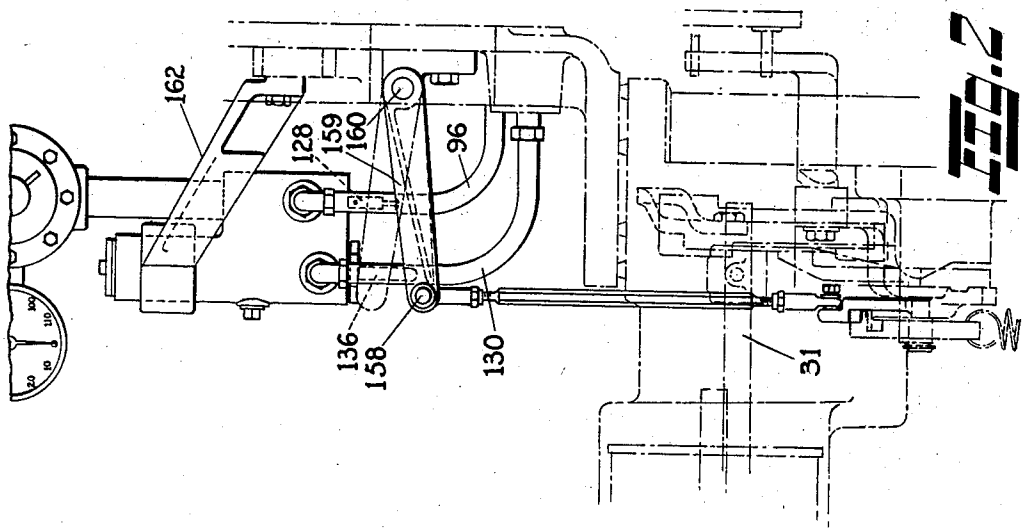


Fig. 2

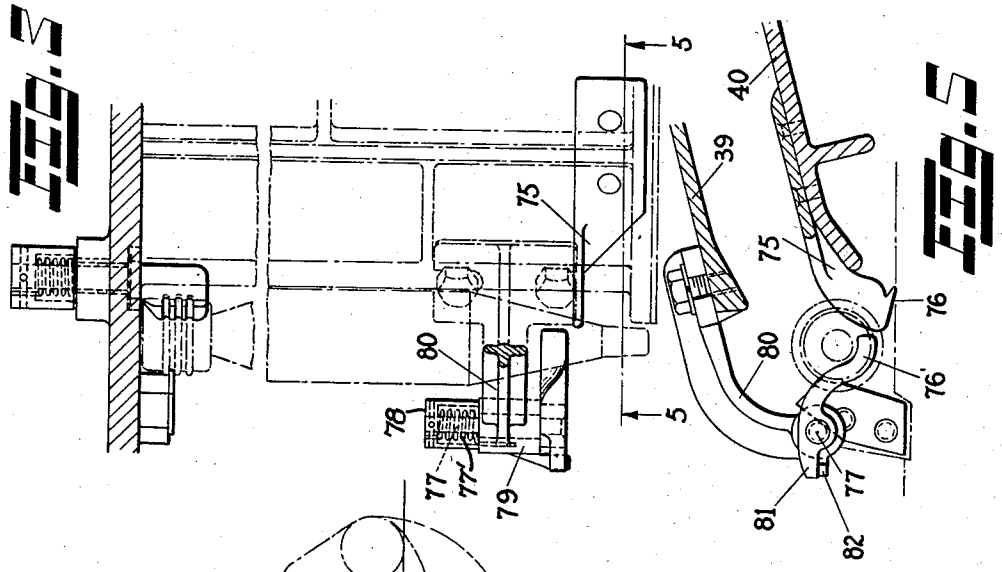


Fig. 5

Fig. 3

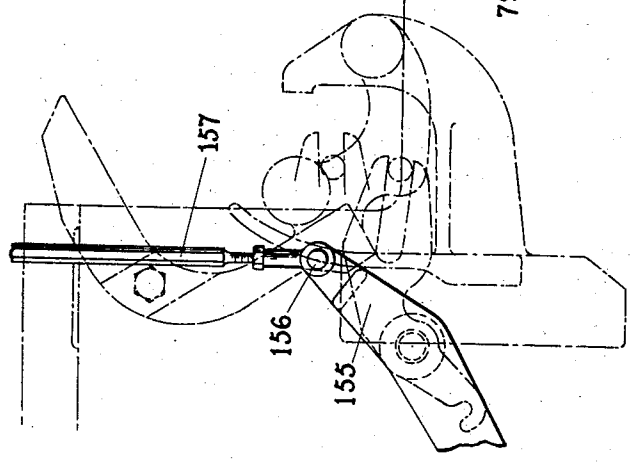


Fig. 4

INVENTOR.
WALDO H. BANKS
HARRISON N. THIBAULT

BY Rodney C. Sandworth

ATTORNEY

Aug. 5, 1958 W. H. BANKS ET AL 2,845,957

AUTOMATIC BOBBIN REPLENISHING LOOM

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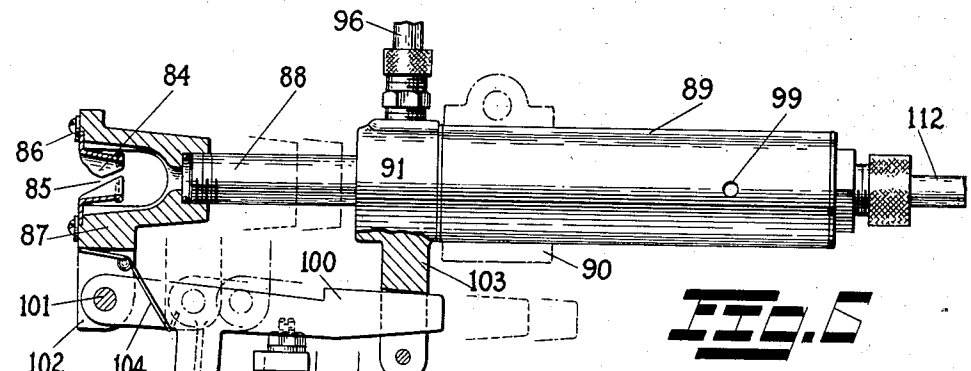


FIG. 6

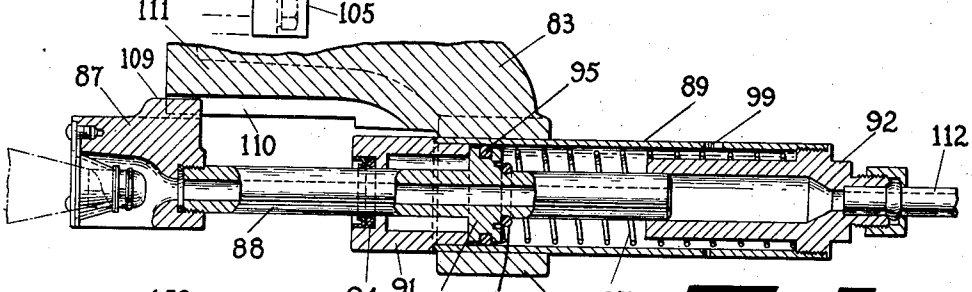


FIG. 7

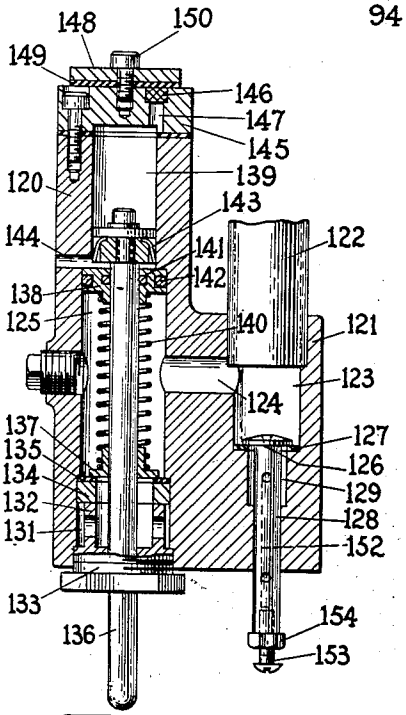


FIG. 9

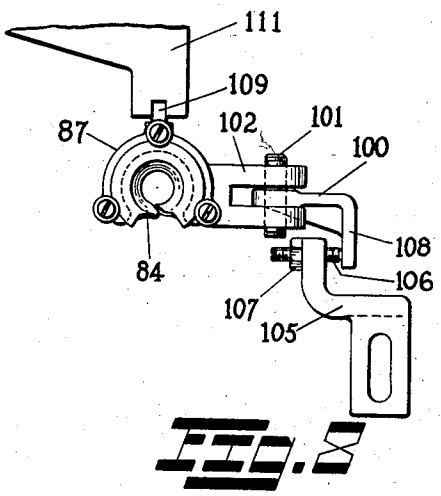


FIG. 8

INVENTOR.
WALDO H. BANKS
HARRISON N. THIBAULT

BY Rodney C. Smith

ATTORNEY

Aug. 5, 1958 W. H. BANKS ET AL 2,845,957

AUTOMATIC BOBBIN REPLENISHING LOOM

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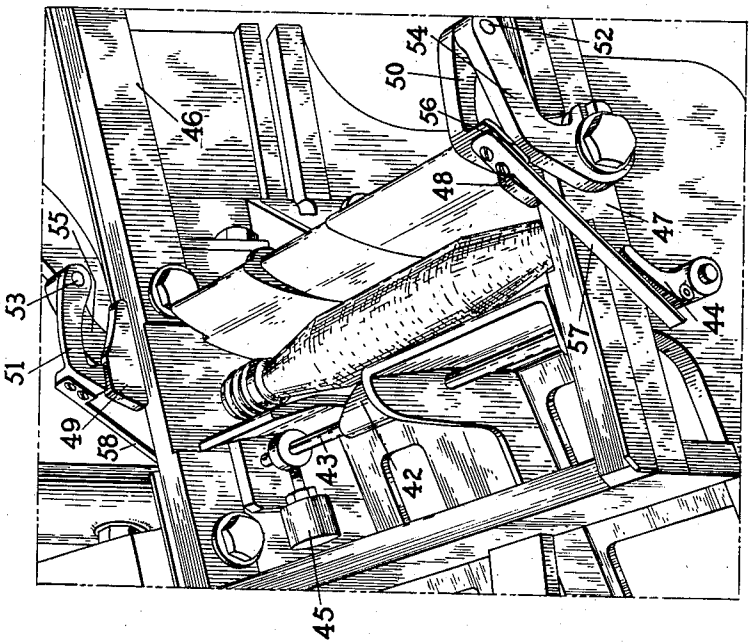


Fig. 11

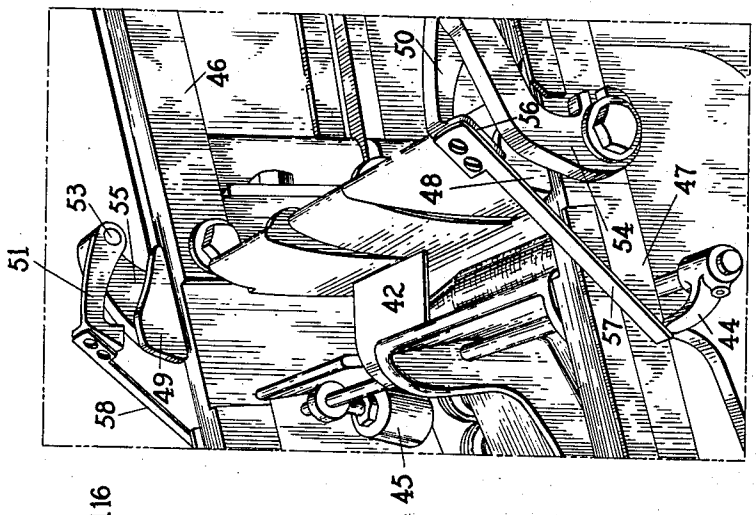


Fig. 10

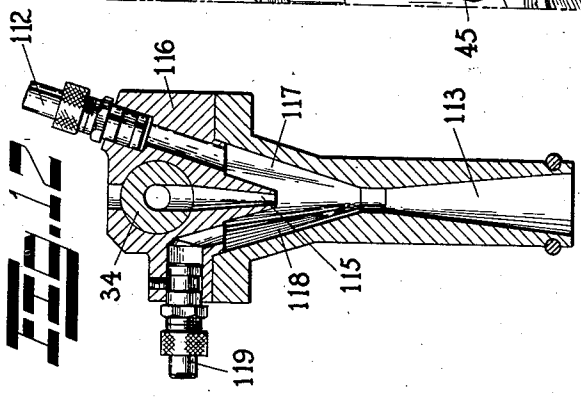


Fig. 12

INVENTOR.
WALDO H. BANKS
HARRISON N. THIBAULT

BY Rodney C. Sandworth

ATTORNEY

Aug. 5, 1958 W. H. BANKS ET AL 2,845,957

AUTOMATIC BOBBIN REPLENISHING LOOM

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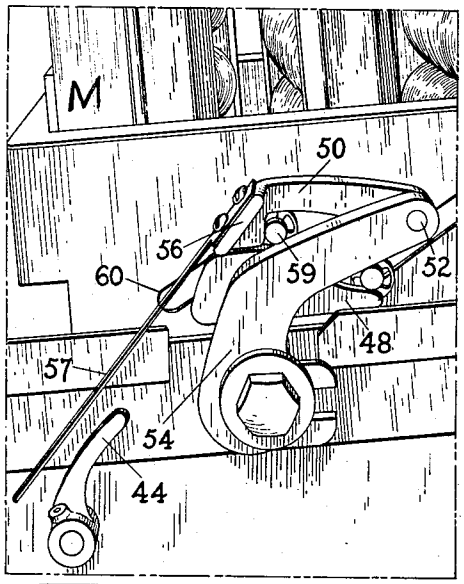


Fig. 14

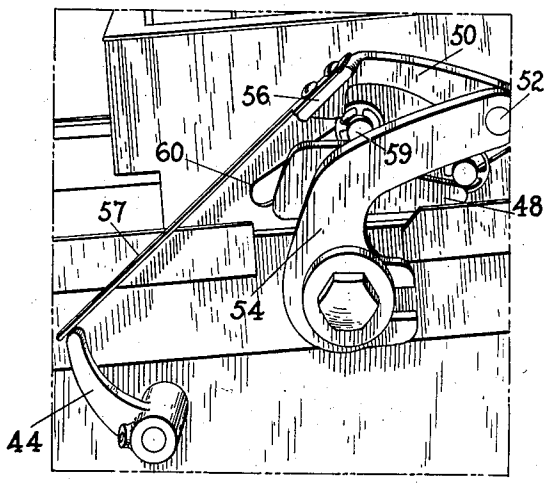


Fig. 15

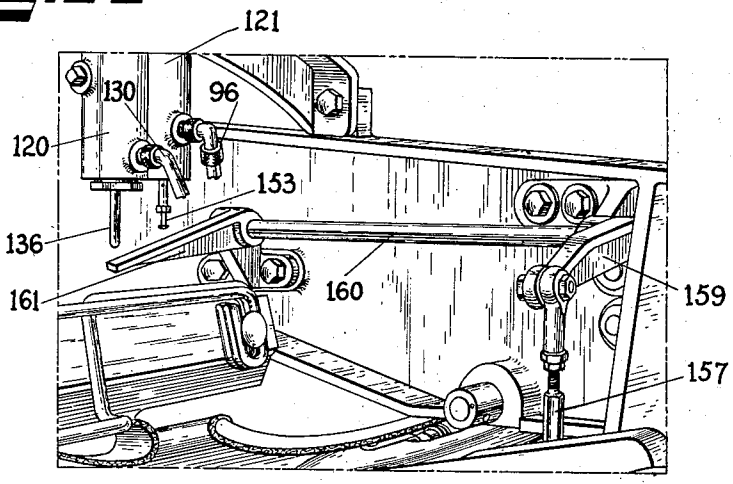


Fig. 13

INVENTOR.
WALDO H. BANKS
HARRISON N. THIBAULT

BY Rodney C. Sawtelle

ATTORNEY

United States Patent Office 2,845,957 Patented Aug. 5, 1958

2,845,957

AUTOMATIC BOBBIN REPLENISHING LOOM

Waldo H. Banks and Harrison N. Thibault, Hopedale, Mass., assignors to Draper Corporation, Hopedale, Mass., a corporation of Maine

Application October 15, 1956, Serial No. 615,905

24 Claims. (Cl. 139—247)

This invention relates to looms for weaving and more particularly, to improvements in batteries for looms in which a supply of filling packages are introduced from a magazine and are automatically controlled in their advance to a position of transfer, withdrawal of the filling end and holding and disposing of that end along with the end from the outgoing filling package.

It is a general object of the invention to improve mechanisms of the type described so that they may be greatly simplified, more effective and dependable in operation and to relate the entire device very largely to an air system by which it is caused to operate in timed sequence with other loom functions.

It is a more specific object to improve the control at the battery entrance in such manner that the magazine employed therewith shall be very precisely stopped in a desired position and shall move quickly and certainly throughout the exact distance by which the adjacent bobbin tiers are spaced.

A further object is that of more effectively maintaining the bobbin next to be transferred in position to have its filling end removed and to be accurately transferred to the shuttle.

Another object is that of devising a simple, coaxially arranged filling bunch extractor or remover and ejector which shall be operated by air under pressure.

A further object is that of improving an air actuated timer and valve system which shall be tied into the air pressure system and shall serve more precisely to regulate the cycle during which air pressure and/or suction may function at and subsequent to transfer of a filling package.

Other objects will become apparent from the following more detailed disclosure.

In automatic, bobbin replenishing looms it has been suggested that an automatic battery be fed from a supply of filling packages (preferably filling wound bobbins) prepared in various ways, thereby to cut down some of the labor costs entering into the weaving of fabric. Most of these have never functioned satisfactorily and thus have not gone into commercial usage.

According to certain recent improvements, a battery has been devised which is fed from a magazine such, for example, as that described in copending applications Serial No. 528,928, filed August 17, 1955, now Patent No. 2,778,382, granted January 22, 1937, but which, however, may be supplied from any other suitable means. The invention, is however, to be practiced with bobbins filling wound and having the thread end temporarily anchored to the bobbin tip by winding it as a tip finding bunch as in United States Patent No. 2,650,769, for example.

In copending application Serial No. 607,420, filed August 31, 1956, a very effective means has been disclosed and claimed in which an automatic battery receives bobbins from a magazine movable under the influence of gravity and loom vibration. In that mechanism certain functions were accomplished mechanically or by mechanically actuated means which, according to improvements herein described and claimed, are more effectively and simply actuated by air under pressure.

According to the invention, a tip bunch remover is combined with a suction thread disposal means the latter of which is concentrically contained within a part of the former and both connected to an air system at the loom so as to be directly responsive to the admission of air at a nozzle and venturi, one being affected by the air at elevated pressure while the other is subjected to suction developed at the venturi.

The timing of the functions is under the regulation imposed by an air timer means acting to valve air to the system upon the initial movement of the members of the bobbin transfer system.

With this bunch remover and suction holding means which also disposes of the bunch and end when the latter is cut at the cloth selvage there is provided a second suction means acting at the proper time to dispose of the end from the selvage which was cut at the outgoing, exhausted supply.

The invention will be described in greater detail by reference to a specific embodiment of the same as illustrated in the accompanying figures of drawing, wherein:

Fig. 1 is a perspective view showing the replenishing end of a loom to which the invention has been applied.

Fig. 2 is a view showing a part of a loom in front elevation and illustrating the timer and its interconnection to the transfer means.

Fig. 3 is a plan view of the lower end of a battery with a bobbin in position for transfer.

Fig. 4 is a detail view of certain control means at the transfer setting mechanism.

Fig. 5 is a section at line 5—5, Fig. 3.

Fig. 6 is a general view, parts being in section, of the bunch remover and other parts pertinent thereto.

Fig. 7 is a vertical section through the mechanism of Fig. 6.

Fig. 8 is an end view of the mechanism of Figs. 6 and 7.

Fig. 9 is a section through the air valve and timing means employed.

Fig. 10 is a perspective view showing certain magazine stopping and bobbin releasing means in position for the magazine to be advanced.

Fig. 11 is a similar view, but showing the parts in position to lock the magazine in a position of rest.

Fig. 12 is a section through a nozzle and venturi by which air under pressure is used to induce suction in parts of the system.

Fig. 13 is a perspective view further illustrating the control connections to the timer.

Figs. 14 and 15 are enlarged detail views showing the cam control employed for raising the magazine latches.

Fig. 16 is a detail view of means for retaining the butt of a bobbin in transfer position.

Fig. 17 is a section showing the parts of Fig. 16 as seen from the end.

Now referring to Figs. 1 through 5, a more or less conventional fly shuttle loom has applied thereto an automatic battery generally indicated by numeral **20** through which a plurality of filling packages are progressed, the lower one only of which is shown at **21**, Fig. 1, in readiness for transfer to a shuttle **22** when required. The shuttle is picked by the usual stick **23** and picker **24** from the box **25** at that side of the loom and, of course, is returned by similar means at the opposite side. It is guided to and fro along a lay **26** and reed **27** and through the usual warp shed formed by warp threads passing through heddles in harness frames **28** and **29**. The fabric F is taken up after being drawn over a take-up roll **30** which is positively driven.

When filling on the bobbin running in the shuttle is nearly exhausted, a filling feeler and other mechanism indicates a transfer in a known manner at which time a starter shaft 31 at the front of the loom, Fig. 2, is rocked to set the loom for the replenishing cycle. At the next forward beat of the lay, through means well known in the art, the bobbin 21 is projected from the battery into the shuttle by a transfer hammer 32 and tip pusher 33. These are mounted on a transfer stud shaft 34 fixed in an extension or plate 35 attached above loomside 36.

A Stafford type cutter and binder 37 is mounted to depend from shaft 34 upon a bracket 38, Fig. 1. This cutter is of more or less conventional construction and need not be described in detail here since a full disclosure is available in United States Patent No. 2,711,193.

This much of the basic loom mechanism has been briefly referred to for the purpose of laying a foundation for detailed description of the invention which is applied to and functions with the loom structure just above mentioned.

The battery 20 is comprised as a downwardly inclined chute having an upper member 39 and a lower member 40, Figs. 1 and 5, between which a number of bobbins are guided as they move by gravity from the entrance end at the top to the lower or feeding end at which bobbin 21 is maintained in readiness for transfer. Both members 39 and 40 are bolted against the supporting plate 35 and have a flat plate 41 bolted at their outer ends so that the bobbin channel is thus enclosed and bobbins are constrained to move down in guided parallelism so long as the chute is kept reasonably well filled.

At the top end bobbins drop down from a magazine M, Fig. 14, as explained in the application Serial No. 528,928, now Patent No. 2,778,382, or from any other source and pass a feeler plate 42 fixed to a spindle 43 which is borne in the side members of the chute and has fixed at each end a cam finger 44, the outer one only of which shows in the illustrations. A counterbalance weight 45 tends to maintain the plate and cam fingers in position to permit the magazine to advance except when there is a bobbin present to press the plate downwardly. By this the feed to the chute is governed as will presently be explained.

As illustrated in Figs. 10, 11, 13, 14 and 15, the magazine M is carried upon inclined rails 46 and 47 which are disposed above the entrance end of the chute. The magazine slides down these guiding rails as the vibration of the loom causes it to work its way along them. It is, however, stopped in position to discharge those bobbins in each successive vertical cell by interaction of cams 48 and 49 fixed to the top outer edges of the rails, and by hooked latches 50 and 51. The latches are pivoted at 52 and 53 to arms 54 and 55 which are fixed to the outer sides of the rails as shown.

Each latch has a laterally projecting flange 56 to which is attached an arm 57 or 58, as the case may be. These arms bear upon or, at least, are positioned to be contacted by the cam fingers 44. Normally with bobbins in or close to the battery entrance the plate 42 is pressed down and weight 45 elevated in which case the fingers 44 do not affect arms 57 or 58 to lift the latches. The latter rest on the tops of cams 48 and 49 to close off the pathway for the ends of rods 59 which are engaged by both the cams and the latches. These rods as described in the application above noted, when at the lower ends of their retaining slots 60 cut in the side plates of the magazine, prevent that particular tier of bobbins to which they relate from being discharged. When a magazine moves down the inclined guides, each rod in turn engages the cams and latches.

The cams raise the rod to the top of its slots 60 thereby freeing that tier of bobbins so they may pass to the battery. In moving to that position, it also brings up against the latches thereby stopping the magazine in that position in which the particular cell involved aligns with the battery entrance.

This mechanism presents a very notable improvement over that previously employed since the cams 48 and 49 have active contours of gradually increasing steepness so that there is no likelihood of a magazine stopping before the rod has been fully displaced. These rods move with more difficulty at the start than when partially raised so that the increasing steepness assures easy action throughout all its motion. The hooked latches present a certain barrier to movement when a rod and the magazine have reached what is a definite and proper position of registry for each successive cell.

The cam fingers 44 and long arms 57 and 58 assure good leverage to unlatch the magazine when the level of bobbins in the battery falls below the plate 42. Weight 45 then very quickly swings the parts to a position of release.

At the lower end the battery or chute is provided with means to hold the foremost bobbin in position for removal of its tip bunch and transfer to the shuttle. As shown in Figs. 3, 5, 16 and 17, the bobbin butt 61 is retained by a stop 62 having a flange 63 which engages between the rings 64 and 65 of the bobbin at the front, and by a swivelling support 66 at the rear. The stop is fixedly attached to the extension 35 while the support is a part of a spindle 67 having a collar 68 which fits in a counterbore in the extension and passes through a bushing or other bearing therein.

A coil spring 69 has one end held in a cupped member 70 pinned to the spindle end and its other end fixed in the hub 71 of the bearing. This spring biases the support 66 to resist motion of the bobbin in a downward direction. Its movement by the spring is limited by a pin 72 which is contacted by an extension 73 of the collar 68. When pressed downwardly to the shuttle by the transfer hammer, the support 66 which is formed with a ledge 74 grooved for the bobbin rings swings out of the way to permit the bobbin butt to pass. It immediately snaps back to support the next bobbin which moves to transfer position.

At the tip end, Figs. 3 and 5, the package is supported by a fixed bracket 75 inclined as shown and screwed to the lower part 40 of the battery. This bracket also provides a hook 76 the purpose of which is to catch the ingoing end of filling at transfer and maintain a separation of that and the outgoing end so that they are not both cut at the selvage at the same time. In addition, a swinging finger 76 fixed to spindle 77 is spring pressed to the position shown by a coil spring 77', see Fig. 3, housed in a cupped holder 78 fixed at the other end of spindle 77. This unit is similar to that described for the bobbin butt so need not be shown or described in further detail.

The finger and its spindle are pivoted in a hub 79 of a bracket 80 bolted to the upper part 39 of the battery. It is stopped in normal or upper position by its forwardly extending lug 81 which bears against a second lug 82 cast as a part of the hub 79.

To remove the tip bunch, to hold it as the shuttle is picked after transfer and to dispose of the end when eventually freed at the fabric selvage, a coaxial, pneumatic means of novel characteristics is employed.

Referring to Figs. 1, 6, 7 and 8, the unit itself is supported within a bracket 83 which is secured to the end plate 41 of the battery or to any other suitable fixed loom part. The bunch is actually stripped from the bobbin tip by an extractor bushing 84 which may be made from metal or plastic and is split as at 85 to permit it to flex and for the thread to pass through. This bushing is subject matter of the United States application Serial No. 607,420 and need not be described in detail here. It is flanged to be held by ring 86 in the end of an extractor head 87 which is also open at the side at which slit 85 is posi-

tioned. This extractor head is threaded or otherwise fixed at the end of a tubular piston rod **88**.

A cylinder **89** is clamped in the hub **90** of bracket **83** and has a head **91** at one end and a combined rod guide and suction tube **92** at its other end by means of which the cylinder is closed off. A piston **93** is so positioned on the rod as to stop against the inner end of the head **91** when the extractor is in position over a bunch. An O-ring **94** seals against leakage past the rod and another at **95** renders the piston tight in the cylinder. Air under pressure enters the space at the head of the piston through a conduit **96**.

At the other side of the piston the rod extends into the bore of the guide and a spring **97** presses the movable parts to a bunch engaging position. When air pressure is admitted, the parts move against the spring to the extreme dot-and-dash position and in so doing, pull off the bunch and extend the filling end. An O-ring **98** acts as a cushion when the parts reach an extreme position under pressure in the cylinder. The cylinder **89** is vented at **99** to release and admit air so that there shall be only the spring force to overcome as air is admitted and to permit rapid recovery of parts when pressure at the working side of the piston is released.

When transfer is in order in a loom the bunch is removed and that much only would require a motion of the extractor to the extent indicated whereupon it might immediately return. However, since a succeeding bobbin must move to position and the extractor must be engaged over its tip and the finder bunch thereon, it is necessary to hold the extractor in retracted position for a brief interval. That is accomplished by a latch **100** pivoted at **101** to a forked extension **102** of the extractor head **87** and engageable with a notch in a similar extension **103** which is a part of the cylinder head **91**. A spring **104** forces the latch to an active position.

To release the latch, the lay carries a bracket **105**, Fig. 8 also, in the upper end of which a screw **106** is adjustably maintained in position by a lock nut **107**. The latch has a depending finger **108** which is contacted by the screw **106** as the lay comes forwardly and when the latch is in position holding the extractor in its outer position. It is not desirable to trip the latch at the very first forward motion of the lay after transfer and for delaying the release to the next beat, the piston movement is greater than required as shown in the dot-and-dash lines, Fig. 6. The pressure remains on long enough so that the first forward beat of the lay comes at that time and the tripping means does not engage the extension **108** of the latch **100**. However, the air pressure is relieved shortly after that and when the lay is to the rear, so that parts move to the latched position in which these members do align. Then the next forward beat of the lay releases the extractor head.

The extractor must bear a definite angular relationship to the bobbin, that is, the slit in the bushing should be at the bottom, and for that purpose, the parts are maintained properly aligned by a spline **109** on the extractor which slides in a groove **110** in an extension **111** of bracket **83**. The extractor bushing is pinned or otherwise prevented from turning in the head.

The tip bunch drawn from a bobbin must be held until after the shuttle has been picked and must then be ejected or disposed of along with the thread end when eventually cut at the selvage. For this purpose the extractor head is made somewhat bell shaped and the rod **88** hollow so that an axially extending conduit is continuous for the length of the unit. The rod guide and suction tube **92** have attached at the end a suction line **112**.

At the same time air under pressure is admitted to the cylinder, suction is induced in line **112**. The suction pulls the bunch through this hollow center of the extractor and piston rod to an extent depending upon freedom of the filling to be drawn from its bobbin.

Means may be provided to limit the amount of filling to enter if there should be a tendency to draw too much. Here such means includes the inclined edge of the bracket **75** upon which the bobbin rests.

After the shuttle is picked the ingoing filling will extend from the selvage to the extractor, and when cut at the selvage, will be drawn through the tube **112** to a chamber in a venturi **113**, Fig. 12, from which it is ejected to a receptacle **114**, Fig. 1.

Air pressure is delivered to the venturi through the hollow transferrer shaft **34** and nozzle **115** in the venturi head **116**. Of course, the jet from the nozzle induces suction at chambers **117** and **118** and the line **112** is coupled to the former while at the latter, a suction line **119** serves to dispose of the end of outgoing thread, first drawing in a part thereof when it is cut at the selvage and the remainder when released at the Stafford or similar cutter. This suction tube functions in a manner known to those skilled in the art and as described in co-pending application Serial No. 607,420 and need not be described further here.

A suitable supply of air under pressure is contemplated and may be generated at the loom or there may be a common source for a group of looms. If pressure is in excess of that desired, a reducing valve may be employed. This air is controlled by a timer presently to be described which may be characterized as an air rather than a mechanical timer. These parts are shown in Figs. 1, 2, 4, 8, 9 and 13.

The combined timer and valve, Fig. 9 in particular, has a body which is divided into two cylindrically shaped parts **120** and **121**. Air under desired pressure enters at **122** to a chamber **123** which is connected by a port **124** to a second chamber **125** in cylinder **120**.

The chamber **123** is closed off from the outlet tube **96** which runs to the extractor cylinder by a valve **126**. This valve seats on a washer **127** or other suitable surface and is movable up or down on its stem **128**. When lifted as will be explained, air may flow past it to a space **129** with which the tube **96** communicates. By this valve the flow to the extractor cylinder is controlled.

Air in chamber **125** may pass to the nozzle **115** and venturi through a tube **130** and the hollow transfer stud **34**. The tube attaches to the timer body at a point opposite the space **131** formed about a perforated sleeve **132**, a part of a plug **133**. These hold a ring **134** and rubber or plastic washer **135** up in sealed contact with a shoulder at the lower end of chamber **125**. These have a relatively large opening so as to provide for a space about a timer stem **136** which passes up through the plug and has a flange **137** pinned or otherwise fixed in air tight relationship to it. At its top end this stem passes through a head **138** which seats against a shoulder in the chamber at which the size of the bore decreases to extend upwardly in a third part **139**. A spring **140** between the head **138** and flange **137** tends to keep the stem in a position to maintain the flange seated on the washer **135** so that the air in chamber **125** may not enter the lower space **131**.

Head **138** is sealed by O-rings **141** and **142**. Above the head and at that extreme end of the stem a piston includes a cup or pump washer **143** and is held in place by a screw and washer and this, of course, will hold air pressure as the spring draws the assembly downwardly, but permits air to pass when moved in the opposite direction.

Chamber **139** is vented below the piston through an aperture **144**. A head **145** is screwed to the top of this cylinder with a gasket between and is provided with means by which air may be permitted to bleed in slowly, here that means takes the form of a porous body of sintered metal **146** set in an opening **147** and held in place in any convenient manner. Here a cap **148** with fiber or rubber washer **149** is held in place by screw **150** and may have a series of apertures **151**, Fig. 1, of pro-

gressively greater diameter which may be brought into register with the porous body. The effective diameter of the porous material may be adjustably controlled in any other convenient way.

The stem **128** of the valve **126** is provided with an exhaust vent **152** drilled centrally thereof and having a radial outlet at either end, one for the space **129** and the other outside the timer body when the valve is closed, but inside the stem guide when opened so that when the valve itself is closed, the extractor piston in returning may push the entrapped air out this valve stem exhaust.

A screw **153** is threaded into the end of the stem **128** and plugs the exhaust opening, but also provides an adjustable abutment against which a means to open the valve may function. The screw is locked in position by a nut **154**.

In operating this time-valve unit, the actuating impulse is taken from the transfer mechanism, more specifically, the starter shaft and an arm **155** movable therewith, Fig. 4. The arm **155** has connected to it at **156** a link **157** which extends to attach at **158** to an arm **159** fast on one end of a shaft **160**. This shaft is carried in suitable bearings and has a finger **161** fixed at its opposite end aligned below the timer stem **136** and valve stem **128**. The link is adjustable for length and thus the swing of the finger may be so controlled as to displace the timer to a greater or lesser extent. It also opens valve **126**.

The timer-valve unit is held in place by a bracket **162** which attaches to the frame member or extension **35**, or to any other fixed part of the loom. Tube **96** passes below the battery.

In operation, assuming parts are all in position ready for a bobbin transfer to take place, the extractor will be positioned as in Fig. 7 with the extractor bushing **84** over the tip bunch and, of course, air pressure is acting against valve **126** and within chamber **125**. From that point, however, there is no pressure or suction in any part of the system. The outgoing filling is held at one end at the cutter **37** while the other end of it has been drawn into tube **119** at the previous cycle.

When the signal for transfer is given, arm **155** swings in a direction to lift link **157** and finger **161** presses valve **126** upwardly to open it and pushes the timer stem **136** upwardly to set it and to admit air to the nozzle and venturi. The jet at the nozzle then induces suction in lines **112** and **119**.

Of course, the transfer parts are set while all this is going on and as the cutter moves to the rear it opens releasing the outgoing thread so that it is completely disposed of by ejecting it to receptacle **114**.

Before the transfer hammer becomes effective, pressure on piston **93** moves the extractor to the right, Fig. 7, withdrawing the bunch. The parts are first moved to an extreme position after which, when the lay has gone forward and back once, they are latched in the withdrawn position by latch **100**. There is suction in tubular rod **88** and at the throat of the extractor so that, once drawn off the bobbin tip, the bunch and filling end are pulled into the line **112**. A brush or other retarding influence at the bobbin prevents too much filling being pulled off at the time.

The bobbin is transferred to the shuttle and the end held by suction can give a bit to relieve tension on the filling.

The cutter and binder cut and hold the old end as the empty bobbin is ejected so that as the transfer is completed the old end extends from the selvage to the Stafford type cutter and the ingoing end from the selvage to the hook **76** and then to rod **88**. The lay on its first forward movement after transfer trips the latch **100** so spring **97** returns the extractor parts to a position to engage over the bunch and tip of the next bobbin which will by then have moved to a position as in Figs. 4 and 5. It is to be understood that the transfer parts return to inactive position quickly after transfer and thus valve **126** is free to close under the pressure above it. It does close prior to the unlatching of the extractor. Air in head **91** and line **96** is exhausted through exhaust port **152**.

The air at the nozzle is maintained for several picks by the timer. However, after the selvage thread cutter has functioned, the stem and piston will have closed by spring **140** so that the cycle ends by suction ejecting the cut ingoing end while at tube **119** a cut end of the outgoing thread is sucked in but the other end at cutter **37** is held until the next cycle.

By varying the rate at which air may bleed into the chamber **139** the time during which suction is maintained is regulated. The ingoing thread is caught by hook **76** and a separation maintained so that both ends will not be cut at the selvage at the same time.

Bobbins feed from the magazine M as the successive cells align with the battery entrance. So long as the battery is filled to the point where plate **42** is pressed down, the magazine remains locked in place by the hooks **50** and **51**. However, as soon as the bobbin supply is depleted below plate **42**, that plate is then tipped upwardly by weight **45**, the cam fingers **44** press arms **57** and **58** to raise the latches thereby to release the magazine. It then descends by gravity along the inclined tracks **46**, **47** and the next rod **59** raises up the cams **48**, **49** to be pressed both upwardly and rearwardly. This action frees the tier of bobbins affected which then descend into the chute to press down the plate and permit the latches to fall prior to the time the magazine and rod have progressed that far. The cams are progressively inclined more steeply so that advantage is taken of the gradual and slow ascent at the start whereupon toward the top of the cams, movement is rapid since the weight of bobbins and the position of the rod with respect thereto is almost enough to displace the rod without the cam.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This invention is, therefore, not to be limited to the precise details described, but is intended to embrace all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

We claim:

1. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a combined means for removing the bunch from bobbin ends and for disposing of it and retaining the filling end while the shuttle is picked which comprises an air operated gripping and suction means.

2. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, and a means for removing the bunch and retaining the end of filling from a bobbin which comprises a gripping means engageable with the bunch and an air pressure responsive means for moving said gripping means axially to and from the bobbin.

3. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, and a means for removing the bunch and retaining the end of filling from a bobbin which comprises a gripping means engageable with the bunch and an air pressure responsive means for

moving said gripping means axially to and from the bobbin, and means controlled in sequence with other parts for timing the action of said bunch removing means.

4. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, and a means for removing the bunch and retaining the end of filling from a bobbin which comprises a gripping means engageable with the bunch and an air pressure responsive means for moving said gripping means axially to and from the bobbin, and an air operated and controlled means for timing the action of said bunch removing means.

5. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a cylinder and piston aligned with that bobbin which is next to be transferred, means operatively connected to said piston and movable therewith to a position to engage a bunch and to remove it from its bobbin, resilient means to move said piston in one direction and means to admit air under pressure to force said piston in the opposite direction against said resilient means.

6. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a cylinder and piston aligned with that bobbin which is next to be transferred, means operatively connected to said piston and movable therewith to a position to engage a bunch and to remove it from its bobbin, resilient means to move said piston in one direction and means to admit air under pressure to force said piston in the opposite direction against said resilient means, said means to admit air comprising valve means incorporating an air responsive timer.

7. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a cylinder and piston aligned with that bobbin which is next to be transferred, means operatively connected to said piston and movable therewith to a position to engage a bunch and to remove it from its bobbin, resilient means to move said piston in one direction and means to admit air under pressure to force said piston in the opposite direction against said resilient means, said means to admit air comprising valve means controlled by a timer responsive to displacement of air.

8. For a loom of the type described a means to remove an end finder bunch from a bobbin to be transferred and for retaining the filling end during transfer and until the shuttle has been picked which comprises a hollow piston rod, a piston toward one end of said rod and a cylinder within which said piston may be displaced, a bunch extractor at the other end of said rod, resilient means for moving the piston in one direction and air pressure means for moving it in the other, and suction means applied to said hollow piston rod to hold and eject a bunch and filling end.

9. For a loom of the type described a means to remove an end finder bunch from a bobbin to be transferred and for retaining the filling end during transfer and until the shuttle has been picked which comprises a

hollow piston rod, a piston positioned toward one end of the rod and a cylinder within which said rod is guided and within which it may be displaced, a bunch extractor comprising a bunch engaging bushing and an extractor head fixed to the other end of said rod, a resilient means to move said piston and rod to a position in which the extractor engages over a bobbin tip and means to admit air under pressure to said cylinder to move the piston, rod and extractor in a direction to remove a bunch from a bobbin, and suction means applied to said hollow piston rod to hold and eject a bunch and filling end.

10. Mechanism as defined in claim 9 wherein the bunch engaging bushing and extractor head are open at one side for passage of the filling and means for maintaining the said extractor head against rotation about the cylinder axis.

11. Mechanism as defined in claim 9 wherein the hollow piston rod is guided at one end within a sleeve extending within the cylinder at one end and having a suction line connected to it at the end externally of the cylinder.

12. In a loom having a lay, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a means for removing the tip bunch from a bobbin to be transferred and for retaining the filling end during transfer and until the shuttle has been picked which comprises a hollow piston rod, a bunch extractor at one end of said rod, a cylinder within which said rod is slidable, a piston on said rod and resilient means to move said piston in one direction and air pressure means to move it in the other, suction means applied to said hollow piston rod to hold and eject a bunch and filling end, and means to retain said rod and ejector means in a position to which they have been moved by said air pressure means for an interval and for then releasing them.

13. Mechanism as defined in claim 12 wherein said means to retain the rod and ejector means comprises latching members.

14. Mechanism as defined in claim 12 wherein said means to retain the rod and ejector means comprises latching members and the releasing means includes a tripping means carried by the lay.

15. Mechanism as defined in claim 12 wherein said means to retain the rod and ejector means comprises latching members, the displacement of the parts under the air pressure being substantially greater than that when in latched position, and contacting means carried by the latch and by the lay for tripping the latch, said means being positioned to align only when the parts are in latched position.

16. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a combined means for removing the bunch from bobbin ends and for disposing of it and retaining the end while the shuttle is picked which comprises an air operated gripping and suction means, and means for timing the action of said bunch extracting and ejecting means which comprises a combined timer-valve means responsive to displacement of air therein.

17. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon an end of which is wound in the form of a tip bunch adjacent the bobbin end, transfer means

for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a combined means for removing the bunch from bobbin ends and for disposing of it and retaining the end while the shuttle is picked which comprises an air operated gripping and suction means, and means for timing the action of said bunch extracting and ejecting means which comprises a combined timer-valve means, said means comprising a valve for admitting air under pressure to said extractor, a second valve to control air for inducing suction at the ejector and timer means forming a part of said second mentioned valve for governing the duration of the cycle.

18. Mechanism as defined in claim 17 wherein said first mentioned valve has exhaust ports therein through which the air for said extractor may be exhausted.

19. Mechanism as defined in claim 17 wherein said valves are opened by means including the transfer setting members.

20. Mechanism as defined in claim 17 wherein said valves are opened and the timer set by means including the transfer setting members.

21. In combination in a loom for weaving, a bobbin feeding means for retaining and presenting for transfer to a loom shuttle a supply of bobbins having filling wound thereon and received from a magazine guided for travel above and in register with said feeding means, said magazine having its bobbins disposed in vertical tiers and means including a transverse rod movable in inclined slots for retaining each tier of bobbins, but movable in their slots for releasing a tier, and means operable

with said feeding means for stopping a magazine in position to discharge bobbins to the feeding means and to release a tier of bobbins comprising a latch, a cam and means in the feeding means to release said latch upon the number of bobbins in said feeding means falling below a prescribed quantity.

22. Mechanism as defined in claim 21 wherein said magazine is arrested and said rod moved to release a tier of bobbins by a combined cam and latch, said cam acting to displace the rods which retain their respective rows of bobbins and having a contour of progressively increasing steepness in the direction of motion of the magazine.

23. In an automatic battery for a loom a bobbin chute inclined to the horizontal so that bobbins may move along it by gravity, means for releasably maintaining a bobbin in transfer position which comprises independent means at each end of the bobbin including a fixed abutment and a rocking, spring loaded member displaceable at transfer.

24. Mechanism as described in claim 23 wherein said guide members at the bobbin butt have means to prevent endwise movement of the bobbin.

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