Feb. 10, 1959 J. L. NEWBEGIN ET AL 2,872,948

AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Aug. 31, 1956 5 Sheets-Sheet 1

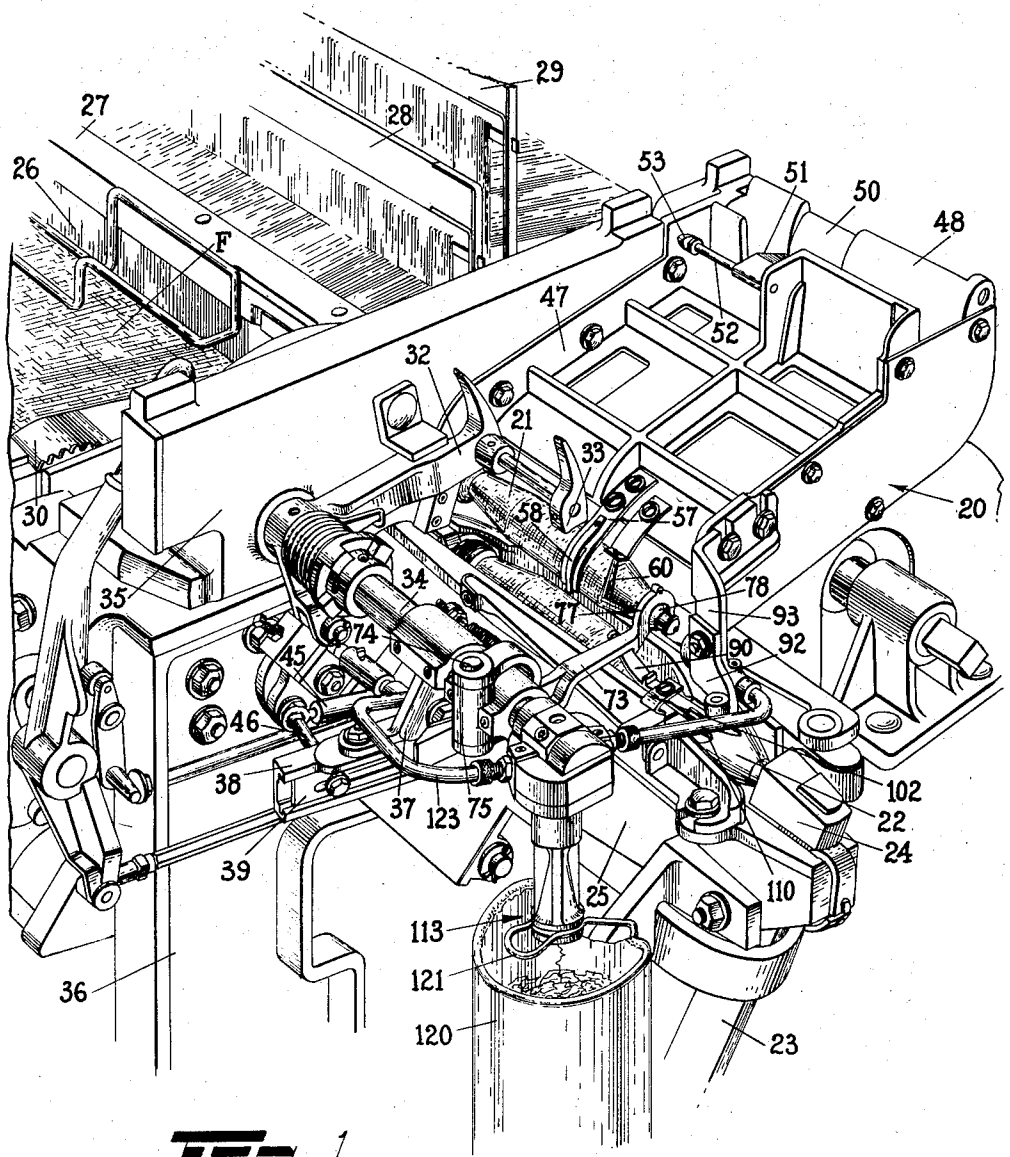


Fig. 1

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AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Aug. 31, 1956 5 Sheets-Sheet 2

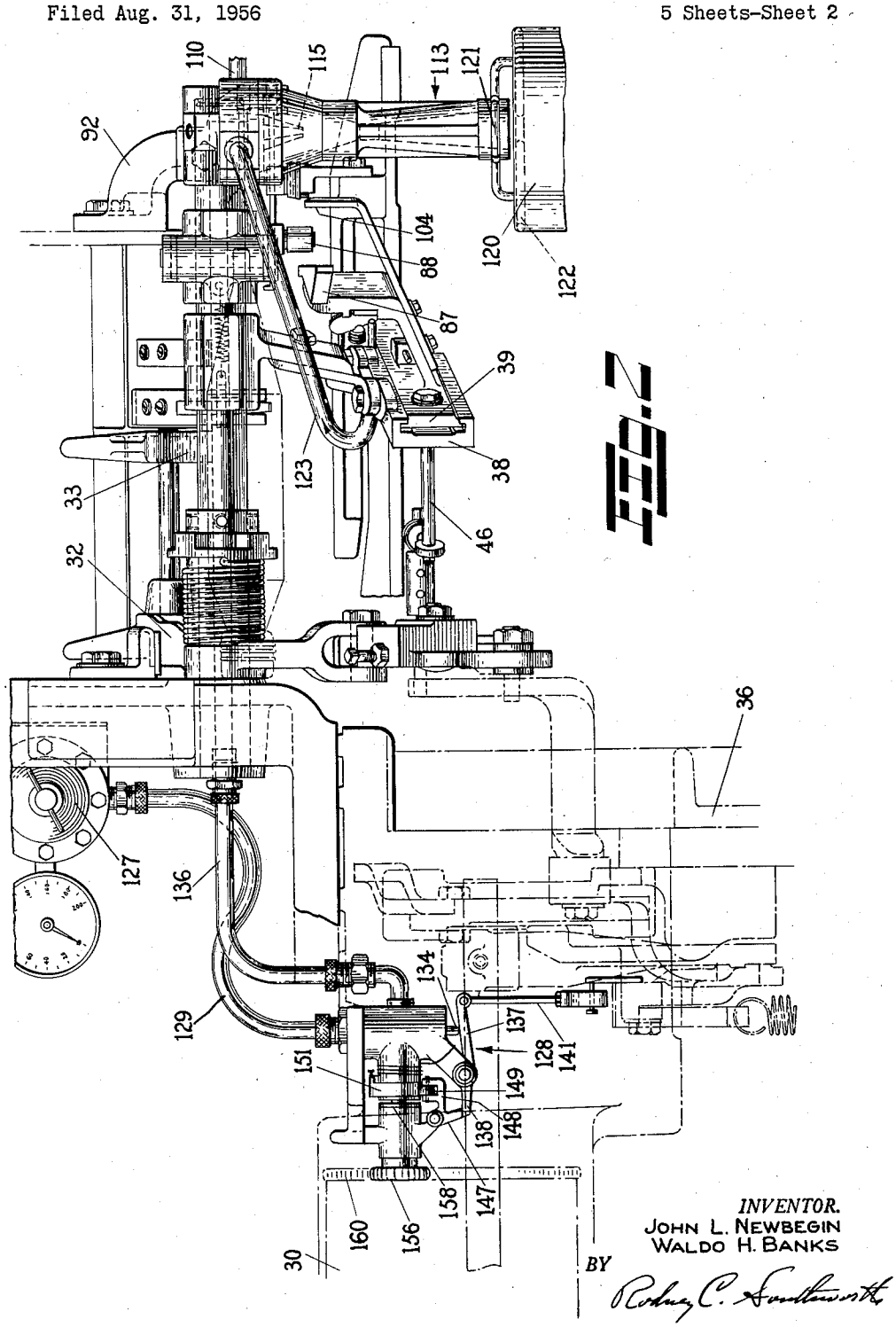


FIG. 2

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AUTOMATIC BOBBIN REPLENISHING LOOM

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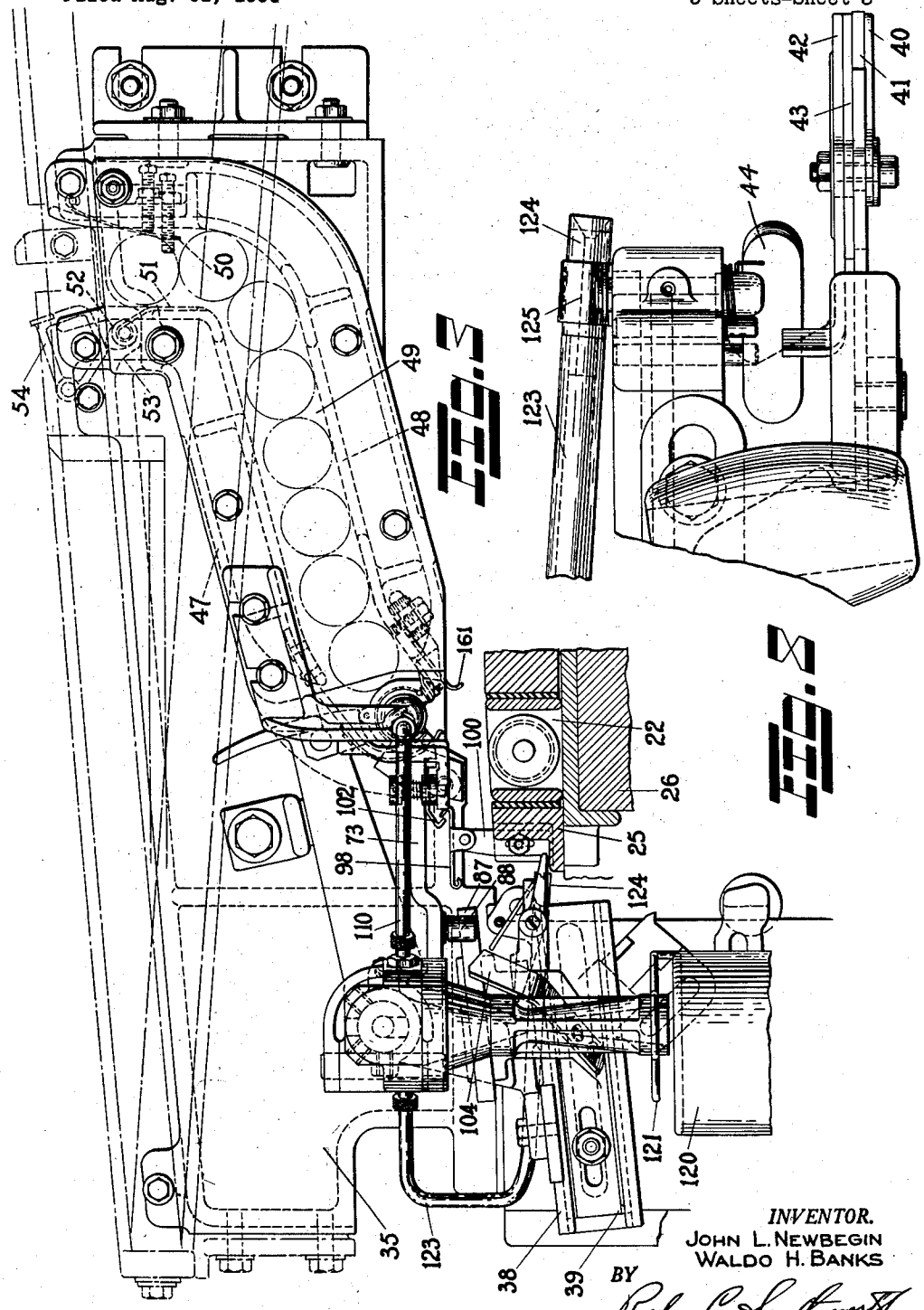


FIG. 5

FIG. 3

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AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Aug. 31, 1956 5 Sheets-Sheet 4

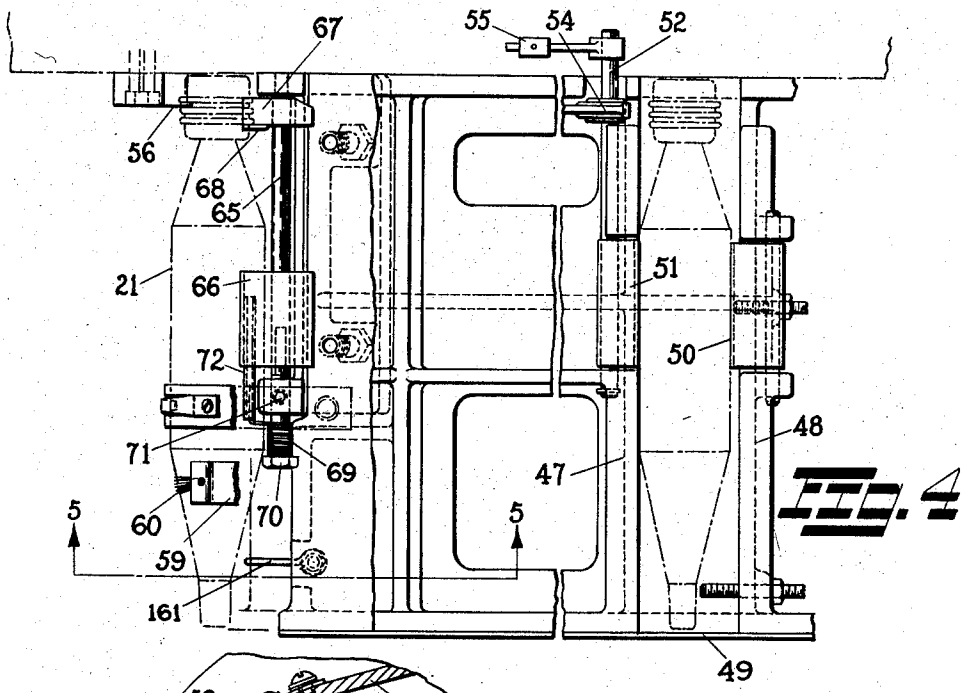


FIG. 4

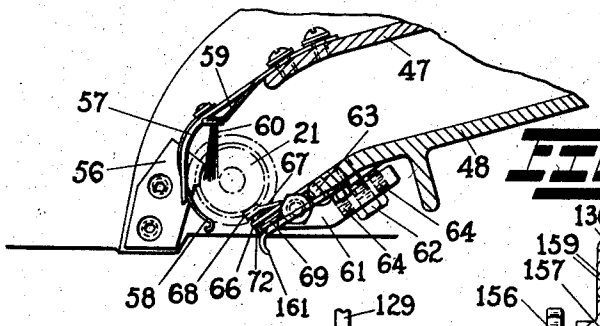


FIG. 5

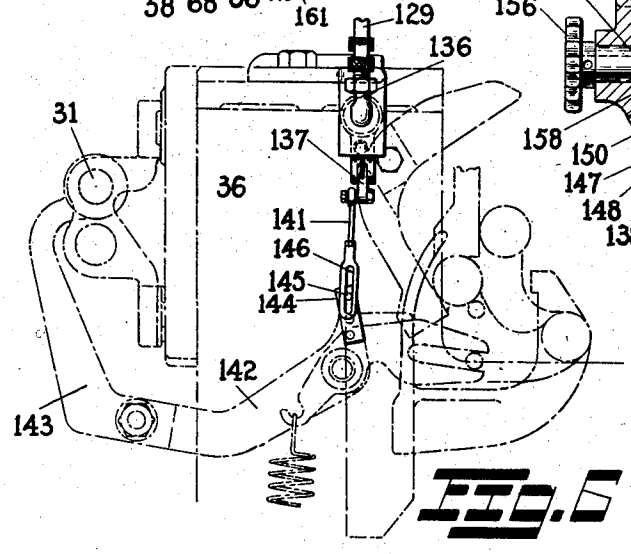


FIG. 6

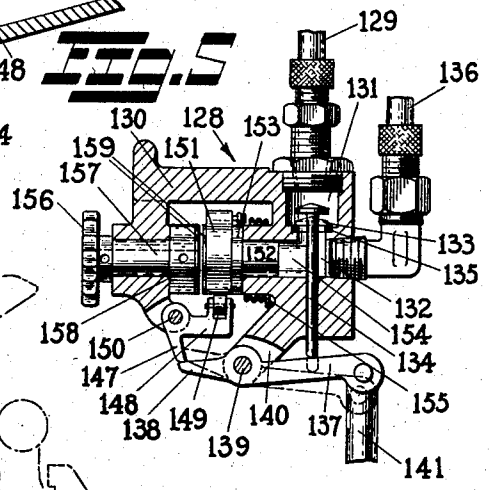


FIG. 7

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AUTOMATIC BOBBIN REPLENISHING LOOM

Filed Aug. 31, 1956 5 Sheets-Sheet 5

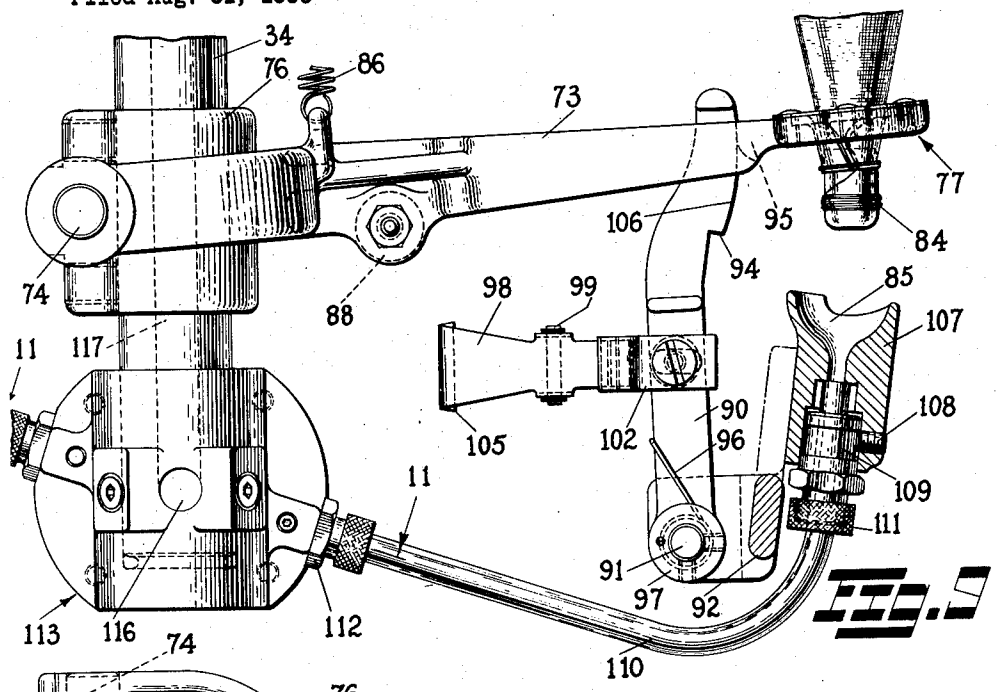


FIG. 9

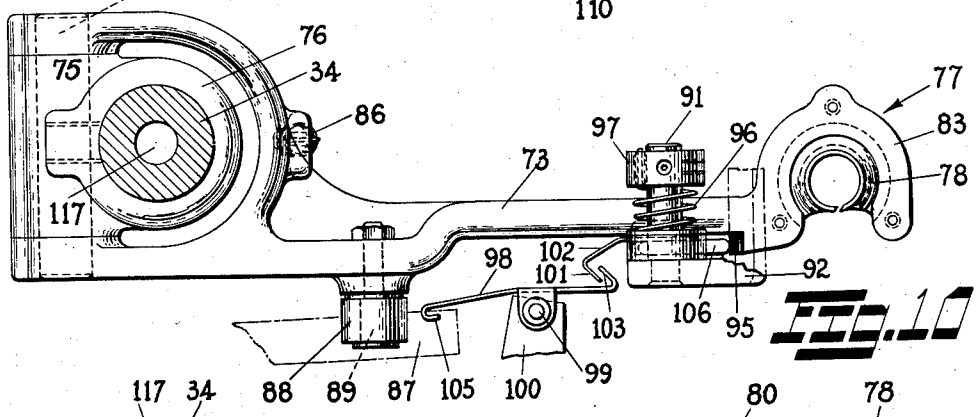


FIG. 10

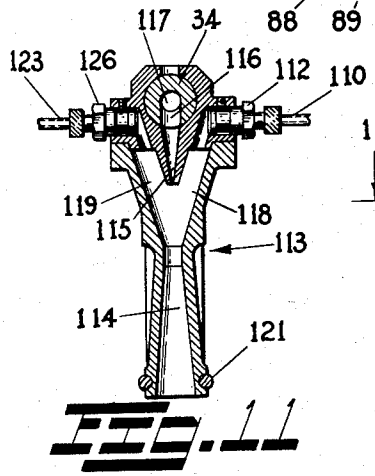


FIG. 11

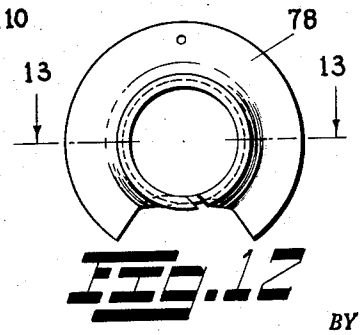


FIG. 12

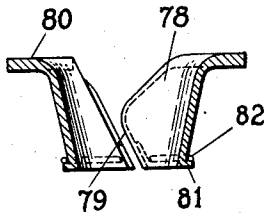


FIG. 13

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United States Patent Office 2,872,948 Patented Feb. 10, 1959

2,872,948

AUTOMATIC BOBBIN REPLENISHING LOOM

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Application August 31, 1956, Serial No. 607,420

22 Claims. (Cl. 139—247)

This invention pertains to looms for weaving and more particularly, to automatic type batteries therefor and to novel means for finding and controlling the filling end at transfer and for disposing of that end and an end of filling cut from the exhausted supply, which means is to a considerable extent, dependent upon an automatically controlled vacuum system.

It is a general object of the invention to devise a simple and effective means operable to control all functions incidental to the replenishment of a shuttle with bobbins having tip finder bunches and loaded and fed down through a so-called automatic battery of a loom.

A more specific object is that of improving such batteries so that the filling packages may be fed to a transfer position and transferred therefrom to the shuttle without displacing the filling or the tip bunch or breaking the end.

Another object is that of devising an effective tip bunch extractor which shall function in timed relationship to the transfer function and which shall perform its intended task in conjunction with a pneumatic means for holding and disposing of the bunch and filling end when the latter is eventually cut at the fabric selvage.

A further object is that of disposing of the cut end from the selvage to the outgoing package thereby to clear the loom of all cut thread ends which might adversely affect the quality of the woven material in the event one were to be dragged and woven into the fabric.

Another object is that of providing an automatic and regulatable means for valving the air through the suction system and for closing it off as soon as it has performed its intended function, and for locking such control in with the indication for transfer so it may act only at the desired times.

A further object is that of increasing the time available for engaging the bunch and removing it.

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

In automatic, bobbin replenishing looms it has been suggested many times that an automatic battery be fed from a supply of filling packages prepared in various ways, thereby to cut down some of the labor costs entering into the weaving of fabric. These prior suggestions, however, have never become commercially usable.

According to the instant invention, a battery has been devised which is fed from a magazine such, for example, as that described in copending application Serial No. 528,928, filed August 17, 1955, now United Stated Patent No. 2,778,382, granted January 22, 1957, 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 all previous attempts at solving these problems, the mechanism devised has been so designed as to engage a tip bunch and to remove it between the time the replenishing cycle is started and a point slightly advanced in that cycle at which the bobbin is about to leave the battery and be moved to the shuttle. That, of course, means that there is a very small period of time within which several mechanical parts must be actuated and in which the bunch must be properly engaged in an extractor or the like, and removed clear of the bobbin so the latter will be free to pass to the shuttle. These functions may be accomplished in the short time available according to the prior art only by imparting to the devices very rapid motions. There is thus greater danger of malfunctioning of parts or damage to the filling than if more time were allowed.

According to the instant invention, the cycle is divided into two parts, one being accomplished before the replenishing cycle is started and the second after the transfer cycle has been initiated. In practice, the bunch is engaged as soon as the leading bobbin in the battery moves to transfer position and more or less as a final step in a transfer operation just accomplished. Then upon initiation of the next transfer function, the bunch is removed, there thus being very much less to be accomplished in the extremely short time interval available.

The battery and cooperating transfer and control devices are so constructed that the end is automatically removed from the bobbin at transfer by an extractor of mechanical type, which is supplemented by or has as an integral part thereof, a suction holding means which also disposes of the bunch and thread end when the latter is cut at the cloth selvage.

A second suction means acts at the proper time to dispose of the end from the selvage which was cut at the outgoing, exhausted supply. These two thread disposal means preferably function through a common source of air which is employed to develop subatmospheric pressure in the system and which is controlled by a valve or valves and automatic devices which start the suction system when the replenishing system indicates a transfer. Then depending upon requirements, the air is shut off by a timer control as soon as it has completed its intended function at each separate replenishing cycle.

The invention will be described in greater detail by reference to specific embodiments 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 front elevation of the mechanism of Fig. 1.

Fig. 3 is a side elevation of that same part of the loom.

Fig. 4 is a plan view of the battery itself.

Fig. 5 is a section at line 5—5, Fig. 4.

Fig. 6 is a detail view of certain transfer control means and connection therefrom to an air control timer.

Fig. 7 is a section through that timer.

Fig. 8 is a detail view showing in plan parts of a cutter and other mechanism cooperating therewith and a part of the invention.

Fig. 9 is a detail plan view with parts in section illustrating the extractor and vacuum system for holding and disposing of the filling end.

Fig. 10 is a detail view of the extractor and its actuating control members.

Fig. 11 is a section through the ejector, suction nozzle and valve control.

Fig. 12 is a detail view of a tip bunch gripping bushing.

Fig. 13 is a section taken at line 13—13, Fig. 12.

Now referring to Figs. 1, 2 and 3, 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

a 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. 6, 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, the foregoing parts being shown in Figs. 1 and 2.

As shown in Figs. 1, 2 and 3, a Stafford type cutter and binder is mounted to depend from the shaft 34 upon a bracket 37 to which is attached a guide 38 in which slide 39 may move to and fro to actuate the cutter. The latter as shown in Figs. 2, 3 and 8 comprises, among other parts, cutter blades 40 and 41 for severing the thread from the outgoing supply at transfer. That thread is held by clamping blade 42 which works against the other side of fixed blade 41, preferably through a fibre intermediate member 43. A swivel cam 44 coacting with the inner end of the actuating arm of the clamping blade 42 effects opening and closing of the cutter and clamping blades of this cutter as the slide 39 is moved in or out by a link 45, Fig. 1. The link 45 connects to the slide through stud 46 and to a part of the transfer setting means in a known manner. The cutter is fully described in United States Patent No. 2,711,193 so that further description of it is not needed at this point.

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 47 and a lower member 48, Fig. 3, 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 47 and 48 are bolted against the supporting plate 35 and have a flat plate 49 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 as explained in the application Serial No. 528,928, now United States Patent No. 2,778,382 or from any other source and pass adjustable plate 50 which is used to restrict the space in accordance with bobbin diameter so that each package must affect a feeler plate 51 fixed to spindle 52 which also carries a cam 53 which raises or permits a latch 54 to fall in accordance with the presence or absence of a bobbin at that general locality. A counterbalance weight 55, Fig. 4, tends to maintain the feeler plate and latch in position to advance a magazine except when there is a bobbin present to press the plate and raise the latch. By this the feed to the chute is governed all as explained in the patented application, above noted.

At its lower end the chute is supplemented by a bobbin butt guide block 56 with a bobbin ring retaining lip, Fig. 5, and by several other parts which govern the bobbin movement, the thread thereon, and regulate the movement of the next succeeding bobbin to position. Somewhat centrally located, but beyond the range of the tip pusher, a curved, forked member 57 limits movement of the bobbin forwardly. A spring finger 58 extends about the bobbin for a considerable extent, but springs out of the way when transfer is effected.

At the tip end of the bobbin a clip 59 carrying bristles 60, Figs. 4 and 5, serves to hold the filling end when the tip bunch is pulled off. The filling cannot be removed at that time beyond the bristles, thus preventing waste of filling.

At the lower end of the chute, see Fig. 5, a bracket 61 is attached by screws 62 to the lip 63 of member 48. This bracket may be tilted to position it by a number of adjusting screws 64. The bracket 61, see Fig. 4, has pivoted on a spindle passing through it a sleeve 65 to which are fixed a large plate 66 and a smaller end plate 67. The former plate is flat and bears against the mid-portion of the package. As seen in Fig. 5, the end plate 67 is offset to contact the smaller butt and ring diameter of the bobbin in opposition to abutment 56. It also has an upturned lip 68 which engages against a ring at the bobbin butt and thus restrains the bobbin against endwise movement as the bunch is pulled from the tip. This unit comprising the sleeve 65 and plates 66 and 67, see Fig. 4, is urged upwardly into contact with the bobbin by a spring 69 coiled about screw 70 locked in place by set screw 71. An end of the spring is bent to enter a tube 72 soldered or otherwise attached to plate 66.

To remove the tip bunch, to hold it as the shuttle is picked after transfer and to dispose of the cut thread end when eventually freed at the fabric selvage, a combined mechanical and pneumatic means acts in cooperation as set in motion by the transfer mechanism. An arm 73, Figs. 1, 9 and 10, is pivoted at 74 in a bearing 75 which is a part of a collar 76 clamped to stud shaft 34. At its free end the arm is formed as a sort of inverted yoke 77 in which is clamped or otherwise fastened an extractor bushing 78 formed from a resilient material, for example, steel or a plastic. The bushing is split as at 79 at the bottom and that slit for exit of the thread as will be explained, is cut at an angle so that as filling flies around just after the bunch is removed it will not escape. This extractor bushing has a flange 80 and is tapered as shown to a smaller end which is also beaded exteriorly as at 81 to retain a restraining spring 82, see Fig. 13. A plate 83 and three screws attach this bushing in place at the yoked end of the arm.

The construction and resilience of the parts just described is such that when, after a bobbin has been moved to transfer position, the arm 73 is swung to the relationship of Fig. 9, the bushing will snap over the bunch 84 and will grip the slightly tapered bobbin tip, but however, will not damage the filling. Movement of the arm in the opposite direction will strip the bunch 84 from the bobbin tip and carry it into the mouth 85 of a pneumatic holder and filling disposal unit.

A spring 86 attached to the arm and to a fixed part (not shown) of the loom always tends to move the arm and bushing to the position of Fig. 9. It is moved in the opposite direction by a cam 87, Figs. 3 and 10, which engages against a follower 88 pivoted on a shoulder screw 89 extending from the arm. As the cutter is moved obliquely inwardly upon indication for transfer, it carries the cam with it and thus the arm 73 is moved in a direction to extract the bunch and deliver it to the mouth 85 of the pneumatic holder which will at that time be active.

The arm 73 is then latched in bunch extracting position by a latch arm 90 pivoted at 91 on a bracket 92 attached to a second bracket 93 in turn bolted to the front, lower end of the chute, see Figs. 1 and 9. This latch arm is notched as at 94 which notch engages the arm at a shoulder 95 projecting therefrom. A spring 96 coiled about pivot 91 and fixed in collar 97 also engages the latch arm 90 to urge it into a latching position.

The latched arm 73 should remain in that position until the bobbin from which a bunch 84 was extracted

has been transferred to the shuttle and another bobbin moved to transfer position, whereupon it may then move to engage the bunch of that next bobbin in readiness for repeating the cycle. For this purpose a latch **98** is pivoted at **99** on a small bracket **100** at the front box plate, Figs. 1, 3, 9 and 10. The latch arm **90** has a hook **101** at the end of a clip **102** which is screwed to the top of the arm in alignment with the latch **98** so that a hooked end **103** of the latter may engage it if the latch is unaffected by a cam **104**, Figs. 2 and 3. This cam is attached to and moves in with the cutter mechanism at transfer. It pushes up on the end **105** of latch **98** so that at the forward movement of the lay at transfer there shall be no contact between booked ends **101** and **103**. At the next forward movement of the lay, the cutter will have been retracted to remove the influence of cam **104** and the parts then become effective to pull arm **90** forwardly and to release the extractor which then moves to position to engage over the next bunch on a succeeding bobbin which will, by that time, have moved into place.

The latch **98** is spring biased to the position of Fig. 10 by a coil spring at its pivot. In order to prevent a contact between hooked ends **101** and **103**, the latch arm **90** is formed at its end with a cam portion **106** which, acting against shoulder **95** presses the arm forwardly against spring **96** to an extent such that the hook **101** will be out of the range of the hook **103**. This effect of cam **106** is possible since spring **86** is much more forceful than spring **96**.

After the bunch and end have been mechanically removed, they enter the mouth **85** of a combined holder and end disposal unit comprising the socket **107** attached to bracket **92** and within which is clamped by set screw **108** a fitting **109** for the end of a tube **110**. This tube end is clamped in place by the threaded ring **111**. At its opposite end tube **110** is held by a similar fitting **112** in one of the intake ports of a suction unit **113**.

This unit comprises a venturi **114** into the mouth of which a nozzle **115** leads air under pressure. This complete unit **113** is fixed at the end of the stud shaft **34** which is hollow to a point near its end where a radial port **116** from the central opening **117** leads to the nozzle. By means to be described air under pressure is admitted when required and as it is discharged into the venturi, it develops a suction at intake or entrance ports **118** and **119**.

At the lower end of the unit a cloth or other receptacle **120** is removably held in place by a snap ring **121** which is preferably an extension from a grommet **122** at the top of the receptacle which is of cylindrical shape. This snap ring makes possible quick detachability of the receptacle.

The mechanism thus far described takes care of feeding bobbins to transfer position, extracting the bunch **84**, transferring to the shuttle and holding and disposing of the thread end from the newly transferred bobbin. Another thread end from the cloth selvage is held by the cutter (the end from the discharged bobbin) and this end is eventually cut at the selvage and released from the cutter and binder in a known manner. This end is disposed of through a suction tube **123**, Figs.1, 2, 3 and 8, a mouth **124** of which is positioned adjacent the cutter, in fact, that end of the tube is preferably attached to the cutter bracket or guide by a clip **125**. The end of this tube may be notched, an expedient frequently resorted to with thread disposal means of this type. Preferably, the tube end is a separate piece with smaller aperture to resist thread withdrawal while the suction is not applied. When such an insert is used, it reinforces the tube end against crushing when clamped in position.

The tube **123** connects by a fitting **126** to the unit **113** and discharges its cut ends of threads into entrance port **119**, see Fig. 11.

The supply of air under pressure may be taken from a source common to several looms or may be generated at each loom, but should be supplied under a suitable pressure and volume to make possible a relatively high vacuum when injected into the venturi throat. In practice air under a pressure of about 25-30 pounds per square inch has been found to serve very well.

As shown in Fig. 2, air may be admitted through a reducing or other valve at **127** to an automatically controlled timing means generally indicated at **128** through tube **129**. This latter means is actually a valve for admitting and shutting off the supply of air in a timed relationship to the replenishing function including the control and disposal of the thread ends involved at that cycle. The valve is opened by a connection to the transfer setting members and is closed by a timing means driven from some positively rotated part of the loom. Referring to Fig. 7, the valve casing **130** has an inlet chamber **131** and an outlet chamber **132**. A poppet type valve **133** with stem **134** is slidable as shown and seats against an O-ring **135** or other sealing means to close off the air supply from or admit it to the chamber **131**. The latter is connected to the adjacent end of the hollow shaft **34** by a tube **136**.

Valve **133** is opened by means of a lever having arms **137** and **138** and pivoted at **139** to a lug **140** cast as a part of or otherwise associated with the unit **128**. This lever may push against the stem **134** to raise the valve and admit air to chamber **131**. Normally, the air pressure will keep the valve seated and thus close off the flow of air from chamber **131** to chamber **132**.

The lever arm **137** is connected by link **141** to the inner end of an arm **142** which is usually known as the feeler finger end and is attached to the feeling finger **143** fixed to the starter shaft **31**. These are standard parts and their function is well known. The end may be specially extended to take a stud for the link, but here an extension **144** is provided and carries a stud **145** which passes through a slot **146** in the link end. The call for replenishment results in a slight rocking of shaft **31** and upward motion for the end of arm **142** which, in turn, lifts link **141** and through lever arm **137**, opens the valve to admit pressure. The slot **146** permits the stud **145** to have a great deal more movement than the link and the starting rod parts to return while the valve is left open.

When the valve is opened, it is temporarily latched open by a bell crank detent **147**. This is part of a complete crank having another arm **148** which is forked to carry a roller **149**. The whole is pivoted at **150** and a spring tends to move it so that the roller bears against an eccentric **151**.

The eccentric forms the large end of a piston **152** having a shouldered concentric stop collar **153**. Piston **152** is a sliding fit in a bore **154** leading to chamber **132** and by means of a spring **155** the eccentric is always biased toward a position in which its smallest radius is opposed to the roller or follower **149**.

To trip the detent **147** and release valve **133** so the pressure may close it, the eccentric is rotated until it presses the roller **149** to swing the detent from arm **138**. That is accomplished by a rotary means including a pinion **156** pinned to the end of shaft **157** rotatable in that portion of the valve housing and a clutch affecting the eccentric **151**. The clutch comprises a disk **158** pinned to the inner end of shaft **157** and friction facings **159**, one on the disk and one on the eccentric.

The disk **158** is rotated slowly since pinion **156** is in mesh with the serrated end **160** of the take-up roll, see Fig. 2. When compressed air is admitted to chamber **132** it also enters bore **154** and pressure on piston **152** forces it and the eccentric endwise to engage clutch facings **159**. The rotation of disk **158** is then imparted to the eccentric

and it slowly moves until it affects the bell crank and detent 147 is withdrawn from latching relationship with arm 138. The valve 133 no longer being held open positively is closed by the air pressure. The amount of time during which the air is admitted is dependent upon the interval between the initiation of the transfer function and the cutting of the threads at the selvage, that is, both the ingoing thread and the thread from the exhausted bobbin.

Now having specifically described one form of the invention, a brief resume of the cycle of operation will be given. Assume that the loom is running and the air available at chamber 131, but the valve 133 is closed and that the binder still holds one end of an outgoing thread which has been drawn into ejection tube 123 since it was cut at the selvage.

As a signal for replenishment is given, the shaft 31 and arm 143, Fig. 6, are rotated to set the transfer mechanism so that at the next forward beat of the lay, the bobbin will be transferred from the battery to the shuttle. That, of course, includes a movement of the cutter to set it for actuation by the lay.

The arm 142 raises link 141 to open the valve which is latched in open position. At that time air is admitted to line 136 and nozzle 115 to set up a suction at the thread holder and disposal tubes 110 and 123. The end released from the binder as it was set rearwardly is thus ejected into receptacle 120. The pressure also drives piston 152 to engage the clutch and start the rotation of eccentric 151 which will govern the period of time during which the pressure remains on the ejector system is to function.

Of course, bobbin 21 is in place to be transferred and as the lay comes forward that will occur. However, as the cutter was moved to position, cam 87 carried by it engaged follower 88 and swung arm 73 to extract the tip bunch 84. The bunch is caught in the air stream entering mouth 85 and is drawn into tube 110 pulling off some filling at that time, the amount being governed by the position of bristles 60. The extractor arm is latched by notch 94 on arm 90 so that as the transfer hammer moves up, a new bobbin moves to transfer position. The stops and plates 56, 66, 67 and 68 all function as described to permit transfer of the bobbin, but prevent unintended escape or movement thereof.

At transfer the end held in the extractor tube 110 will be left extending therefrom to the point of entering the selvage. Cutter blade 40 and binder 42 close on the outgoing thread as the lay comes forward and that is held until the next indication for transfer.

As the lay comes forward at transfer the cutter being positioned to the rear, cam 104 holds up on end 105, pressing hook 103 down so there can be no engagement of the hook 101 and extractor arm 73 remains latched. However, on the next forward beat of the lay, these parts do function to swing arm 90 to unlatch the extractor which moves to the position of Fig. 9. It then engages over the bunch 84 in readiness to extract it when the occasion arises. The action of shoulder 95 on the cam contour 106 moves arm 90 to a position where hooked ends 101 and 103 do not make contact as the loom continues to run.

The transfer being completed and parts returned to inactive position, the air pressure continues to induce suction in lines 110 and 123 until the temple thread cutter has severed the two ends projecting at the selvage. Cutting involves several picks in that the outgoing thread and that from the ingoing bobbin are separated or disposed at an appreciable angle so the former is cut first and the latter a few picks later to prevent entanglement and ineffective action at the disposal tubes. The rearmost of the threads is caught by a hook 161, Figs. 4 and 5.

During all this the clutch has been advancing the eccentric 151 slowly until latch 147 is tripped to release the valve 13. Of course, that is set to occur a few picks after the selvage thread cutter works and as pressure falls at piston 152, the clutch is disengaged and the eccentric 151 returns to initial position. Spring 155 works to rotate it back to that position and also holds the clutch axially out of engagement. A stop for the rotary motion of the eccentric assures that it always ends up in an intended initial position.

To change the time interval during which air is admitted, the shape of eccentric 151 may be varied to that of a steeper or less steep cam, or the pinion 156 may be changed to one with greater or smaller diameter.

Thus it may be seen that the invention provides mechanism for automatically handling bobbins fed to it from some source and which have been prepared by winding the end into a tip finder bunch, and that the cut ends are disposed of without any chance of their being caught or woven into the fabric. The source of air is conserved in that it is in use only for so long as is required for the transfer and the thread to be cut at the selvage.

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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, and a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage.

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, a thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin bing transferred to the shuttle which comprises a means normally movable to a position over the tip end of that bobbin, a cooperating means to hold said means for engaging the tip bunch in a position removed from the bobbin end for at least one pick so that a succeeding bobbin may move to transfer position, and a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage.

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, a thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging over the tip of the bobbin being transferred for pulling the tip bunch therefrom, resilient means for normally maintaining it in position over the bobbin tip and engaged with the tip bunch, a latching means for holding said means for engaging the tip bunch in a position remote from the bobbin tip when it has been moved

against said resilient means to extract a tip bunch, a cam controlled means for releasing the said means to engage the tip bunch after an interval of at least one pick, and a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage.

4. Mechanism as defined in claim 3 wherein said latching means comprises a pivoted member resiliently pressed into a latching position, hooked members for tripping said means when the loom beats up, and the means for delaying said tripping function comprises a cam member carried by the loom cutter and clamping 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for extracting the tip bunch from the bobbin at transfer which comprises a pivoted arm, a bunch engaging member carried by the arm, a spring for maintaining said extracting means engaged over the tip of the bobbin to be transferred, a means movable with the cutter and clamp for camming said extracting means to a position to pull the bunch clear of the bobbin tip, a latch for temporarily locking said extracting means in that position, and other means actuated as the loom acts to beat a pick of filling into the fabric for releasing said latch after an interval of one pick.

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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means including gripping means for engaging over the bunch at the tip of the bobbin to be transferred and for stripping it from the bobbin, and in cooperation therewith a pneumatic means for receiving the bunch and filling end and for drawing a short length of filling from the bobbin.

7. Mechanism as defined in claim 6 wherein a means is provided at the battery for limiting the length of the end which may be pulled from the bobbin.

8. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means including an extractor for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, and a pneumatic means having two branches, one of which constitutes a means effective for holding said tip bunch and filling end from said bobbin and for disposing of that bunch and end when the latter is severed at the fabric selvage and the other of which is effective to discharge that thread end held by the cutter and binder when severed at the selvage and released by the binder.

9. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage, and control means for said pneumatic means which comprises a valve opened coincidentally with a movement into action of said transfer means, and a timer means for closing said valve after a predetermined interval.

10. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage, and control means for said pneumatic means which comprises a valve opened coincidentally with a movement into action of said transfer means, and a timer driven by a rotating member in said loom for closing said valve after a predetermined interval.

11. Mechanism as defined in claim 10 wherein said timer comprises a continuously driven member, a detent for latching said valve in open position, an eccentric for controlling said detent to unlatch the valve, and clutch means between said driven member and eccentric engageable by pressure of air admitted by said valve when it is opened.

12. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage, and control means for said pneumatic means which comprises a valve, means for opening said valve which means is primarily actuated in response to movement of a transfer setting means at the loom, and means for closing said valve dependent upon the air pressure admitted by the valve when opened.

13. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, a pneumatic means for holding said tip bunch and filling end from said bobbin further effective for disposing of the bunch and end when the latter is cut at the fabric selvage, and control means for said pneumatic means which comprises a valve, means for opening said valve which means is primarily actuated in response to movement of a transfer setting means at the loom, and means for closing said valve

which comprises a continuously driven member and detent means unlatched by said driven member.

14. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, and means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle which comprises a pivoted arm having a bunch stripping member, means to hold said arm and member in a position to engage behind a bunch, a latch means to lock said arm in a position in which it has stripped the bunch from the bobbin, and a cam and follower means carried by the arm and by said thread cutter and binder for moving the arm to latched position while stripping a bunch.

15. 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 thread cutter and binder for severing and holding the end of filling from the exhausted bobbin and a temple thread cutter, a means including a pivotal arm having a gripping means for engaging over the bunch at the tip of the bobbin to be transferred and for stripping it from the bobbin, and in cooperation therewith a pneumatic means for receiving the bunch and filling end and for drawing a short length of filling from the bobbin, a latch means to lock said arm in a position in which it has stripped the bunch from the bobbin, and other means operable subsequently for releasing the arm from its latching means.

16. Mechanism as defined in claim 15 wherein said means for releasing said arm comprises a hook on the arm, a pivoted hook carried by a movable part of the loom and engageable with that on the arm, and cam means movable with the cutter and clamp for preventing engagement between said hooks.

17. An extractor for stripping a tip finder bunch from a bobbin which comprises a means movable endwise over the bunch and bobbin tip having a unitary tapered bushing formed of a resilient material split longitudinally whereby it will be capable of expansion to pass over the bunch and so constricted as to strip the bunch from the bobbin when withdrawn axially endwise therefrom.

18. Mechanism as defined in claim 17 wherein said bushing is split along a plane oblique to its axis.

19. 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 including a stud shaft and a transfer hammer for moving the leading one of said supply of bobbins into the shuttle upon call for replenishment, a thread cutter and binder for severing and holding a thread from an outgoing bobbin and a selvage thread cutter, means for extracting the bunch from the end of the bobbin to be transferred and pneumatic means for holding and disposing of the extracted bunch and end, said means comprising a chamber fixed to the end of said stud shaft, a venturi in said chamber, said shaft being hollow and having a supply of air under pressure connected at one end and at the venturi end, a nozzle for discharging an air jet into the venturi, a bunch receiving means cooperating with said extractor and a hollow conduit leading therefrom to said chamber.

20. 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 means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, said last mentioned means being timed to engage over the tip bunch before the initiation of the transfer function and to withdraw the bunch after said function has been initiated.

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 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 engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, and means controlling the cycle of said last mentioned means to engage over the tip bunch prior to the initiation of the transfer function and to withdraw the bunch after such function has been initiated.

22. 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 means for engaging and pulling the tip bunch from the bobbin being transferred to the shuttle, and means for actuating said last mentioned means according to a cycle in which the bunch is withdrawn from a bobbin transfer of which has been initiated, and then upon movement of the next bobbin to transfer position is engaged over the tip bunch thereon prior to initiation of transfer of that bobbin.

References Cited in the file of this patent

UNITED STATES PATENTS

2,455,149	Turner	Nov. 30, 1948
2,474,632	Krukonis	June 28, 1949
2,505,443	Turner	Apr. 25, 1950
2,566,880	Fiset et al.	Sept. 4, 1951
2,628,639	Kiely	Feb. 17, 1953
2,778,382	Banks	Jan. 22, 1957