April 30, 1940. R. G. TURNER 2,199,354

PNEUMATIC THREAD CONTROL FOR WEFT REPLENISHING LOOMS

Original Filed March 31, 1938 2 Sheets-Sheet 1

FIG. 1

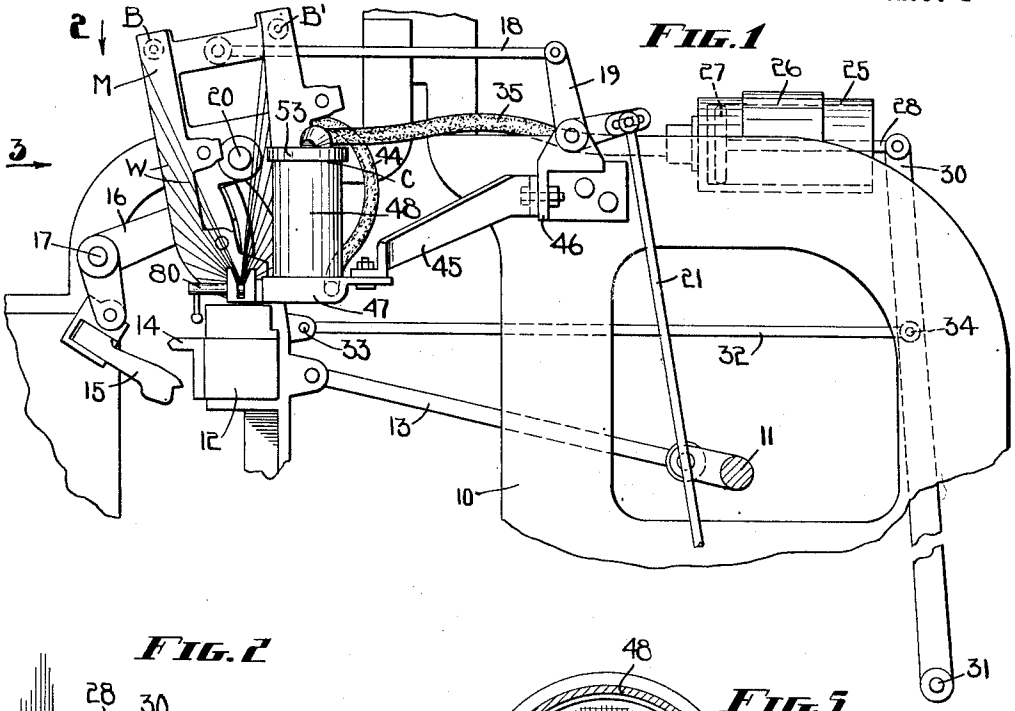


FIG. 2

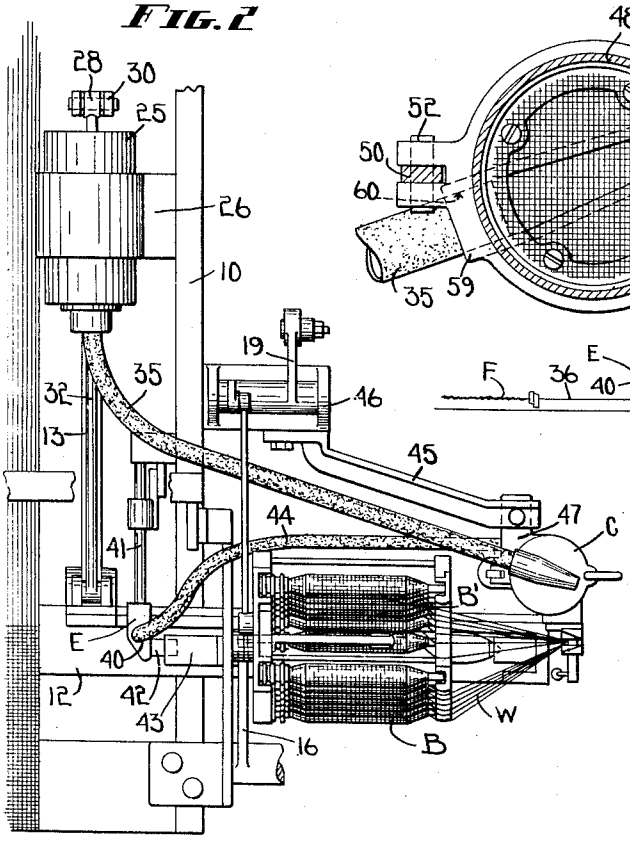


FIG. 5

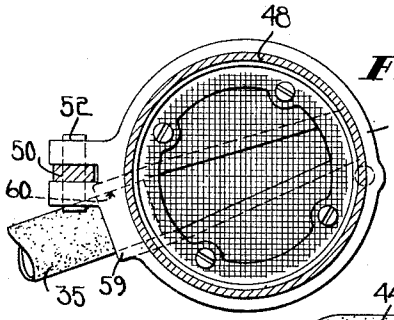
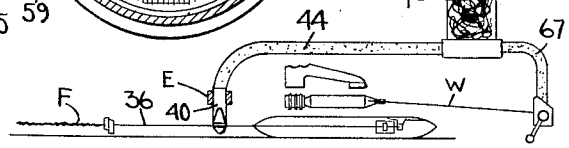


FIG. 10



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PNEUMATIC THREAD CONTROL FOR WEFT REPLENISHING LOOMS

Original Filed March 31, 1938 2 Sheets-Sheet 2

FIG. 3

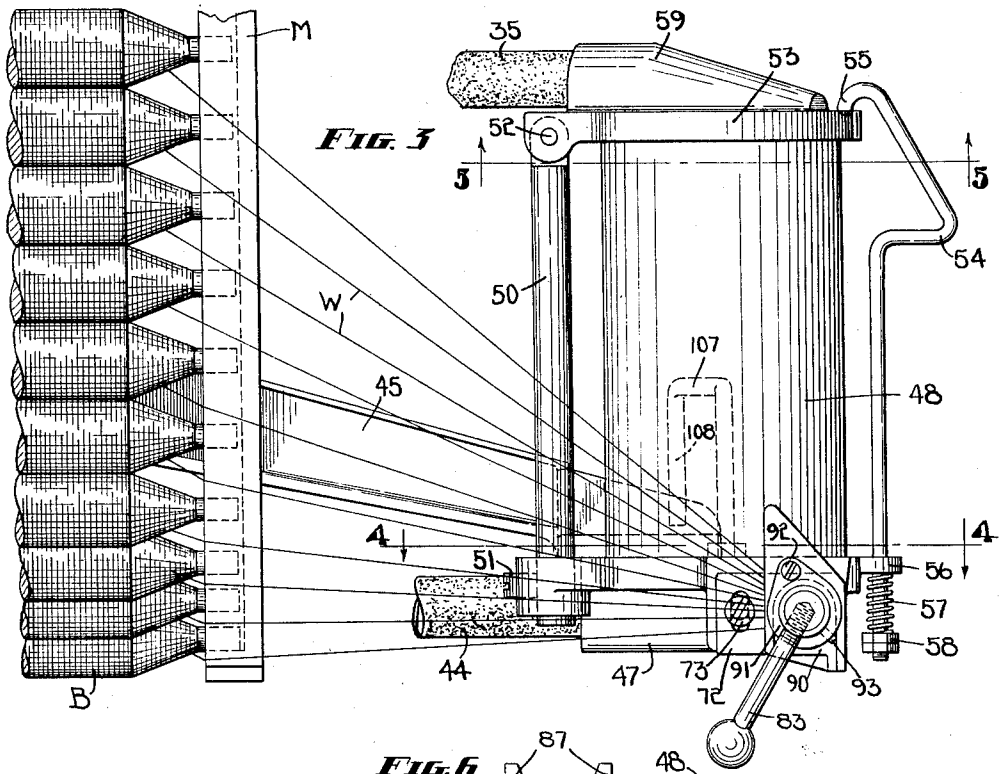


FIG. 6

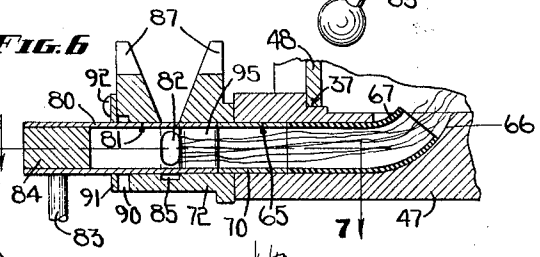


FIG. 4

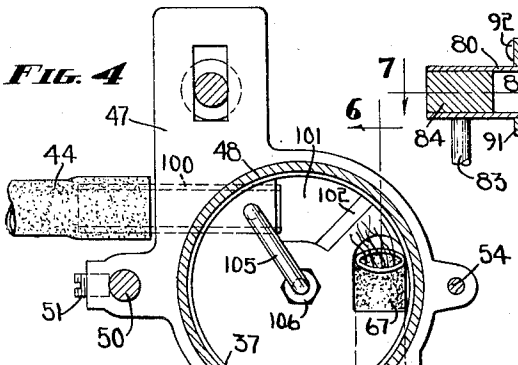


FIG. 8

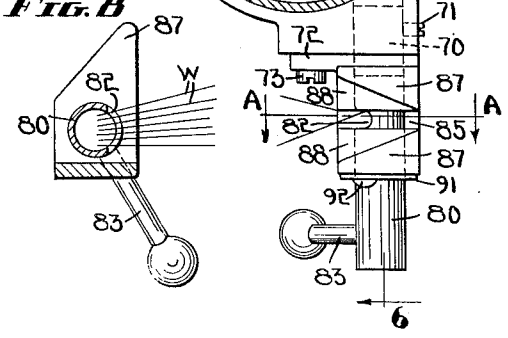


FIG. 7

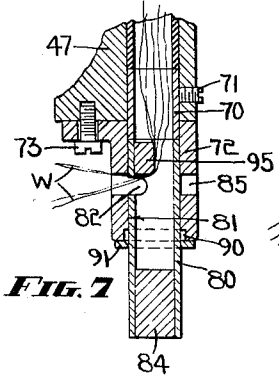
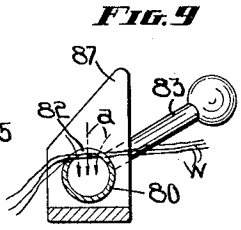


FIG. 9



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UNITED STATES PATENT OFFICE

2,199,354

PNEUMATIC THREAD CONTROL FOR WEFT REPLENISHING LOOMS

Richard G. Turner, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application March 31, 1938, Serial No. 199,169
Renewed March 8, 1940

19 Claims. (Cl. 139—247)

This invention relates to improvements in pneumatic thread holding or removing devices for weft replenishing looms and the method of their operation. One important object of the invention is to provide an improved holder into which the weft ends of reserve bobbins are drawn by pneumatic action.

In bobbin changing looms a magazine is provided to hold reverse bobbins from which weft ends extend toward a thread holder. At the time of transfer the bobbin freshly inserted into the depleted shuttle can be threaded because of the fact that the weft end is held comparatively fixed with respect to the loom.

As the reserve bobbins await transfer their weft ends have a tendency to twist on each other the effect of which is to render difficult if not impossible the separation from the twisted thread mass of the thread attached to the freshly transferred bobbin. It is an important object of my present invention to provide an accumulator for weft ends located close to the intake of the thread holding system so that the threads resulting from previous transfers may form a ball or mass of yarn with which the weft ends of the reserve bobbins become entangled. This mass of threads provides an anchorage for the weft ends beyond the intake of the thread holder and serves to keep the threads in a more or less parallel relationship and thereby prevent twisting. As a result of this construction the thread of a freshly transferred bobbin, not being twisted on other threads outside of the holder, can be drawn into the latter and the accumulator and thus be entirely removed from the zone of influence of moving parts of the loom, such as the shuttle or lay.

At the time of transfer there are ordinarily two threads which must be removed from the path of the shuttle, one of which is connected to the reserve bobbin already mentioned. The other thread is that which extends from the selvage to the outgoing bobbin, usually cut close to the temple, and removed either by the downward motion of the expelled bobbin or by mechanism specially constructed for the purpose. It is a further object of my present invention to provide a pneumatic thread extractor for this second thread also connected to the accumulator so that the latter serves for the reception of both threads. By this arrangement the aforesaid mass or ball of yarn is increased in size because of the threads received from the extractor, and entry of the thread from the extractor into the accumulator assists in entangling and insuring anchorage for the weft ends of the reserve bobbins.

When fresh bobbins are inserted into a magazine the weft ends are ordinarily drawn away from the magazine toward the end of the loom to be attached to some form of thread holder. Where the thread holder is of the pneumatic type it is necessary to provide some means for passing these reserve ends into the mouth or intake of the holding system. To facilitate entry of the threads it is a further object of my invention to provide a movable intake operable preferably manually, so constructed that the intake can be moved to an upwardly facing position so the weft ends can be laid across and drawn into it, after which the intake is moved angularly so that it faces the magazine to permit the weft ends to be drawn thereinto along substantially straight lines.

It is a further object of my present invention to create a vacuum in the accumulator by a connection from a pump entering the top of the accumulator, while the thread extractor and thread holder mechanisms communicate with the bottom of the accumulator. This has the effect of drawing the weft ends up into the mass of threads in the accumulator. I find it desirable to place a baffle or the like between the intakes of these two systems so that the drafts of air will not interfere with each other sufficiently to impede correct entry of the threads. In this connection I find it desirable also to introduce a rod or similar device in the accumulator to prevent the mass or ball of yarn from rotating under pneumatic action. With certain types of yarns rotation of the mass of threads in the accumulator may subject the weft ends to too much tension and also twist the weft ends together, and it is to prevent these disturbances that I prefer to use means to prevent rotation of the mass of threads.

It is a further object of my invention to provide an improved method for attaching reserve bobbin weft ends to a ball or mass of threads so that the latter can act as a holder for the ends. This method consists in blowing the ends into a group of loosely entangled threads through which the draft of air passes to carry the ends into holding relation with the mass.

Certain features of this invention constitute improvements over the structure set forth in my co-pending application Serial No. 166,571, and the extractor may be as set forth more fully in my co-pending application Serial No. 190,637.

With these and other objects in view which will appear as the description proceeds, my in-

vention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawings wherein a convenient embodiment of my invention is set forth,

Fig. 1 is an end elevation of the upper part of a weft replenishing loom having my invention applied thereto,

Fig. 2 is a plan view taken in the direction of arrow 2, Fig. 1,

Fig. 3 is an enlarged front elevation taken in the direction of arrow 3, Fig. 1,

Fig. 4 is a horizontal section on line 4—4 of Fig. 3 looking in the direction of the arrows,

Fig. 5 is a section on line 5—5 of Fig. 3,

Fig. 6 is a longitudinal vertical section on line 6—6 of Fig. 4,

Fig. 7 is a horizontal section on line 7—7 of Fig. 6,

Figs. 8 and 9 are detailed vertical sections on line A—A, Fig. 4, showing the intake and its manual control in two different positions, and

Fig. 10 is a diagrammatic view in front elevation of the extractor and thread holder together with the magazine and shuttle.

Referring to the drawings, particularly Figs. 1 and 2, I have shown a loom frame 10 having a crank shaft 11 which makes one revolution for each beat of the loom. The lay 12 is reciprocated by power derived from the crank shaft and transmitted through connectors 13 and is provided with a transfer bunter 14 to engage a latch 15 on transferring beats of the loom. The latch is carried by the lower end of a transferring arm 16 pivoted as at 17 to fixed structure on the loom frame and cooperates with a magazine designated generally at M and set forth herein as provided with two stacks of distinctive reserve bobbins B and B'. By means of a rod 18 connected to a lever 19 the magazine is rocked about its fixed pivotal support 20 to move one or the other of the stacks of reserve bobbins into operative relation with respect to the transferrer arm 16. The lever 19 may be rocked by means of a depending rod 21 connected by mechanism not shown to cause rocking of the magazine in time with the shifting of a gang of shuttle boxes at the opposite end of the loom not shown herein. It is to be understood that the loom will operate with two weaving shuttles either one of which may become active whenever required by the demands of the pattern being woven. For a further description of the magazine and the means by which it may be rocked reference may be had to my Patent No. 2,128,974, issued September 6, 1939.

A pneumatic pump cylinder 25 is held by a bracket 26 secured to the loom frame and has a piston 27 operated by a connector rod 28 pivoted to the upper end of a lever 30. The latter is pivoted near the bottom of the loom as at 31 and at a point intermediate its length is attached to an operating rod 32 connected to the lay as at 33. The pivotal connection 34 between rod 32 and lever 30 may be chosen to give the piston 27 the desired stroke. As the lay recedes, or moves to the right of the front center or transfer position shown in Fig. 1, the piston 27 will move rearwardly to create a partial vacuum in the left part of the cylinder 25, and as the lay moves forwardly from its rearmost position the piston will advance. By this construction a partial vacuum is set up in the cylinder for each beat of the loom, starting with and continuing throughout the rearward stroke of the lay. Leading forwardly from the cylinder is a tube 35 connected to an accumulator to be described.

Details of the cylinder are not given herein, as they are set forth in my co-pending application Serial No. 166,571, to which reference may be had for further understanding of the construction and operation of the pump. It is deemed sufficient for present purposes to state that during rearward motion of the lay a vacuum will be created in tube 35. While I have shown a pump yet I do not wish to be limited to this particular means for inducing a vacuum in tube 35.

A thread extractor designated generally at E and shown more particularly in Figs. 2 and 10 comprises a head 40 adapted for the entry of a weft thread 36 extending from the selvage of the cloth F to the right and in front of said extractor head, as viewed in Figs. 2 and 10. The extractor head is mounted on a rod 41 which may be raised and lowered with respect to the lay and is under control of the transfer mechanism by means of a lug 42 projecting laterally from the head and under a projection 43 on the transferrer arm 16. Whenever the latter is depressed in well-known manner to effect transfer the head 40 will be lowered from its normally raised position. A tube 44 extends outwardly from the head 40 to the accumulator C to be described. For further details of the thread extractor E and its mode of operation and support reference may be had to my co-pending application Serial No. 190,637.

The details of the matter thus far described of themselves form no part of my present invention and may be as set forth in the aforementioned applications.

Referring particularly to Figs. 1, 2 and 3, the accumulator C is mounted on an arm 45 projecting outwardly from a stand 46 secured to the loomside and forming a support for lever 19. Bolted to the arm 45 is a base 47 extending horizontally and supporting a preferably transparent hollow cylinder 48 the lower end of which fits snugly into a seat 37 in the base. Extending upwardly from the base is a rod 50 adjustably held in vertical position on the base by means of adjusting set screw 51. Pivoted as at 52 to the top of the rod is a cover 53 for the cylinder. The cover may be held yieldingly in place by means of a hook 54 engaging the top of the cover as at 55 and extending down through an ear 56 on the base. A compression spring 57 is located between the ear and adjusting nuts 58 on the lower end of the hook. Ordinarily the partial vacuum existing within the cylinder 48 is sufficient to hold the cover in place, but when the latter is to be moved upwardly to permit removal of accumulated weft within the cylinder 48, the hook may be raised against the action of spring 47 and thrown to one side, after which the cover can be swung around its pivot 52. The tube 35 is preferably made of rubber and fits into a receiving head 59 integral with the cover and having a bore 60 which communicates with the interior of the cylinder 48, see Fig. 5.

The base 47 has extending thereinto from the forward side a bore 65 the rear of which is curved upwardly as at 66. The rear part of this bore receives a rubber tube 67 which fits snugly into the bore and provides a passage the interior surface of which offers frictional resistance to threads.

Projecting forwardly from the base 47 and fitting into the bore 65 is a metallic tube 70 held fixed with respect to the base 47 by a set screw

71. Tube 70 projects forwardly into a guide member 72 held to the base 47 by a screw 73. The base 47, tube 70 and guide member 72 are fixed with respect to the arm 45.

A second metallic tube 80 fits into a bore 81 of the guide member which also receives the forward end of tube 70. The tube 80 is rotatable in bore 81 and has a thread inlet port 82. In order to effect partial rotation of tube 80 I provide a handle 83 passing through tube 80 and into a plug 84 fitted tightly into the forward end of the tube to close the outer end of tube 80. The guide member 72 is provided with a vertical slot 85, which is in transverse alignment with the port 82, and has upwardly extending horns 87 with diverging opposed surfaces 88 lying on opposite sides of the slot 85. These horns and the slot between them define a guide pocket into which the weft ends W from the reserve bobbins may fall.

The means for retaining tube 80 and limiting its angular motion is shown in Figs. 3 and 7, where the guide member 72 as shown as having a recess 90 over a portion of which fits a plate 91 held in place by a screw 92. A pin 93 (Fig. 3) carried by the tube 80 lies between plate 91 and part 72 to hold the tube in longitudinal position, and engagement of the pin by the opposite vertical walls of the recess limits angular motion of the tube 80. The intake opening or port 82 is thus kept aligned with the slot 85 in all of its angular positions. The tube 80 fits its bore 81 snugly to reduce to a minimum air losses which may arise when a vacuum is created in the accumulator C.

A block 95 secured to the interior of tube 80 just behind the port 82 projects to the right a distance substantially equal to the radius of the interior of tube 80, as indicated in Fig. 7, thereby serving as a guide to require the weft threads W to extend along the center of the tube 80 and be exposed on all sides to the action of the inrushing air.

The base 47 has projecting thereinto another tube 100 which connects with an opening 101 in base 47 communicating with the air within the cylinder 48. Tube 100 projects to the left of the base as shown in Fig. 4 and has the rubber tube 44 attached thereto. A vertical baffle plate 102 extends upwardly between the inner end of tube 100 and the rubber tube 67 for the purpose of deflecting inrushing drafts of air from these two tubes and preventing such interference as might reduce the efficiency of the system.

Projecting upwardly from the base 47 and within the cylinder is a rod 105 threaded into the base and held in fixed position by a nut 106. The rod is bent horizontally as at 107 and ends in a depending end section 108. The purpose of the rod is to prevent rotation of a mass of threads T within the accumulator.

In operation, rearward motion of the lay will cause a partial vacuum in the cylinder 48 to cause inrushes of air toward the interior of the cylinder through tubes 67 and 100. When the magazine is first supplied with reserve bobbins the handle 83 will be thrown temporarily to the raised position shown in Fig. 9 which will face port 82 upwardly between the horns 87 and the weft ends W previously drawn off from the bobbins will be laid down between said horns and across the port. During the first backward motion of the lay the inrushing air in the direction of arrows *a*, Fig. 9, will draw the weft ends into the tube 80. These threads will pass around the block 95 and move rearwardly toward the rubber tube 67. The threads will ordinarily be of sufficient length to reach into the cylinder 48 and after the threads have assumed the position shown in Fig. 7, the handle 83 will be released and return by gravity to its normal position shown in Fig. 8 where the port 82 faces the magazine. Thereafter the weft ends will feed directly into the port 82 along substantially straight lines. At each subsequent rearward motion of the lay there will be an inrush of air into the port to exert pneumatic pressure on the weft ends W tending to keep them taut.

On a transferring beat of the loom one of the bobbins will move in well-known manner from the magazine into the depleted shuttle S by means of transferrer arm 16 and at some subsequent time in the operation of the loom the thread will be cut, after which the inrushing air will draw said cut end into the cylinder 48. As subsequent transfers occur there will be an accumulation of thread ends in the cylinder 48, the weft ends of the reserve bobbins still held in the magazine being sufficiently long to project into the cylinder and become entangled with the mass of threads which serves as a thread holder. In this way the ball of yarn within the accumulator prevents twisting of the weft ends W on themselves outside the port 48 and between the latter and the magazine due to the fact that the rod 105 prevents rotation of the thread mass.

As described in my aforesaid co-pending application Serial No. 190,637 the thread of the outgoing bobbin will be received by the extractor head 40 during the rearward beat of the lay immediately following transfer and will pass along tube 44 into the accumulator, thereby adding to the number of thread ends within the cylinder 48 and assisting in providing additional anchorage for the weft ends W of the reserve bobbins. By this construction the accumulator not only serves the purpose of providing vacuum for both the thread holder and the extractor, but requires all threads released during a normal transfer to pass into it to provide a ball of threads which serves as an anchor for the weft ends W.

From the foregoing it will be seen that I have provided pneumatic control mechanism for the threads which are released at the time of transfer, the threads from both the thread holder and extractor being passed into a common reservoir or accumulator pneumatically. It will also be seen that the mass of weft within the accumulator is entangled with the weft ends extending from the reserve bobbins and the force tending to hold said weft ends taut is not only that arising from the inrush of air into the port 82 but also the resistance created by entanglement with the mass of threads. Furthermore, the thread removed by the extractor E forms part of the ball of yarn and thereby further assists in anchoring the weft ends W. It will also be seen that the port 82 is movable so that weft ends from a freshly inserted supply of bobbins can be laid between the horns 87 and drawn into the accumulator when the tube 80 is temporarily turned to receiving position, after which the tube returns to normal position facing the magazine. The block 95 within the tube 80 requires the weft ends W to extend into the center of the stream of air passing along the tube 80 to the accumulator. Furthermore, the accumulator is located close to the thread holder so that a small length of yarn only is required to extend into the cyl-

inder 48 for entanglement with the ball of yarn therein. Rotation of the ball of yarn is prevented by the rod 105, and the baffle plate 102 also assists in directing the inrushing streams of air in non-conflicting directions. The current of air passes upwardly through the yarn mass, drawing the incoming threads up into entangling relation with the yarn mass. The method by which the yarn mass becomes an anchorage for the weft ends is also a part of my invention.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow weft end accumulator having a mass of threads therein, a thread holder having an intake opening pneumatically connected with the interior of the accumulator and into which the weft ends extend, means to induce a draft of air into the opening and accumulator to move the weft ends against and entangle them with said mass of threads, and means to prevent rotation of said mass of threads within the accumulator.

2. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow weft end accumulator having a mass of threads therein, a thread holder having an intake opening into which the weft ends extend and pneumatically connected with the interior of the accumulator, means to create a partial vacuum within the accumulator to induce a draft of air into the opening and accumulator to move the weft ends against and entangle them with said mass of threads, and a thread guard within the accumulator in engagement with said mass of threads to prevent rotation of the latter.

3. In a weft replenishing loom having reserve bobbins from which extend weft ends, a pneumatic thread holder at one side of the reserve bobbins, a rotatable tubular member forming part of said holder and having an intake opening, means to induce a draft of air into said intake, and operating means by which said tubular member may be rotated to face the opening upwardly to permit weft ends from the bobbins to lie across said opening preparatory to being drawn thereinto by the draft of air, said tubular member thereafter being turned by said operating means to face the intake opening toward the bobbins so that the weft ends extend from the latter directly into the opening.

4. In a weft replenishing loom having reserve bobbins from which extend weft ends, a supporting member, a tubular member having an intake opening therein and angularly movable within said supporting member to two angularly spaced positions one of which causes the intake opening to face the bobbins so that the weft ends extend from said bobbins directly into the opening, and said tubular member when in the other position causing the intake opening to face in a direction transverse of the direction in which the weft ends extend, said ends to lie over the intake opening, and means to induce a draft of air into said opening to draw the weft ends into the tubular member when the latter is in either of said positions.

5. In a weft replenishing loom having reserve bobbins from which extend weft ends, a fixed support, upwardly spaced guide horns on the support defining between them a thread receiving slot, a tube rotatably mounted in the support and having a lateral intake to register with said slot, said tube being movable angularly in the support to a position to place the intake in an upper position to receive weft ends extending across the tube between said horns and said tube thereafter being movable to a position causing the intake to face the reserve bobbins, and means to cause the intake to remain in register with the slot as the tube moves angularly in the support.

6. In a weft replenishing loom having reserve bobbins from which weft ends extend, a fixed support, a tubular member angularly movable within the support and having a laterally opening intake, a handle connected to said tubular member normally in low position with the intake at one side of the tube facing the reserve bobbins, said tube being movable angularly in the support by motion of the handle to high position to place the intake on the upper part of the tube to receive weft ends extending from the reserve bobbins across the tube, stop means to limit motion of the handle to an angle less than 180°, and means to induce a draft of air into said intake to draw the weft ends thereinto when the handle is in high position, said handle falling by gravity when released to return the intake to a position facing the reserve bobbins.

7. In a weft replenishing loom having reserve bobbins from which extend weft ends, a tubular member having an intake opening laterally thereinto, weft end guide means adjacent one side of the opening and extending into and part way across the interior of the tube, and means to induce a draft of air into the opening in a direction around said guide means to draw the weft ends into the opening, said guide means causing the weft ends to lie along lines spaced from the interior walls of the tube.

8. In a weft replenishing loom having reserve bobbins from which extend weft ends, a tubular member having an intake opening laterally thereinto, a weft end guide on the interior of the tubular member located at one side of the intake, and means to induce a draft of air into the intake and within the tube in a direction from the intake toward the guide to draw the weft ends into said intake and around the guide and along the interior of the tubular member, said guide located to place the weft ends approximately at the transverse center of the tubular member.

9. In a pneumatic thread control for a weft replenishing loom having reserve bobbins from which extend weft ends and having a cloth with a selvage, a pneumatic thread extractor located adjacent the selvage to attract threads extending from the selvage, a pneumatic thread holder for the weft ends, a common accumulator for the threads attracted by the extractor and the weft ends, and means pneumatically connecting the thread extractor and the thread holder with said common accumulator.

10. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a hollow thread accumulator, a thread extractor between the selvage and the reserve bobbins having an intake mouth to receive a thread extending from the selvage, means to pneumatically connect the extractor to the accumulator, a thread holder having an intake opening for the weft ends, means pneumatically connecting the intake opening in the thread holder with the accumulator, and means to induce a partial vacuum in the

accumulator to induce a draft of air into the extractor to cause the same to attract a thread extending from the selvage and also induce a draft of air into the intake of the thread holder to draw the weft ends toward the accumulator.

11. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a thread extractor adjacent the selvage and having an intake mouth to receive a thread extending from the selvage, a thread holder having an intake opening to receive the weft ends of the reserve bobbins, a hollow thread accumulator for both the extractor and the thread holder, means defining an inclosed passage from the mouth of the extractor to the interior of the accumulator, other means defining an inclosed passage from the intake opening of the thread holder to the interior of the accumulator, and means to induce drafts of air into said mouth and said intake opening to cause the thread extending from the selvage and the weft ends to move toward said accumulator.

12. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a thread accumulator containing a mass of thread, a pneumatic thread extractor adjacent the selvage and having an intake mouth to receive a thread extending from the selvage toward the reserve bobbins, a pneumatic thread holder having an intake opening to receive the weft end from the reserve bobbins, means defining an inclosed passage to connect the mouth of the extractor with the interior of the accumulator, other means to provide an inclosed passage from the intake opening of the thread holder to the interior of the accumulator, and means to create a partial vacuum within the accumulator to induce a draft of air into said mouth of the extractor to move the thread extending from the selvage to said mass of yarn in the accumulator and also induce a draft of air into said intake opening of the thread holder to move the weft ends into entangling engagement with the mass of threads and the threads reaching the accumulator from said mouth, the threads reaching the accumulator from the extractor assisting by entanglement with the weft ends to hold the latter within the accumulator.

13. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a pneumatic thread extractor adjacent the selvage having an intake mouth for a thread extending from the selvage, a thread holder having an intake opening to receive the weft ends of the reserve bobbins, a hollow thread accumulator having a mass of threads therein, means to pneumatically connect the interior of the accumulator with said mouth of the extractor and said intake opening of the thread holder, means to induce drafts of air from said mouth and said intake opening to the interior of the accumulator to move threads connected to the selvage and said weft ends into the accumulator, threads from the extractor increasing the mass of yarn within the accumulator and the weft ends being entangled with and held by the mass of thread within the accumulator.

14. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a pneumatic thread extractor adjacent the selvage and having an intake mouth to receive threads extending from the selvage, a pneumatic thread holder having an intake opening to receive said weft ends, a hollow thread accumulator having a mass of thread therein, means defining an inclosed passage between the mouth of the extractor and the lower part of the interior of the accumulator below said mass of threads, other means defining an inclosed passage between the intake opening of the thread holder and the bottom of the interior of said accumulator below said mass of thread, and means connected to the upper part of the accumulator above said mass of threads to create a partial vacuum within the accumulator and thereby induce a draft of air into said mouth to draw threads extending from the selvage into the lower part of the accumulator and also induce a draft of air into the intake opening of the thread holder to move the weft ends into the accumulator and entangle said weft ends with said mass of threads by the action of a current of air moving upwardly through said mass of threads, the threads received by the accumulator from the extractor forming part of said mass of threads and assisting in entangling the weft ends to hold the latter within the accumulator.

15. In a weft replenishing loom having reserve bobbins from which extend weft ends and having a fabric with a selvage, a pneumatic thread extractor having an intake mouth adjacent the selvage to receive threads extending from the selvage, a pneumatic thread holder having an intake mouth to receive the weft ends, a hollow thread accumulator, means defining an inclosed passage between the mouth and the bottom of the interior of the accumulator, other means defining an inclosed passage between the intake opening of the thread holder and the bottom of the interior of the accumulator, means to induce drafts of air into the mouth and said intake opening through said means into the accumulator, the drafts of air from the first and second named means entering the accumulator in opposite directions, and baffle means within the accumulator to prevent interference of the drafts of air coming from said first and second means.

16. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow holder having a mass of threads confined therein, a hollow guide for the weft ends leading toward the holder, the weft ends being of sufficient length to extend through the hollow guide and engage the mass of threads in the holder, and means to induce a draft of air through the guide toward the holder and pneumatically move the weft ends toward and entangle them with the mass of threads.

17. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow pneumatic thread holder having an intake opening to receive said weft ends, a hollow accumulator having a mass of threads confined therein, hollow connections between said intake opening and the lower part of the interior of said accumulator, the weft ends being of sufficient length to extend through the opening and hollow connections and have contact with the mass of threads in the accumulator, and means to induce a draft of air into the intake opening and along said connections and into the lower part of said accumulator, said draft of air moving the weft ends and entangling them with the mass of threads in the accumulator.

18. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow accumulator having a mass of threads confined therein, a pneumatic thread holder having an intake opening into which the weft ends extend, hollow connections between the intake opening

and the lower part of the interior of the accumulator, the weft ends being of sufficient length to extend through the hollow connections and into the accumulator and having contact with the mass of threads confined within the accumulator, and means to create a partial vacuum within the accumulator to induce a draft of air into the intake opening and in said hollow connections to draw the weft ends into the accumulator and entangle said weft ends with the mass of threads confined within the accumulator.

19. In a weft replenishing loom having reserve bobbins from which extend weft ends, a hollow accumulator having a mass of threads confined therein, a pneumatic thread holder connected to the accumulator and having an intake opening in pneumatic communication with the lower part of the interior of said accumulator below said mass of threads, and means communicating with the interior of the accumulator above the mass of threads to create a partial vacuum within the accumulator, the weft ends from the reserve bobbins extending through the intake opening and into the accumulator and being of sufficient length to engage the mass of threads within the accumulator, creation of a partial vacuum within the accumulator above the mass of threads inducing a draft of air into the intake opening and the accumulator and through said mass of threads to draw said weft ends toward and entangle them with the mass of threads within the accumulator.

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