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[56] **References Cited**

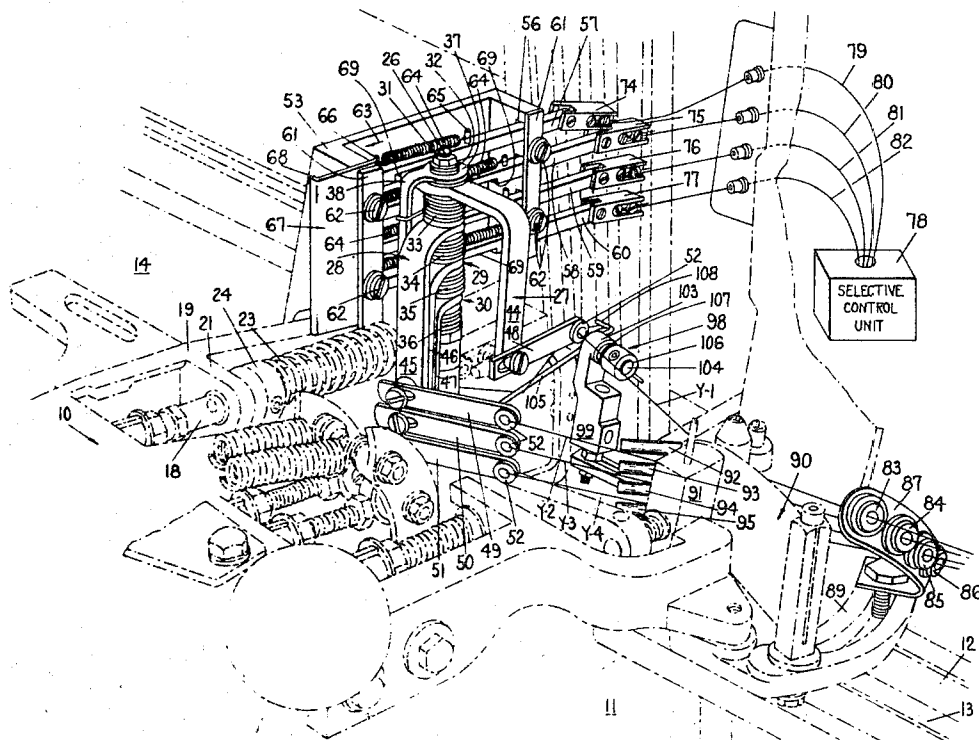
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458,695	8/1950	Italy	139/122

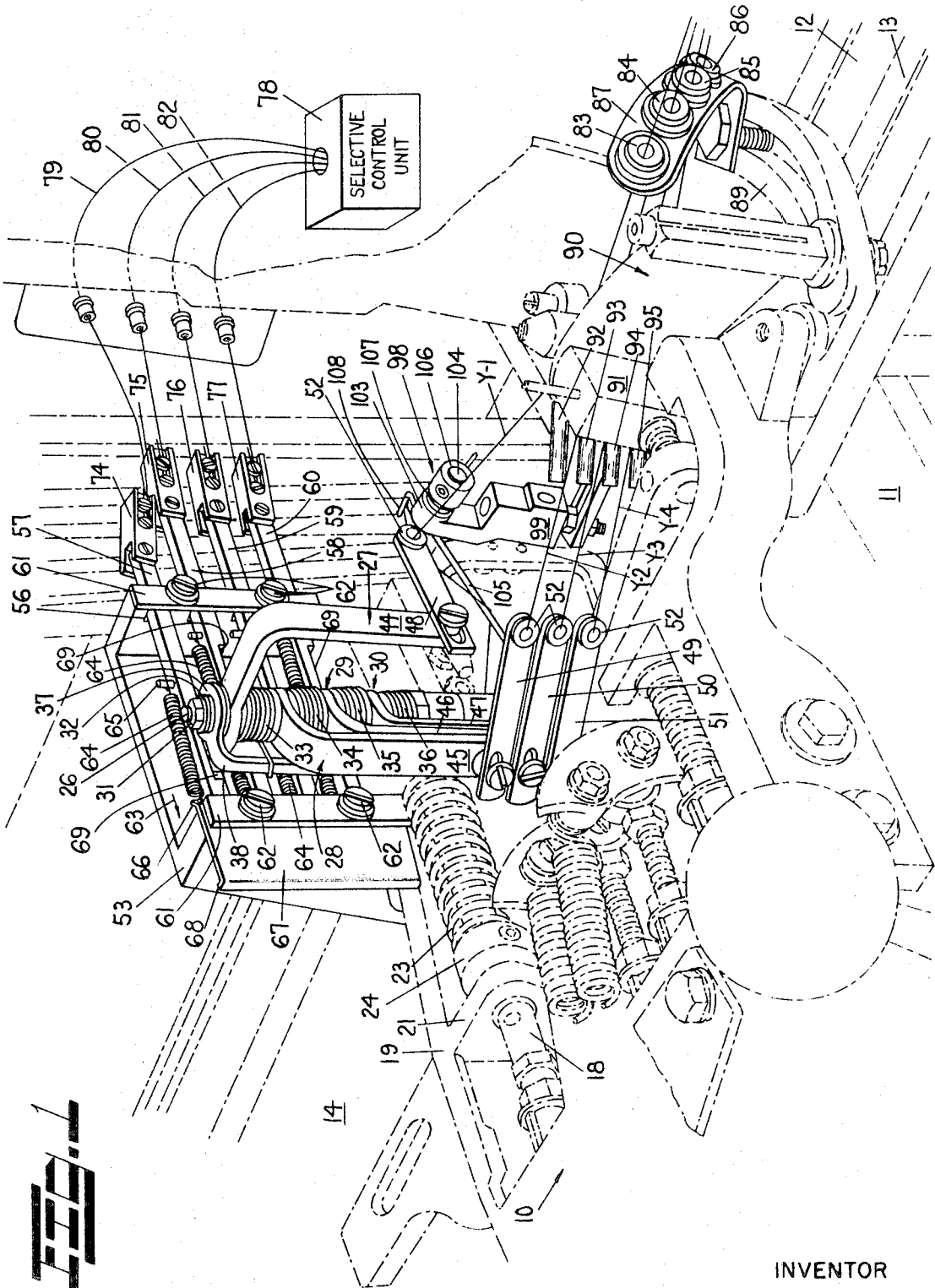
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[54] **FILLING CONTROL MECHANISM**
 5 Claims, 5 Drawing Figs.

[52] U.S. Cl. 139/122W
 [51] Int. Cl. D03d 47/38
 [50] Field of Search 66/125;
 139/122—127

ABSTRACT: A filling mechanism for shuttleless looms having a control unit and a mechanism functioning in cooperation therewith for supporting and guiding at least two filling yarns from separate sources of supply and which are individually selectable in accordance with a desired pattern for presentation into the warp sheds by the filling inserting means.

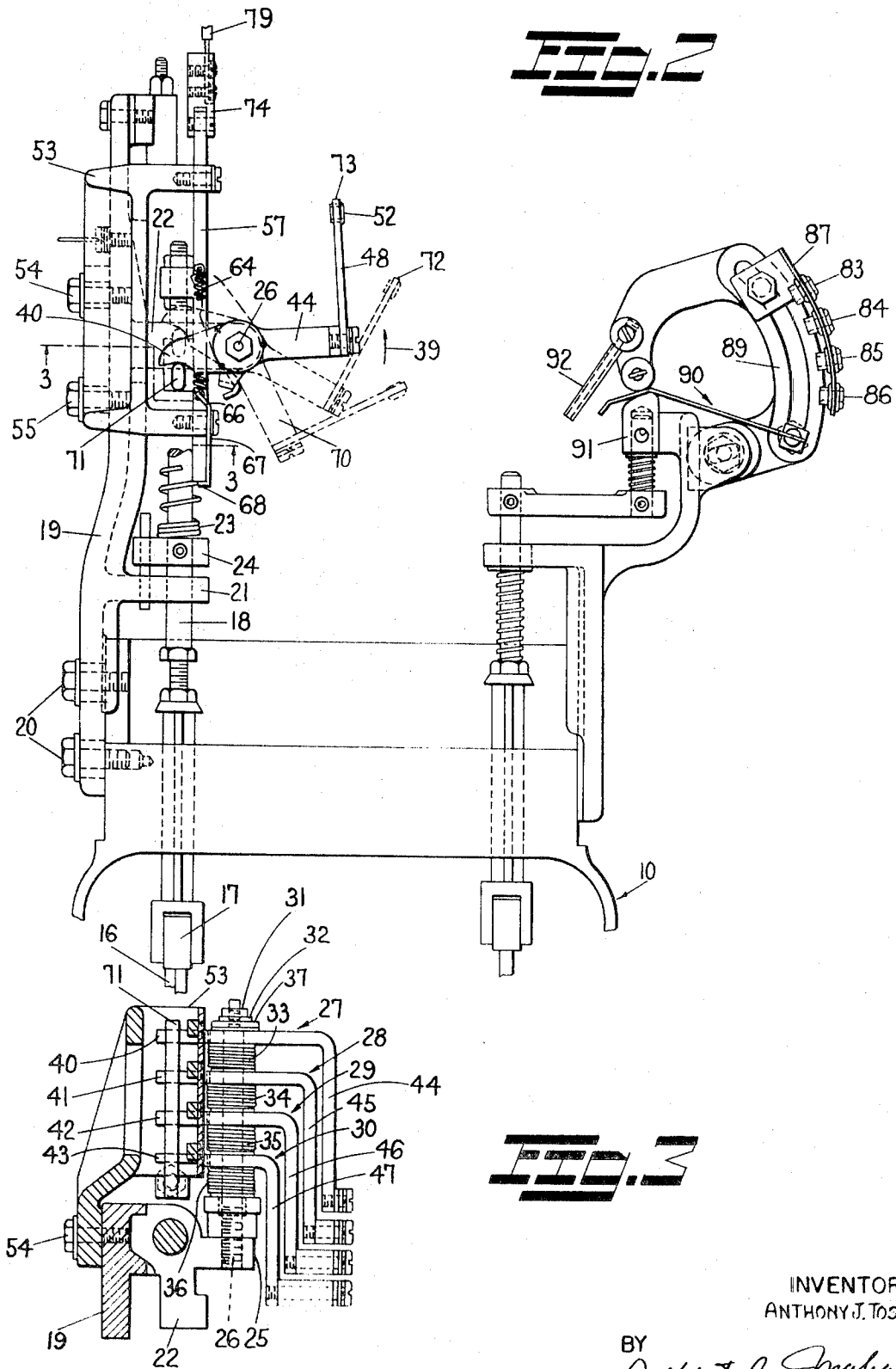




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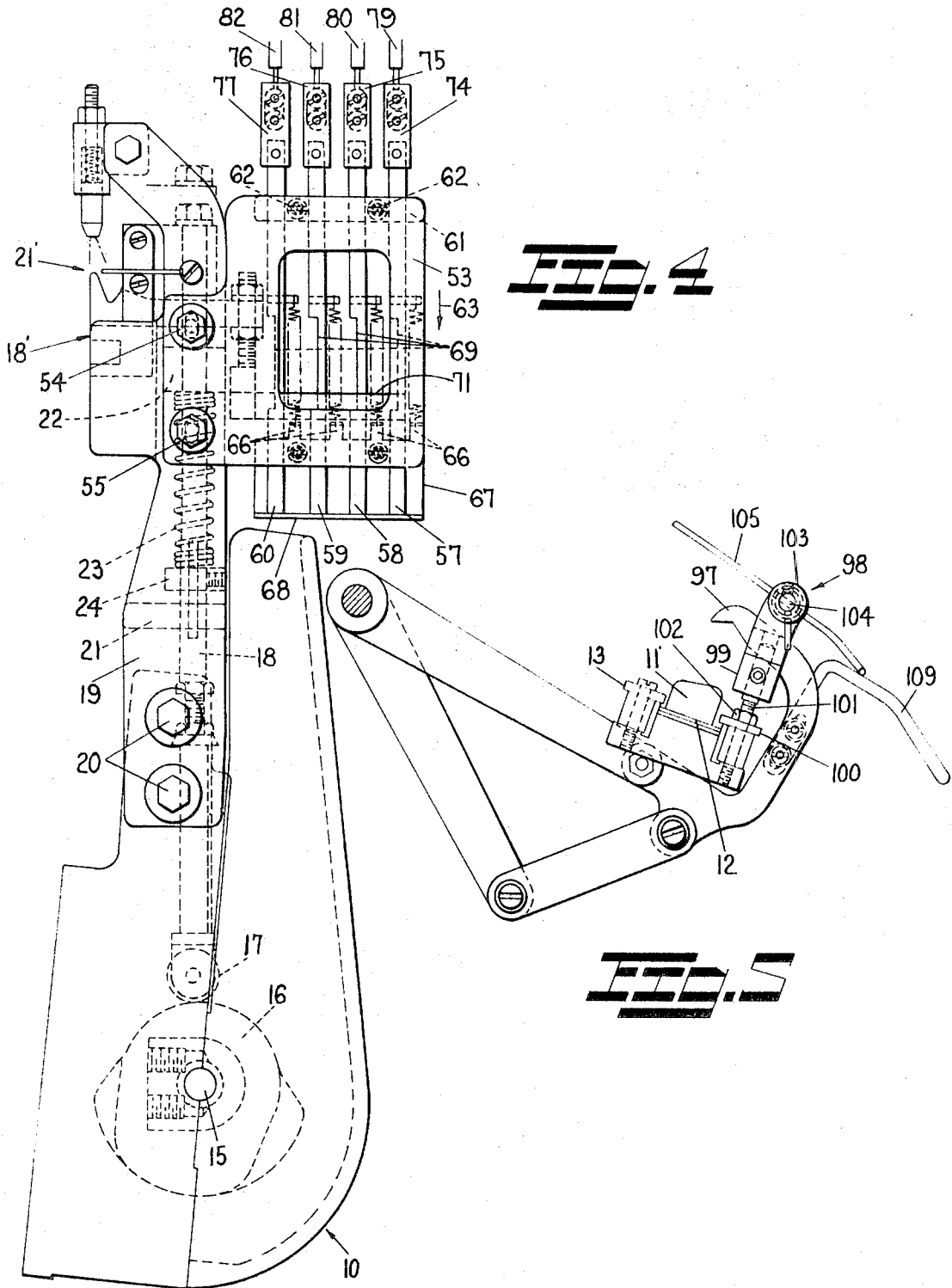
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FILLING CONTROL MECHANISM

BACKGROUND OF THE INVENTION

The invention pertains to shuttleless looms of the type wherein filling yarn in the form of hairpins or interconnected pairs of picks is inserted into separate sheds of warp threads as shown and described in U.S. Pat. No. 2,654,399.

In the weaving of particular types of fabric, it is desirable to mix the filling yarns by drawing them from separate sources of supply so as to distribute variations therein and give said fabric a uniform overall appearance. By mixing filling yarns from different sources of supply patterning effects can be had by utilizing filling yarns of a different color to form stripes, for example, and is accomplished by selecting one color for a given number of picks and subsequently selecting a second and then a third and so on. A striped warp in combination with the mixing of colored filling increases the patterning possibilities substantially by providing unlimited plaid and check pattern effects.

Filling control mechanisms for shuttleless looms are shown and described in U.S. Pat. Nos. 3,323,556 and 3,409,053 to T. S. Higgins et al. as well as Ser. No. 633,183 to R.H. Brown and each discloses a means for mixing filling yarn by drawing them from separate sources of supply.

In the Higgins et al. patents an indexing head is utilized to carry the yarns and by means of the dictates of a selective control unit the head is rotated to move a selected yarn to a position to become active and inserted into the warp shed.

In the Brown patent a similar control unit is adapted to act upon pivotable arms having cooperating camming elements which when selected are caused to act upon a pivotable yarn positioner and guide lever individual thereto to swing the filling yarn carried by the latter into active position.

The Higgins filling control devices have performed their intended functions satisfactorily; however the complexity thereof and the many components required have left something to be desired relative to a simpler and less expensive mechanism which can perform the same function with a fewer number of parts as well as parts which require a minimum amount of machining.

The filling control mechanism of the present invention also receives its dictates from a selective control unit and being of simpler construction with fewer components relative to mechanisms of the prior art, it provides an improved, positive and less expensive means for selecting and presenting a particular filling yarn to the means for its insertion into a warp shed.

SUMMARY OF THE INVENTION

The filling control mechanism according to the present invention is provided with a number of pivotable yarn positioner and guide levers that are selectively and individually movable between active and inactive positions with each thereof being individual to a separate source of filling yarn supply. Each of the levers is spring biased in the direction of its active position and by a selective control unit which holds them in their inactive position, they are selectively and individually released thereby permitting them to pivot to their active position in accordance with some desired and preselected pattern.

The mechanism includes a number of superimposed spring-biased plunger members that are interconnected with the selective control unit with each thereof being individual to and in direct contact with its respective yarn positioner and guide lever.

The mechanism further includes a vertically disposed reciprocating drive bar that is effective upon each of the yarn positioner and guide levers as they are selected to cause them to pivot with their respective yarn between first and second pick positions.

With the yarn positioner and guide levers being superimposed, their respective yarns are also supported and guided in a like manner and it is necessary that a means be provided to

lower the upper yarns to a position where the filling yarn depressor will make contact with these yarns so as to position them for pickup by the inserting carrier in a manner well known to those conversant with shuttleless weaving.

It is a general object of the invention to provide a filling control mechanism in a shuttleless loom for presenting any one of a plurality of filling yarns to the yarn inserting carrier.

A further and more specific object of the invention is to provide an improved filling control mechanism for shuttleless looms of simplified construction, one that is relatively inexpensive to manufacture and to be of lightweight construction with long life expectancy.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a portion of a shuttleless loom showing the filling control mechanism according to the invention applied thereto;

FIG. 2 is a plan view of the filling control mechanism shown in FIG. 1;

FIG. 3 is a view in end elevation and partially in section taken along line 3-3 of FIG. 2 showing the superimposed and spring-biased yarn positioner and guide levers;

FIG. 4 is a view in side elevation of a portion of the mechanism according to the invention showing the spring biased plunger members and the reciprocating drive bar for pivoting a selected yarn positioner and guide lever, and

FIG. 5 is a view in side elevation of a conventional filling yarn depressor having a camming rod fixed thereon for actuating the filling yarn locating member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing wherein only as much of conventional shuttleless loom structure is depicted as is necessary to a complete understanding of the invention, there is shown in FIGS. 1 and 4 a filling control housing generally indicated by numeral 10. This filling control housing is mounted in a well known manner on the upper right-hand side of the loom which positions it close to the upper and forward end of the right-hand loom-side a portion of which is depicted in FIG. 1 by numeral 11.

As is well known to those familiar with the type of shuttleless looms to which the instant invention is applicable, a filling inserting carrier 11' (FIG. 5) is fixedly attached to the end of a flexible tape 12 which moves through a tape guide 13 (FIG. 1) and which is wrapped about and unwrapped from a tape wheel (not shown) to cause the carrier to be inserted into and withdrawn from sheds formed by warp threads 14.

A filling control cam shaft 15 (FIG. 4) traverses the distance within the control housing 10 and the ends thereof are journaled in suitable bearings not shown that are fixed to the sides of said control housing.

A so-called cutter cam 16 is fixed to rotate with the cam shaft 15 and by means of a follower 17 a spring-biased cutter rod 18 is caused to reciprocate to actuate a filling yarn cutter and clamping arrangement of conventional construction that is depicted generally in FIG. 4 by numeral 18'.

The cutter rod 18 is supported by a filling cutter bracket 19 (FIGS. 1 and 4) which is fixedly attached to the side of the filling control housing by means of capscrews 20.

The inner end of the cutter rod 18 has fixed thereto a so-called second pick positioner which is generally indicated in FIG. 4 by numeral 21'. This second pick positioner functions in a known manner and being of conventional structure attention is hereby directed to U.S. Ser. No. 633,183 to R.H. Brown, Jr. for a complete detailed description and illustration thereof.

The filling cutter bracket 19 is provided with a pair of spaced and integrally formed lug elements 21 and 22 each having an opening aligned with the other through which the cutter rod 18 extends and by which it is guided during its reciprocating movement. A coil spring 23 (FIGS. 1, 2 and 4) assembles on the cutter rod 18 intermediate the lug elements

21 and 22 and by means of a collar 24 said spring can be compressed to provide the required biasing force to maintain the follower 17 in contact with the outer periphery of the cutter cam 16.

The end of lug element 22 terminates in an integrally formed and horizontally disposed lip 25 (FIG. 3) which is adapted to fixedly position the lower end of a vertically disposed stud member 26.

In the case of the instant invention stud 26 supports for pivotal movement four-yarn positioner and guide levers generally identified in FIGS. 1 and 3 by numerals 27, 28, 29 and 30. These levers are superimposed on stud 26 or, in other words, positioned one above the other and are maintained thereon by a nut 31 and washer 32.

Each of the yarn positioner and guide levers is separately pivotable and each includes a hub portion on which a torsion spring assembles and which are identified by numerals 33, 34, 35 and 36.

A spring end retainer 37 also assembles on stud 26 immediately below the washer 32 and is provided with a downwardly extending arm 38 (FIG. 1) that provides a means for attaching one end of the torsion springs 33, 34, 35 and 36. The opposite ends of these springs are attached to their respective yarn positioner and guide lever and provides the means for continually urging the latter toward their active positions or in the direction of the indicating arrow 39 shown in FIG. 2.

These yarn positioner and guide levers are of the double-armed type and each includes a relatively short actuating arm and a downwardly extending yarn positioner arm. In FIG. 3 the actuating arms are identified by numerals 40, 41, 42 and 43 and the yarn positioner arms by numerals 44, 45, 46 and 47. The lower end of each arm is formed and directed to terminate in close proximity with each of the terminus portions of the adjacent arms and yet are provided with sufficient clearance to permit the levers to be pivoted individually on stud member 26. The terminus portions of the yarn positioner arms 44, 45, 46 and 47 have fixedly attached thereto horizontally disposed finger elements 48, 49, 50 and 51, respectively (FIG. 1) which all extend in the same general direction and are positioned in close proximity one with the other. Adjacent the free end of each finger element an eyelet 52 is provided and each eyelet serves as a means for guiding and controlling filling yarn from separate sources of supply and which are individual to each yarn positioner and guide lever.

On that side of the cutter bracket 19 opposite the integrally formed lug element 22 a generally U-shaped and upwardly extending plunger support bracket 53 is attached by means of a pair of cap screws 54 and 55 (FIGS. 2 and 4). The leg portions of this plunger support bracket 53 are directed toward the right-hand side of the loom as shown in FIG. 1 and each includes four milled slots 56 (two only shown in FIG. 1) disposed in spaced and vertical alignment. The milled slots of one leg of this bracket 53 are each in horizontal alignment with the milled slots of the other leg and each pair of aligned slots is adapted to support a spring biased plunger member for sliding movement therein. The plunger members are identified in FIGS. 1 and 4 by numerals 57, 58, 59 and 60 and are retained within their respective slots 56 by means of rectangular strip members 61 which attach to the leg portions by means of screws 62. These plunger members are continually urged toward the front of the loom as shown by the directional arrow 63 in FIGS. 1 and 4 by means of separate coil springs 64 individual to each of said members. One end of these springs is attached to a peg 65 provided on the upper surface of each plunger member and the opposite ends thereof attach to integrally formed ears 66 provided on the rearward edge of a stop plate 67 (FIGS. 1 and 4). This stop plate 67 attaches to the forward most leg of the plunger support bracket by means of one of the strip members 61 and the screws 62 therefor.

As shown in FIGS. 1 and 2, the forward most edge of the stop plate 67 terminates in a laterally extending lip 68 which serves as a stop to limit sliding movement of the plunger members in a forward direction.

Each of the plunger members 57, 58, 59 and 60 is provided on its lower surface at a position intermediate its ends with an elongated recess 69 (FIGS. 1 and 4) into which the actuating arms 40, 41, 42 and 43, respectively, are adapted to extend.

By a means yet to be described, the plunger members are held in a rearward position which positions the recess 69 thereof in close proximity with the rear leg portion of the support bracket 53. In this position, the actuating arms of the yarn positioner and guide levers are in contact with the forward edge of the recesses 69 of their respective plunger member and the yarn positioner arms of said levers are held in their inactive position as shown at 70 in FIG. 2. When any one of these plunger members is released its coil spring 64 slides it forwardly until its forward end comes into contact with the lip 68 of the stop plate 67. When a plunger member is caused to slide forwardly contact between the forward edge of its recess 69 and the actuating arm of the yarn positioner and guide lever individual thereto is lost. The biasing force on the guide lever then swings the latter rearwardly and its actuating arm is caused to make contact with a vertically disposed drive bar 71. This drive bar 71 is fixed to and caused to reciprocate with the cutter rod 18 and the combination of the motion of the drive bar and the biasing force to which the guide lever is subjected is effective in swinging a selected yarn positioner and guide lever between first and second pick positions as depicted by numerals 72 and 73, respectively, in FIG. 2.

In FIGS. 1 and 4 the rearward ends of the plunger members 57, 58, 59 and 60 are shown with pivotable linkage connectors 74, 75, 76 and 77, respectively, assembled thereon. These connectors provide a means of connecting each of the plunger members by Bowden Wire elements to any suitable form of a selective control unit 78 diagrammatically shown in FIG. 1. The Bowden Wire elements are depicted in FIGS. 1 and 4 by numerals 79, 80, 81 and 82 and in accordance with any desired pattern the dictates of the selective control unit 78 will individually effect said Bowden Wires to cause any one of the plunger members to be released and caused to slide to its forwardmost position.

In FIG. 1 four separate filling yarns are shown and identified by the letters and numerals Y-1, Y-2, Y-3 and Y-4. These filling yarns extend from independent sources of supply (not shown) through eyelets 83, 84, 85 and 86, respectively, which are provided in a filling guide bracket 87 that is mounted by means of a cap screw 88 to a friction plate support stand 89. The yarns then extend through a conventional friction plate arrangement generally indicated by numeral 90 which functions in cooperation with the usual spring biased clamping member 91. From the friction plate arrangement the filling yarns are separated by four horizontally disposed and vertically aligned guide pins 92, 93, 94 and 95 that are supported in spaced relation by a screw 96 fixed in the friction plate support stand 89. The yarns are then caused to extend through the eyelets 52 of their respective finger elements 48, 49, 50 and 51 and thence to the second pick positioner 21' where they are supported in a known manner.

In FIG. 5 a conventional filling yarn depressor 97 is shown and is caused to move through its elliptical path by means of the cam controlled linkage (not shown) which connects it with the filling control housing 10 all of which is well known to those familiar with shuttleless looms to which the invention is applicable.

The function of the depressor is to draw the filling yarn downwardly to a position where the filling inserting carrier 11' will pick up said filling and carry it into the warp shed. The present invention utilizes four separate filling yarns and they being positioned one above the other it is necessary that an additional means be provided to move the upper yarns when selected to a position low enough to be acted upon by the depressor 97. For this purpose a filling yarn locator generally indicated in FIGS. 1 and 5 by numeral 98 is provided. This yarn locator includes a support bracket 99 the lower end of which is fixedly attached to the tape guide 13 as at 100 (FIGS. 1 and 5) by means of a stud 101 and nut 102.

The upper end of the support bracket 99 terminates in a hub 103 which supports for oscillating movement a stud member 104. This stud member extends outwardly from each side of the hub 103 and one side thereof is provided with a yarn locator wire 105 extending therethrough in a plane substantially normal to the axis of said stud. The opposite end of the stud member is provided with a collar 106 and a torsion spring 107 disposed between said collar and hub 103. Spring 107 is arranged to apply a biasing force upon the stud member 104 so as to continually urge it in a clockwise direction as viewed in FIGS. 1 and 5.

The rearward end of the yarn locator wire 105 terminates in a laterally extending foot 108 (FIG. 1) and is adapted to be pushed upwardly by a camming rod 109 that is attached to the filling yarn depressor 97, as at 109, each time said depressor swings upwardly during its function. This motion causes the forward end of wire 105 to swing downwardly and any selected filling yarn in its path will be moved downwardly to a position where it can be acted upon by the filling yarn depressor 97.

In operation the cutter rod 18 is continuously reciprocating and with it is moving the vertically disposed drive bar 71. The drive bar is acting upon the actuating arm of any one of the four yarn positioner and guide levers so as to assist in its movement between first and second pick positions.

In FIG. 1 the upper yarn positioner and guide lever 27 is shown in active position and the other three 28, 29 and 30 in their inactive position. Upon selection of a different yarn the plunger member individual to the active feed lever is drawn rearwardly to the extent where its recess 69 will act upon said levers actuating arm so as to pivot it to an inactive position. At this time another of the plunger members is released and the yarn positioner and guide levers individual thereto automatically swing to active position and its actuating arm is then acted upon by the drive bar 71.

The embodiments of the invention in which I claim an exclusive property or privilege are defined as follows:

1. In a shuttleless loom of the type wherein filling yarn is inserted individually into separate sheds of warp threads in pairs of interconnected picks by means of reciprocating carrier means, a filling control mechanism for selectively presenting

one of at least two yarns each of which is fed from an independent source of supply which comprises

- a. a single yarn cutter and binder mechanism alternately and individually effective upon each of said yarns,
- b. yarn positioner means having at least two pivotable yarn positioner and guide levers with each being individual to a source of filling yarn supply including a depressor member for moving the filling yarn to a position for presenting it to said carrier means and a filling yarn locating member effective upon certain ones of the selected yarns for positioning the latter to be acted upon by said depressor member.
- c. biasing means including individual torsion springs adapted to urge each of said yarn positioner and guide levers to their active position, and
- d. control means including superimposed spring-biased plunger members, one for each of said yarn positioner and guide levers and effective in pivoting and holding the latter in their inactive positions in readiness for release to active position upon indication for selection thereof.

2. The filling control mechanism according to claim 1 wherein said filling yarn locating member comprises a spring biased wire pivotably supported intermediate its ends and disposed in a plane substantially normal to the path of the filling yarn.

3. The filling control mechanism according to claim 4 wherein said depressor member includes a camming rod fixed on and movable with the depressor through positions which alternately activate and thence deactivate said filling yarn locating member.

4. The filling control mechanism according to claim 1 wherein said mechanism includes a common reciprocating drive bar for effecting movement of a selected yarn positioner and guide lever between first and second pick positions.

5. The filling control mechanism according to claim 1 wherein said mechanism includes a control unit having individual linkage elements interconnected with each of said spring biased plunger members for selectively and individually releasing said yarn positioner and guide levers to active position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,593,754 Dated July 20, 1971

Inventor(s) ANTHONY J. TOSCHES

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 26, change "claim 4" to read "claim 2".

Signed and sealed this 25th day of April 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents