

May 13, 1947.

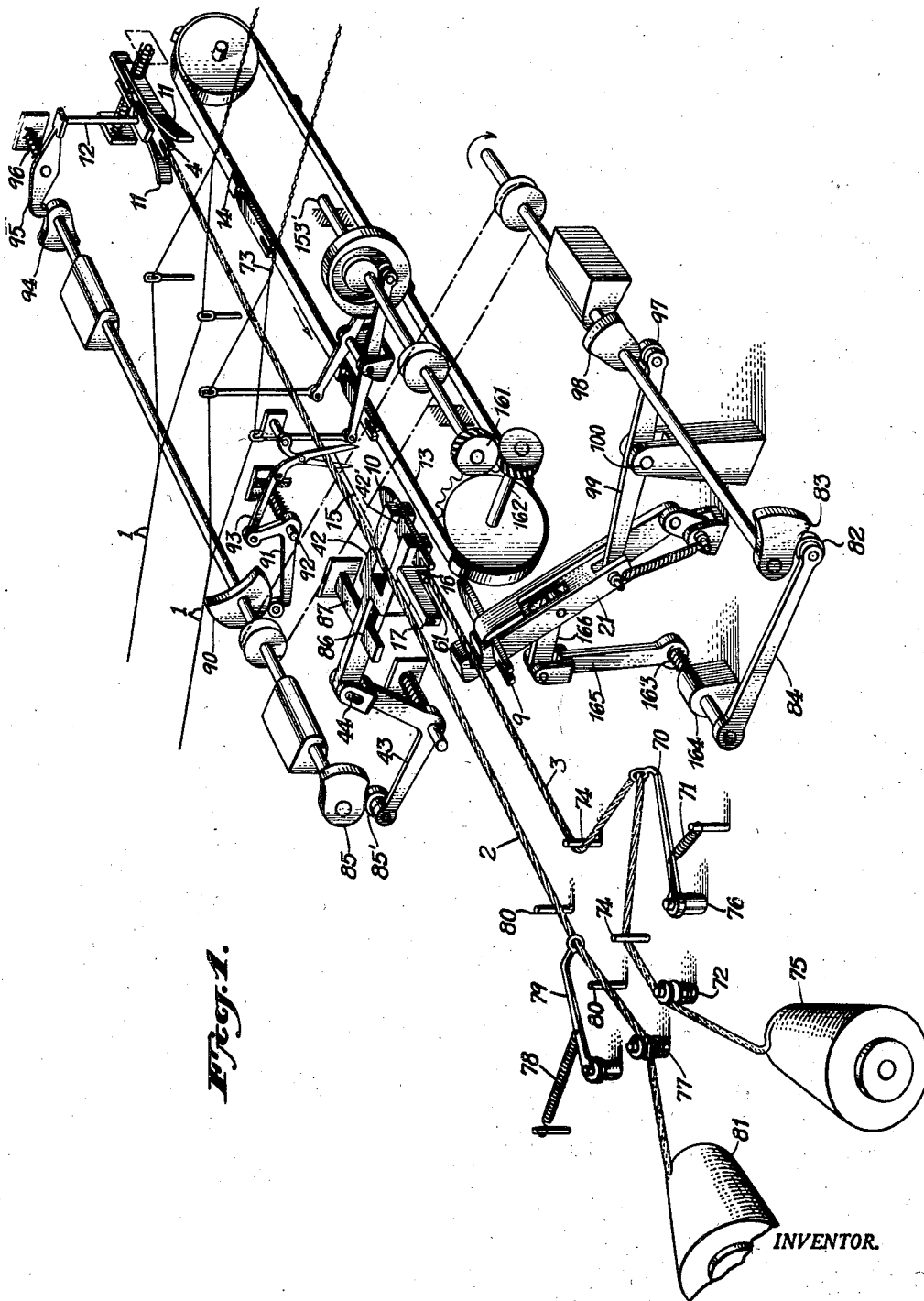
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2,420,380

METHOD AND DEVICE FOR WEAVING ON LOOMS WITH GRIPPER SHUTTLES

Filed March 9, 1944

5 Sheets-Sheet 1



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METHOD AND DEVICE FOR WEAVING ON LOOMS WITH GRIPPER SHUTTLES

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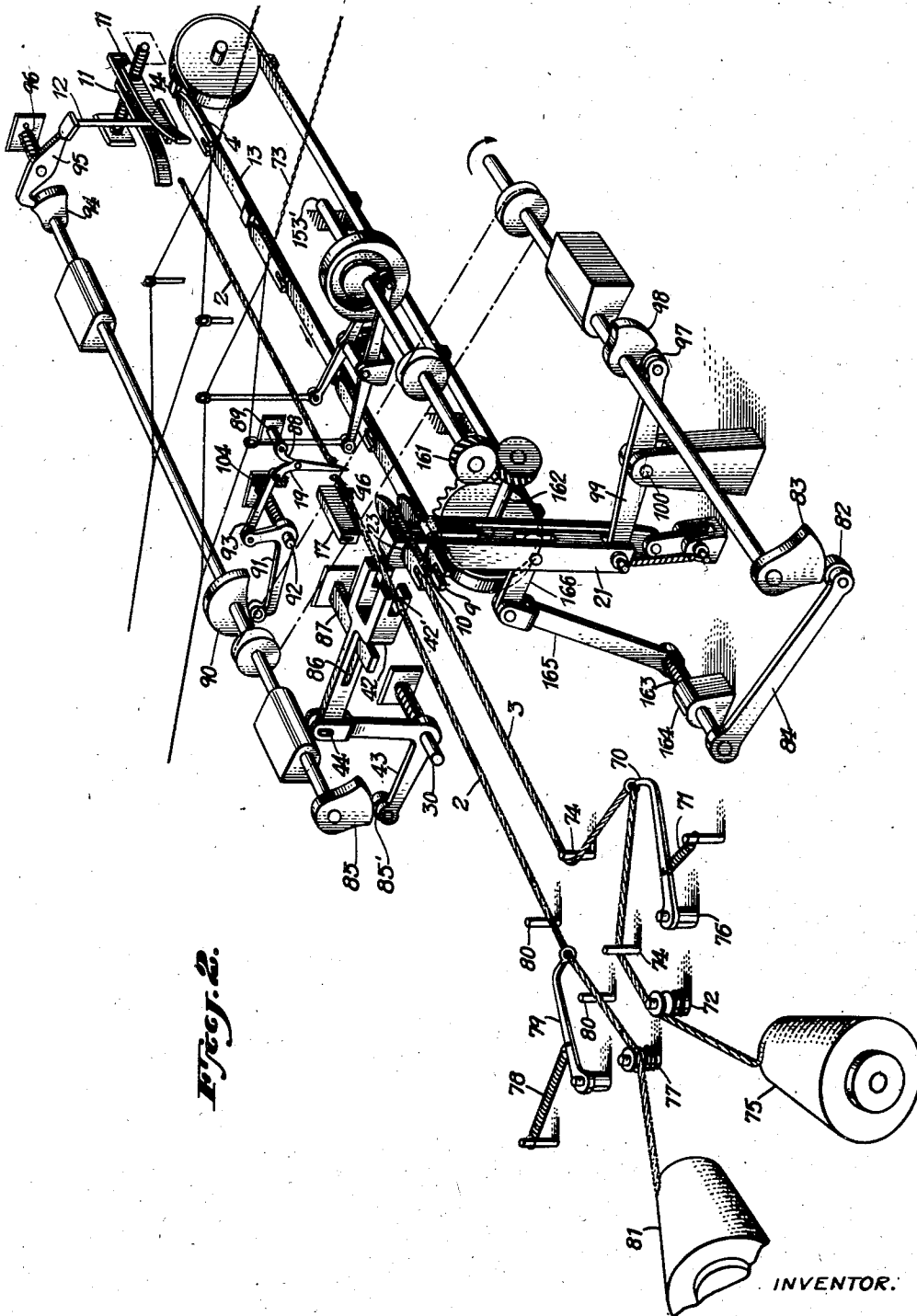


Fig. 2.

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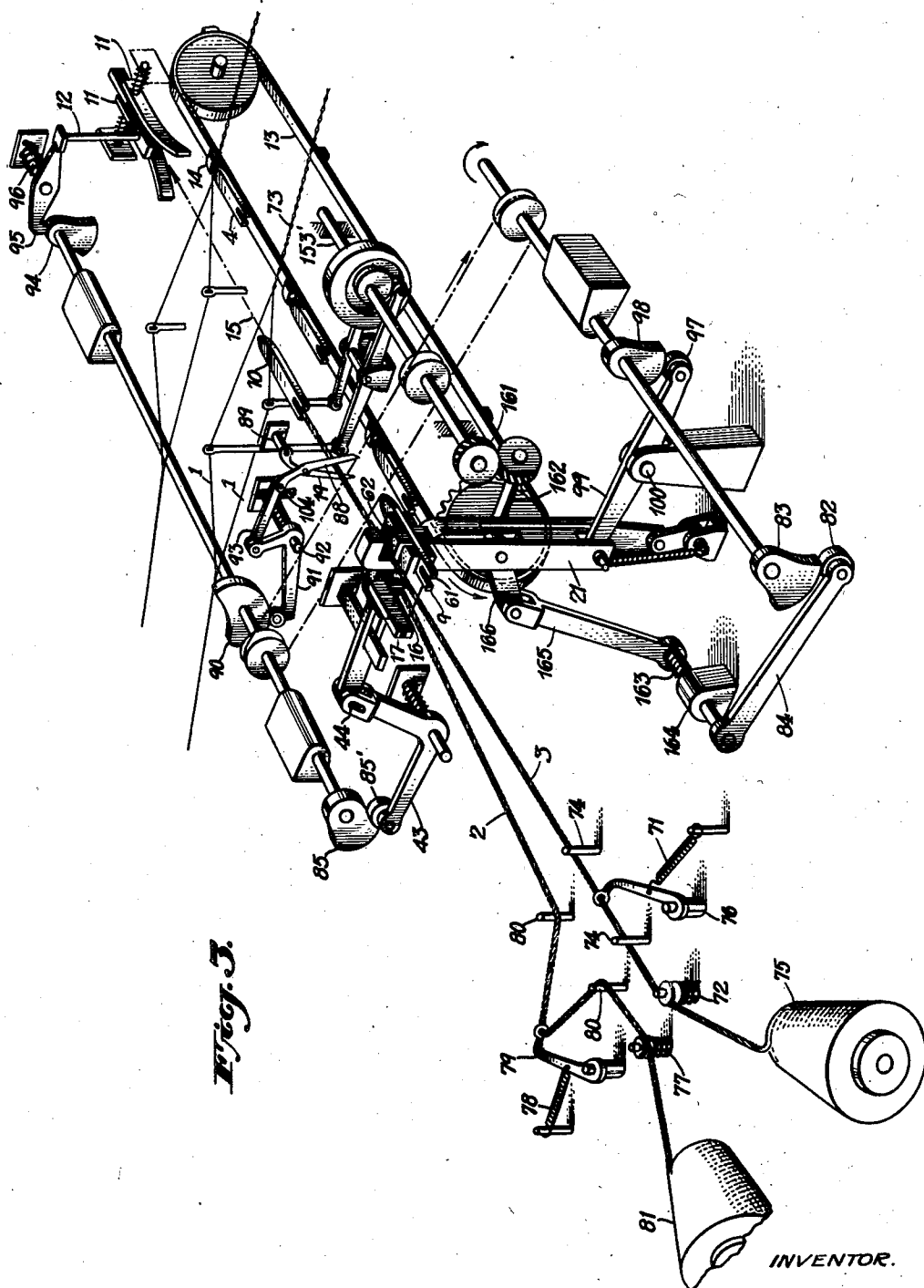


Fig. 3.

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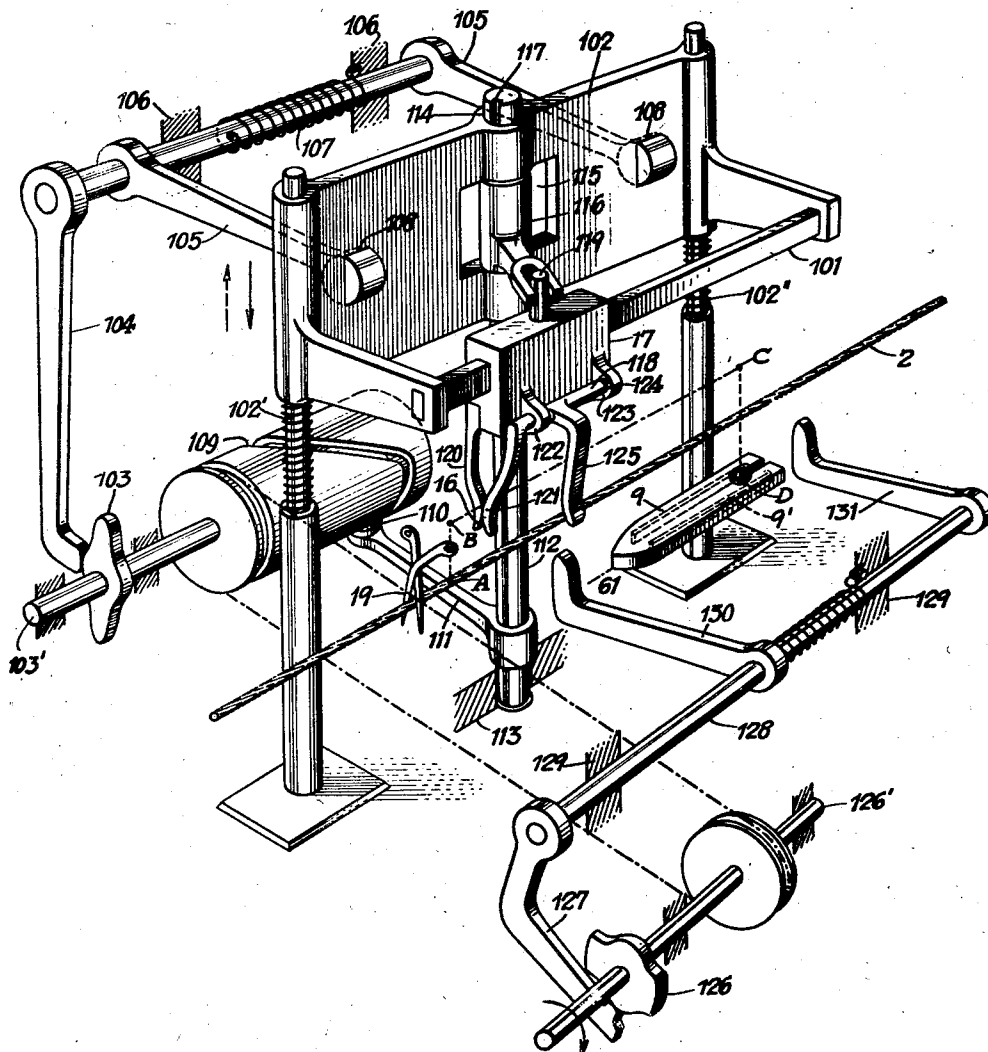
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METHOD AND DEVICE FOR WEAVING ON LOOMS WITH GRIPPER SHUTTLES

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5 Sheets-Sheet 4

Ftgs. 4.



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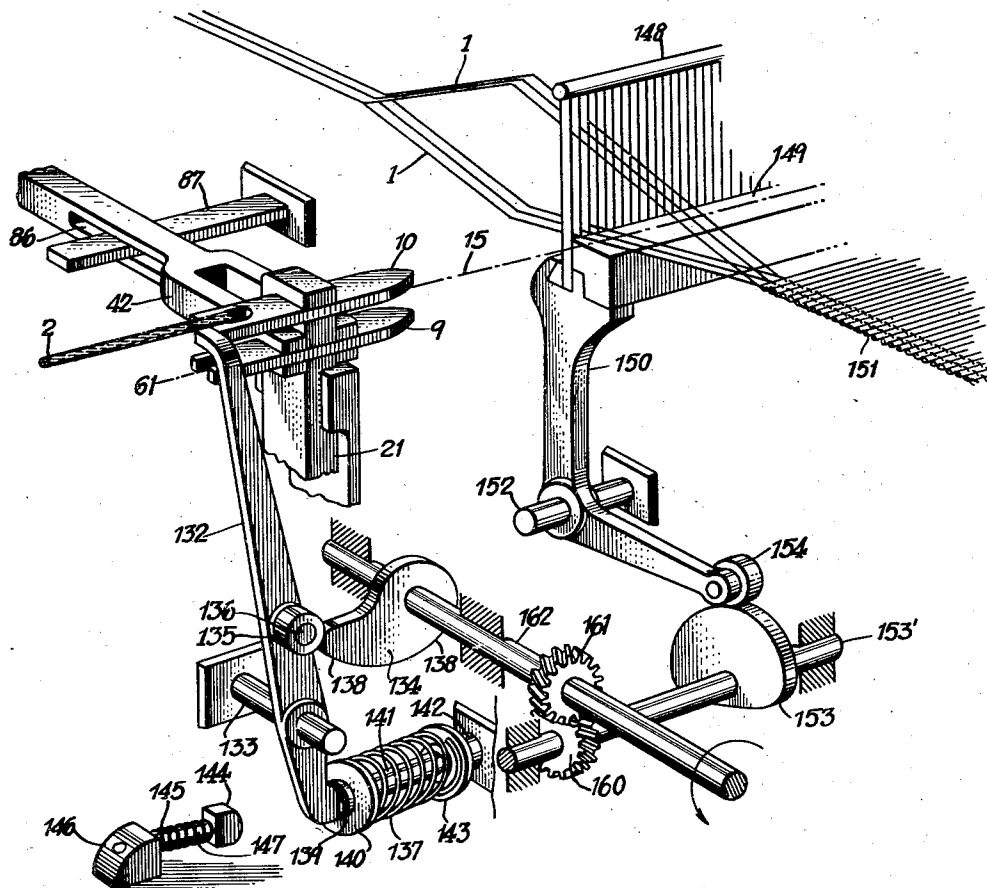
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METHOD AND DEVICE FOR WEAVING ON LOOMS WITH GRIPPER SHUTTLES

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Fig. 5.



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UNITED STATES PATENT OFFICE

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METHOD AND DEVICE FOR WEAVING ON
LOOMS WITH GRIPPER SHUTTLESAlbert Moessinger, Winterthur, Switzerland, as-
signor to Sulzer Freres, Societe Anonyme, Win-
terthur, SwitzerlandApplication March 9, 1944, Serial No. 525,801
In Switzerland December 4, 1941

14 Claims. (Cl. 139—126)

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The present invention relates to a method of and means for weaving on looms having a plurality of successively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric after it has been inserted into the shed and come to rest, and the end of the not inserted weft thread portion is held and transferred and connected to a shuttle to be picked later.

The present application is a continuation in part of copending application Ser. No. 454,916, filed August 15, 1942.

An object of the invention resides in the provision of a method and means for picking a shuttle with the end of a weft thread connected thereto into the shed while the end of the not inserted portion of a previously inserted weft thread is transferred to another shuttle, to be picked later, whilst the latter shuttle is at rest.

The invention is also concerned with the steps of temporarily arresting a gripper shuttle outside of the shuttle picking path, of gripping the end of the not inserted portion of the last inserted weft thread and transferring and connecting it to the shuttle arrested outside of the picking path, and of picking a shuttle with another weft thread connected thereto into the shed while the end of the not inserted portion of the last inserted weft thread is transferred and connected to the shuttle which has been temporarily arrested outside of the shuttle picking path.

Further, the invention refers to a loom for weaving having stationary weft bobbins, a plurality of gripper shuttles, conveyor means returning the shuttles from the shuttle receiving to the shuttle picking side of the loom, and cutting means cutting the weft threads at the edge of the fabric after their insertion, shuttle transport means transporting the shuttles from the conveyor means to the picking position and being laterally swingable for moving across the path of the returned shuttles and vertically movable for lifting same into the shuttle picking path, and a shuttle holding means holding a shuttle in a predetermined position while said shuttle transport means move to receive another shuttle from said conveyor means.

A further object of the invention resides in the provision of a mechanism for gripping and holding the end of the not inserted portion of a last picked weft thread after it has been cut in the neighborhood of the edge of the fabric and transferring it to a position where it can be connected with a shuttle to be picked later.

Further and other objects of the present in-

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vention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be a preferred embodiment of my invention.

In the drawings:

Fig. 1 is a diagrammatic perspective showing of the mechanism according to the invention.

Fig. 2 shows the mechanism illustrated in Fig. 1 in a subsequent operating condition.

Fig. 3 shows the mechanism illustrated in Figs. 1 and 2 in a further operating condition.

Fig. 4 shows in a perspective view the mechanism for operating a member forming part of the mechanism shown in Figs. 1 to 3.

Fig. 5 is a diagrammatic showing of a shuttle picking and beating up mechanism in combination with a shuttle holding and transport mechanism according to the invention.

Referring more particularly to Fig. 1, the shuttle 9 has been brought into the lower part of the picking holder or shuttle lifter 21 by the return conveyor 13. The shuttle 10 is held between the shuttle 9 and the picking path 15. In this position the shuttle is given a thread 3 by the gripper 16 of the transfer mechanism of which only the gripper holding member 17 is shown.

The thread 3 taken by the transfer mechanism from the edge 73 of the fabric and given to the shuttle is held in tension by a thread tensioner 70 turned clockwise about fulcrum 76 under the influence of a spring 71.

The thread 3 is guided around two studs 74 and held under tension between the shuttle 10 and thread brake 72. The plate type thread brake 72 determines the tension of the weft thread while it is being inserted into the shed; the thread tensioner 70 determines the tension of the thread at rest after it has been inserted. The tension produced by the brake 72 may be greater than the tension produced by the thread tensioner 70.

Meanwhile a weft thread 2 has been drawn into the shed by the shuttle 4. The weft thread 2 of weft bobbin 81 is braked by plate thread brake 77 so that the spring 78 of the thread tensioner 79 is stretched. The shuttle 4, braked by brake 11 in the catch box, lies directly under the pusher 12.

In the position of the mechanism shown in Fig. 2, the shuttle lifter 21 is brought into its vertical position by means of a mechanism comprising lever 84 fixed to shaft 163 which is supported in stationary bearing 164, lever 165, connected with the other end of shaft 163, and link 166, connecting the free end of lever 165 with the lifter 21; the free end of lever 84 carries a roller 82 rolling

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on cam 83. The shuttle lifter 21, in its lowermost position, is swung through fork 42' of shuttle carrier 42 and, with its upper groove 23, takes hold of the shuttle 10 which was held in recesses at the ends of the prongs of fork 42'. The carrier 42 is reciprocatingly operated by a cam 85 engaging roller 85' at one end of elbow lever 43, which lever is swingably supported by shaft 30 and is connected with fork 42 by pin 44. Fork 42 is slidably supported by a stationary rail 87 extending through slot 86 of the stem of fork 42.

The weft thread 2 which has been inserted into the shed at the operating phase shown in Fig. 1 is held by the thread gripper 16 of transfer mechanism 17 and is cut by shears 19 at the edge 73 of the fabric.

Part 88 of the shears 19 is pivotably supported on stationary pin 89, and the other part is operated by a mechanism comprising lever 91 pivotably supported on the stationary axle 92 to which it is connected by link 93 guided in stationary guide 104. The free end of lever 91 is actuated by cam 90. During this time the shuttle 4 is pressed down by pusher 12 onto return conveyor 13 where it is seized by operator 14 of conveyor 13 and taken back to the picking side of the loom. The pusher 12 is actuated by lever 95 pivotably supported on shaft 96 and operated by cam 94.

In the position of the mechanism illustrated in Fig. 3, the shed formed by the warp threads 1 has been changed and the weft thread 2 has already been beaten into the fabric. The shuttle lifter 21 holding two shuttles 9 and 10 was raised in such a way that the shuttle 9 comes to lie in the position formerly occupied by the shuttle 10 which had been picked.

Raising of the shuttle lifter 21 is done by lever 98, which is pivotably supported at 100 and has one end swingably connected with the lower end of lifter 21. The other end of lever 98 carries a roller 97 rolling on cam 98 which is operated by the loom drive.

In this way the shuttle 10 was brought from the thread receiving position 61 to the picking position 62, and the shuttle 9 into the thread receiving position 61. The transfer mechanism had gone upwards to the position shown in Fig. 2 until its thread gripper 16, holding weft thread 2, is outside the picking path 15; then it went back towards and above position 61. During this time the shuttle 10 which holds the thread 3 was picked and now passes through the shed formed by the warp threads 1. Clamp 16 is then moved downwards to the thread transfer position 61, where the weft thread 2 is transferred to the shuttle 9.

When the thread 2 is held firmly in the shuttle 9, the transfer member 17 makes its return motion, while the thread 3 is carried further by shuttle 10. Member 17, first, moves upward above the picking path 15, then in the direction of the pick towards the warp threads 1 up to the shears 19. Then the member 17 moves downwards until its clamps can take hold of the weft thread 3 which has already come to rest in the position shown for thread 2 in Fig. 2. The weft thread is cut at the edge 73 of the fabric by the shears 19 and the working process is repeated with the weft thread 2 in place of the weft thread 3.

In Fig. 4 the mechanism for operating member 17 is shown. Member 17 slides on rail 101 which is rigidly connected to slide 102 by two arms projecting therefrom. The slide 102 is moved up and down on columns 102' and 102'' by a mechanism comprising arms 105 pivoted to slide 102 at 108 and extending from shaft 107 supported in bear-

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ings 106. A lever 104 is connected with shaft 107 having a free end sliding on cam 103 fixed to shaft 103' which is driven by the loom.

Substantially between the up-and-down motions of the slide, the member 17 makes a lateral motion. This motion is controlled by cam 109 and transferred by roller 110 to lever 111 which is rigidly connected to vertical shaft 112. The shaft 112 is pivotally supported in the base of casing 113 and in bore 114 of the slide 102. A lever 116 is slidably connected with the shaft 112 by means of a key sliding in groove 117. Lever 116 extends through window 115 of slide 102 and has a forked end between the prongs of which pin 119 rigidly connected to the member 17 is held.

Gripper 16 on member 17 consists of a gripper arm 120 rigidly connected to member 17 and of an arm 121 which is movably connected with member 17. Gripper arm 121 is disposed at one end of torsion shaft 118 which is revolvably supported in ear 122 extending from member 17 and which shaft has a square-headed end 123 extending through a corresponding opening in ear 124 of the member 17. A control yoke 125 is rigidly connected with shaft 118. The torsional elasticity of the relatively long shaft 118 presses the gripper arm 121 against the stationary gripper arm 120 and thus holds the thread.

When member 17 comes down along line B—A immediately behind shears 19, grippers 120, 121 are opened over the weft thread 2 which has just been inserted, due to the action of the control yoke 125 when running against a finger extending upward from lever 130. The grippers 120, 121 are closed on the weft thread when member 17 has reached its lowermost position and arm 130 is counterclockwise turned by a mechanism comprising a cam 126 fixed on shaft 128' which is driven by the machine and a lever 127, which is firmly connected to shaft 128 rotatably supported in bearings 129 and carrying the finger levers 130 and 131 which are rigidly connected thereto.

After shears 19 which are operated in any conventional manner, have cut the weft thread at the edge of the fabric, member 17 begins its return journey, which takes place as follows:

(a) Slide 102 and with it member 17 travels upward by the distance A—B.

(b) Member 17 is moved to the right by distance B—C; the slide 102 remains thereby in its top position.

(c) Slide 102 and with it member 17 descend for a distance C—D until the grippers 120, 121 extend into the shuttle which is in position 61 for taking on the thread.

When the weft thread is firmly held in grippers 9' of the shuttle 9, the control yoke 125 is turned counterclockwise by the finger of lever 131 and the grippers are opened and the weft thread 2 is released and is now held only by the shuttle 9.

When the slide 102 moves upward with the return member 17, the control lever 125 moves out of engagement with the finger of lever 131 whereby the clamps 120, 121 are closed by the tensioning force stored up in and caused by the twisting of the shaft 118.

Fig. 5 shows a shuttle picking and weft beat up mechanism in the position between the operating phases shown in Figs. 2 and 3. The shuttle 10, with the weft thread 2 connected to it, is held in the picking path 15 by the shuttle lifter 21. The shuttle 9 has been brought into the thread receiving position 61 by the shuttle lifter 21 and is also held by the carrier 42.

Picker 132 which is in position ready to pick shuttle 10, is pivotably supported on the stationary axle 133. It is controlled by cam 134 co-operating with roller 135 which is pivotably supported by pin 136 rigidly connected to the beater 132. The picking force is stored in spring 137 which has been compressed during a counter-clockwise motion of lever 132 due to the action of the specially formed curve 138 of the cam 134. Nose 139 of lever 132 abuts spring plate 140 which is rigidly connected to one end of rod 141. The other end of rod 141 slides in tubular member 142 to one end of which a plate 143 is attached on which one end of spring 137 rests.

The movement of the picker is limited by a stop 144 which is yieldingly held in position by spring 145 wound around rod 147 having one end rigidly connected with stop member 144 and the other end slidingly supported in stationary member 146.

Reed 148 is rigidly connected with slay 149. The slay 149 is carried by a plurality of levers 150 which are swingably supported by stationary axle 152. The beating up of the weft thread by the reed 148 is controlled by cam 153 acting on roller 154 of lever 150. Cam 153 is mounted on shaft 153' driven by the loom. To this shaft also gear wheel 160 is keyed, which meshes with the gear wheel 161 keyed to shaft 162 which carries cam 134.

While I believe the above described embodiment of my invention to be a preferred embodiment, I wish it to be understood that I do not desire to be limited to the exact details of design and construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. The method of weaving on looms having a plurality of consecutively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric, characterized by the steps of gripping the end of the not inserted weft thread portion and holding it, and of picking a shuttle with another weft thread connected thereto into the shed while the end of the not inserted weft thread portion of the previously inserted weft thread is held.

2. The method of weaving on looms having a plurality of consecutively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric, characterized by the steps of gripping the end of the not inserted weft thread portion and transferring and connecting it to a shuttle, and of picking another shuttle with another weft thread connected thereto into the shed while the end of the not inserted portion of the previously inserted weft thread is transferred and connected to the first mentioned shuttle.

3. The method of weaving on looms having a plurality of consecutively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric, characterized by the steps of holding a gripper shuttle outside of the shuttle picking path, of gripping the end of the not inserted portion of the last inserted weft thread and transferring and connecting it to the shuttle held outside of the picking path, and of simultaneously picking a shuttle with another weft thread connected thereto into the shed.

4. The method of weaving on looms having a plurality of consecutively picked gripper shuttles and stationary weft bobbins and in which the

inserted weft thread is cut at the edge of the fabric, characterized by the steps of temporarily arresting a gripper shuttle outside of the shuttle picking path, of gripping the end of the not inserted portion of the last inserted weft thread and transferring and connecting it to the shuttle arrested outside of the picking path, and of simultaneously picking a shuttle with another weft thread connected thereto into the shed.

5. In a loom for weaving having stationary weft bobbins, a plurality of gripper shuttles, conveyor means returning the shuttles from the shuttle receiving to the shuttle picking side of the loom, cutting means cutting the weft threads at the edge of the fabric after their insertion, and shuttle transfer means receiving a shuttle from said conveyor means and transferring it to the weft thread receiving position and therefrom to the picking position, a weft transfer mechanism transferring the end of the not inserted weft thread portion to the weft thread receiving position, said weft transfer mechanism comprising a thread gripper and a gripper carrier supporting said gripper, and transport means removing said carrier with the thread end gripped by said gripper from the path along which said weft thread has been picked, carrying said carrier away from the edge of the fabric, and moving said carrier and gripper attached thereto to a shuttle in weft thread receiving position.

6. In a loom for weaving as set forth in claim 5, said transport means comprising a rail member slidably supporting said carrier, and guiding it substantially parallel to the weft thread between the position where the weft thread end is gripped and the weft thread receiving position, a slide member supporting said rail member, support means slidably supporting said slide member and guiding it and said rail member and said carrier to and from the path of the weft thread.

7. In a loom for weaving as set forth in claim 5, said gripper having a member rigidly connected with said carrier and a member movably connected therewith and including yielding means yieldingly maintaining thread gripping engagement of said second member and said first member and a gripper opening member, actuating means connected with the loom drive and adapted to temporarily engage and actuate said gripper opening member and opening said gripper and releasing the thread gripped thereby.

8. The method of weaving on looms having a plurality of consecutively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric, characterized by the steps of holding a gripper shuttle temporarily outside of the shuttle picking path for connecting a weft thread thereto, and of holding another shuttle with another weft thread connected thereto in picking position.

9. The method of weaving on looms having a plurality of successively picked gripper shuttles and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric and the end of the not inserted weft thread portion is held and transferred and connected to a shuttle to be picked later, characterized by the step of picking a shuttle with the end of a weft thread connected thereto into the shed while the end of the not inserted portion of a previously inserted weft thread is connected to another shuttle to be picked later.

10. The method of weaving on looms having a plurality of successively picked gripper shuttles

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and stationary weft bobbins and in which the inserted weft thread is cut at the edge of the fabric and the end of the not inserted weft thread portion of the weft thread is held and transferred and connected to a shuttle to be picked later, characterized by the step of picking a shuttle with the end of a weft thread connected thereto into the shed while the end of the not inserted portion of the last inserted weft thread is connected to the shuttle to be picked next.

11. In a loom for weaving having stationary weft bobbins, a plurality of gripper shuttles, conveyor means returning the shuttles from the shuttle receiving to the shuttle picking side of the loom, and cutting means cutting the weft threads at the edge of the fabric after their insertion, shuttle transport means transporting the shuttles from the conveyor means to the picking position and being swingable for moving across the path of the returned shuttles and movable for lifting same into the shuttle picking path, and a shuttle holding means holding a shuttle in a predetermined position while said shuttle transport means move to receive another shuttle from said conveyor means.

12. In a loom for weaving as set forth in claim 11, said shuttle transport means having two shuttle support means disposed above one another, the lower of said support means supporting a shuttle received from said conveyor means and the upper supporting a shuttle for the pick.

13. In a loom for weaving as set forth in claim 11, said shuttle transport means having two shuttle support means, and an operating mechanism connected with and operating said transport means and placing one of said support means into the path of the shuttles returned on said conveyor means and then moving said transport means till the other of said support means is in the shuttle picking path.

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14. In a loom for weaving as set forth in claim 11, said shuttle transport means having two shuttle support means, and an operating mechanism connected with and operating said transport means and placing one of said support means into the path of the shuttles returned on said conveyor means and receiving a shuttle, said shuttle holding means having a shuttle support portion, operating means connected with and operating said holding means and, when the other of said two support means is in the shuttle picking path, positioning said support portion adjacent the one of said support means which has received a shuttle, said operating mechanism withdrawing said transport means and thereby surrendering the received shuttle to said support portion of said holding means and then moving said transport means with said other support means adjacent said support portion, then said operating means withdrawing said holding means and surrendering the shuttle held in said support portion to said other support means, said operating mechanism then moving said transport means till the shuttle received from said holding means is in the picking path.

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