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NEEDLE SELECTOR MECHANISM FOR MULTIPLE NEEDLE LOOMS

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2 Sheets-Sheet 1

Fig. 1

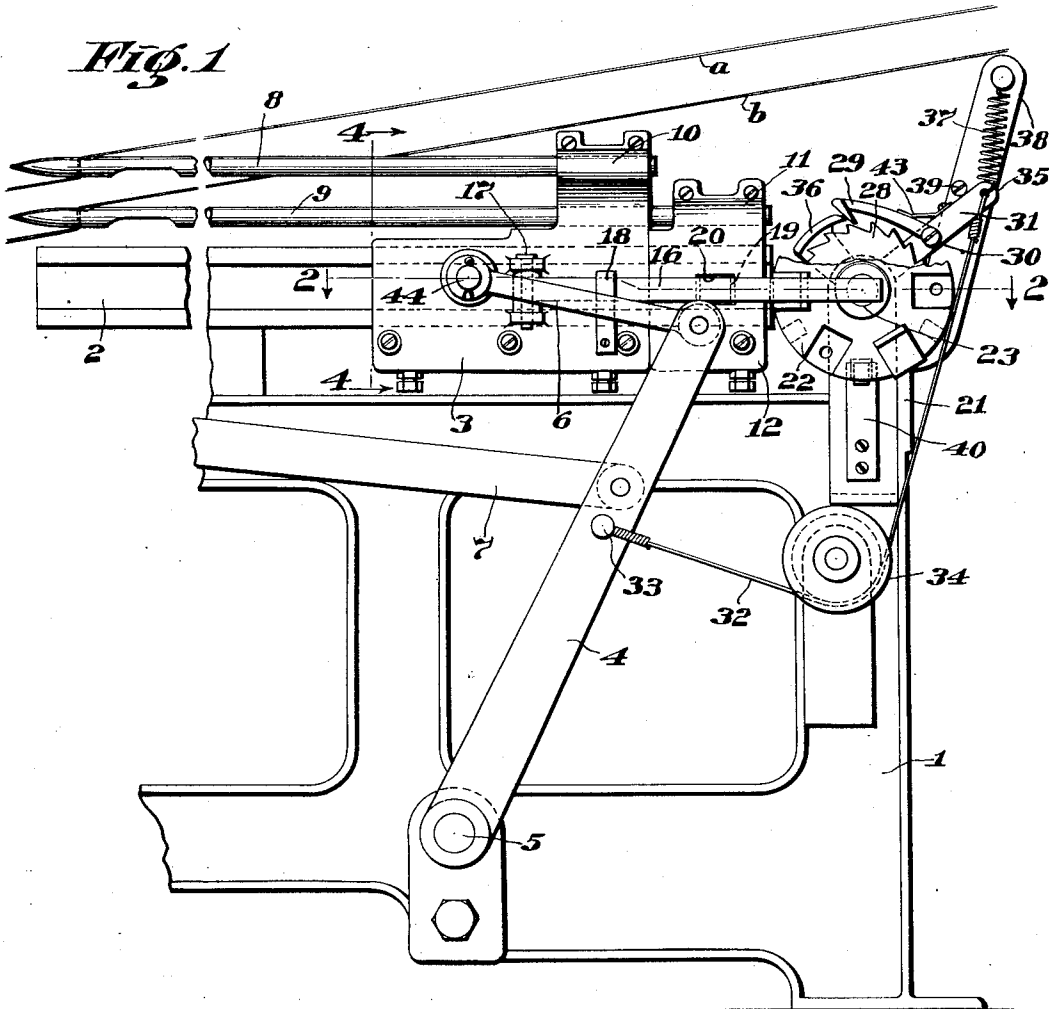
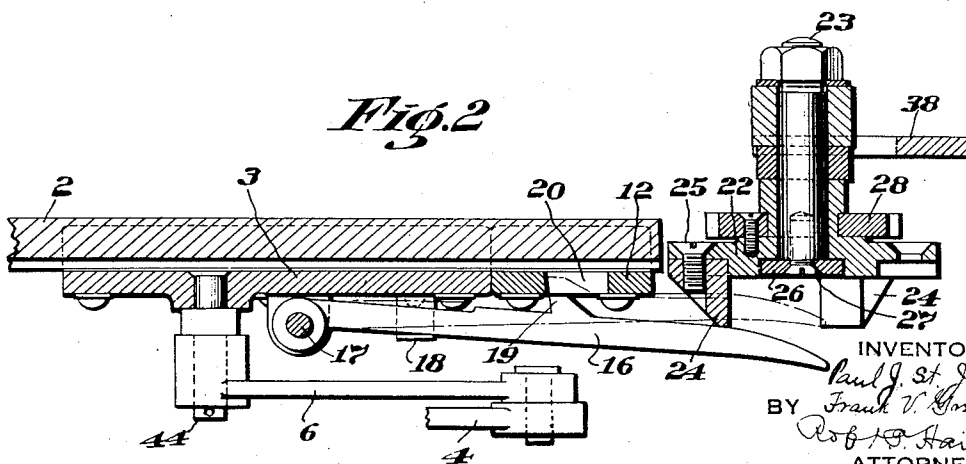


Fig. 2



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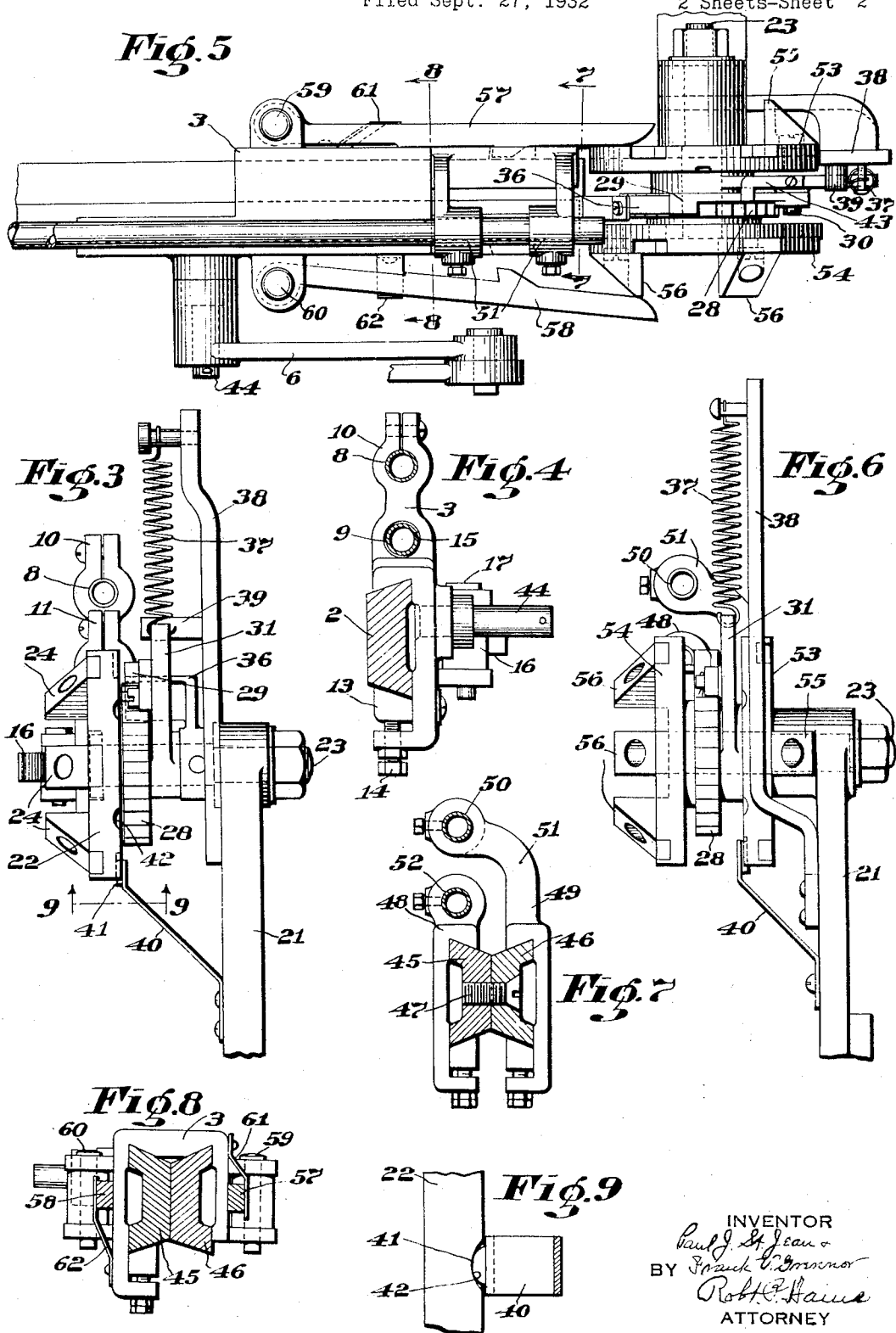
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2 Sheets-Sheet 2



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NEEDLE SELECTOR MECHANISM FOR MULTIPLE NEEDLE LOOMS

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This invention relates to multiple needle looms and is more particularly directed to a needle selecting mechanism whereby any one or more of a series of needles may be introduced into the shed at the will of the operator.

Weft inserting needles are now commonly employed in looms adapted to weave tuft pile fabrics such for instance as Axminster carpets and rugs. In many cases these tuft pile fabric looms employ a single weft inserting needle, but it has been proposed heretofore to employ a pair of needles for weaving tuft pile fabrics having a two or three plane ground structure.

The needle selector mechanism of the present invention is of a novel character and automatically defines which one or more of a series of needles may be introduced into the shed. This selective operation of the different needles is not only well adapted for use in weaving tuft pile fabrics, but also may be employed in weaving multiple, plain and double fabrics with or without pile. It is also well adapted for use in weaving plain or other type of fabrics where it is desired to vary the color or character of the successively inserted weft threads.

In accordance with the present invention an actuator is provided and is given movements towards and from the shed by appropriate means and under the control of the needle selector mechanism any one or more of the needles may be introduced into the shed.

The invention and novel features thereof will best be made clear from the following description and accompanying drawings of one good form or embodiment thereof.

In the drawings:—

Fig. 1 is a side elevation showing portions of the loom embodying the present invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an end view looking from the right of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a modification wherein all of the needles of the series are under control of the needle selector mechanism of the present invention whereby any one or more of the series

may be connected to the actuator and moved into the shed;

Fig. 6 is an end view looking from the right of Fig. 5;

Fig. 7 is a section on the line 7—7 of Fig. 5;

Fig. 8 is a section on the line 8—8 of Fig. 5; and

Fig. 9 is a detail showing one form of brake mechanism for holding the rotary wedge carrying member in its established position.

The loom frame may be of appropriate character for support of the operating parts and extending at one side of the loom frame is the auxiliary frame 1. Extending from the auxiliary frame and supported by appropriate means is the guide or trackway 2 for directing the movement of the needle actuator or slide 3 and the desired reciprocating movements are imparted to the actuator or slide 3 by an arm 4 pivotally mounted at 5 on the auxiliary frame 1 and connected to the actuator or slide 3 by the link 6. The arm 4 is given its oscillating or actuating movements through a link 7 which may be appropriately connected to a crank or cam actuated from a going part of the loom.

In the construction illustrated by Fig. 1 there are two needles, an upper needle 8 and a lower needle 9 and as shown, the upper needle 8 is secured to the actuator 3 by the clamp member 10, while the lower needle 9 is connected by a similar clamp member 11 to a needle carriage 12. Each of the needles 8 and 9 controls the insertion of a weft thread *a* and *b* into the shed, as usual, the weft threads being taken from a convenient source of supply.

As an appropriate means for slidably securing the actuator or slide 3 and the needle carrier 12 on the guide rail 2 blocks 13 held in place by the adjusting screws 14 serve to engage the lower edge portion of the guide 2 and direct the movement of the actuator and needle carriage. This detail, of course, may be readily varied within the scope of the present invention. From the construction thus far described it will be noted that on each reciprocation of the actuator or slide 3 the upper needle 8 will be introduced into the shed and the lower needle 9 will be

introduced into the shed when and only when it is connected to the actuator or slide 3, and in order that the lower needle 9 may be appropriately guided in its reciprocating movements it passes through an opening 15 in the actuator or slide 3, thus imparting to the lower needle 9 a guide condition which may be desirable in certain instances.

In order that the lower needle 9 may be connected to the actuator or slide 3 when the lower needle is to be passed into the shed a latch is provided for connecting the needle carriage 12 to the actuator under the dictates of the main features of the present invention, as will presently be described.

The connecting latch comprises an arm 16 pivotally mounted at 17 on the actuator or slide and is normally under the influence of a spring 18 tending to move the free end of the latch 16 inwardly or towards the slide or needle carriage 12. The latch 16 is provided with a shouldered portion 19, Fig. 2, which is adapted to engage an opening 20 in the needle carriage 12 for the lower needle, the construction being such that should the latch 16 be operatively connected to the needle carriage 12 when the actuator or slide 3 is in its outer or retracting position, the latch 16 will cause the needle carriage 12 to move with the actuator on its next reciprocation towards the shed and carry the lower needle 9 into the shed along with the upper needle 8 so that two shots of weft will be laid in the respective sheds.

From the construction thus far described it will be evident that the upper needle 8 will be introduced into its appropriate shed on each reciprocation of the actuator or slide 3 and that the lower needle 9 will be similarly introduced into its shed whenever the needle carriage 12 is operatively connected to the actuator or slide 3 by the latch 16.

Aside from the particular mechanism hereinbefore described for the introduction of one or two needles into the sheds, the primary feature of the present invention resides in the automatic means whereby a needle may be connected to the actuator or slide or fail to be connected thereto under the dictates of the needle selector, as will now be described.

Mounted upon the auxiliary frame 1 is the bracket 21 which supports the rotary member or wedge block carrying wheel 22. The stud 23 may be conveniently passed through the bracket 21 and afford a support for the rotary member 22, as more clearly indicated in Fig. 3.

The rotary member or wedge carrying wheel 22 has a number of seats about its periphery for the detachable connection of the wedge blocks 24, each of which may be secured in its seat by the headed screw 25.

In order that the rotary member or wedge carrying wheel 22 may be held rotatively upon its stud 23, one end portion of the stud

23 has secured thereto the retaining member 26 by means of a screw or other appropriate means 27, the construction being such that the rotary member 22 is free for rotative movement upon the stud, and the wedge blocks 24 may be secured to the rotating member 22 in any predetermined order dependent upon whether a needle shall be connected to or disconnected from the actuator.

Secured for rotative movement with the rotating member 22 is a ratchet wheel 28, Fig. 2, whereby the rotating member 22 may be given a rotating step-by-step movement through actuation of the ratchet wheel.

In the present embodiment of the invention the ratchet wheel 28 is given is rotary step-by-step movement through a pawl 29 pivotally mounted at 30 upon an arm 31 mounted for rotative movement upon the stud 23 or other convenient support.

Connected to the arm 31 for operating the pawl is a flexible member 32 which has one end at 33 secured to the arm 4 and passes about a guide pulley 34 then upwardly to the arm 31 where it is connected at 35, the construction being such that on movement of the arm 4 to carry the actuator towards the shed the flexible member 32 will cause the pawl to act upon the ratchet and turn it a predetermined amount which, in the present instance, is about one-sixth of a revolution. The amount of turning movement, however, that is imparted to the ratchet 28 may be conveniently regulated by a guard 36, Fig. 1. Connected to the upper end of the arm 31 which operates the pawl is a spring 37, one end of which is connected to a bracket 38 for returning the pawl in its idle stroke to the left, Fig. 1, as the arm 4 which actuates the slide 3 returns to its outer position and a stop 39 serves to limit the movement of the arm 31.

The order in which the needle 9 may be introduced into the shed may be determined by a predetermined arrangement of the wedge blocks 24 on the rotary member 22 under the following conditions:—

As hereinbefore stated, the latch 16 is connected to the actuator or slide 3 and as the actuator or slide 3 moves towards the shed and carries with it the latch 16, the rotary member or wedge carrying wheel 22 will be rotated the prescribed amount thereby either presenting a wedge block or failing to present a wedge block owing to its absence on the wheel as the latch 16 and the actuator or slide 3 returns outwardly to the position indicated in Fig. 1. Should a wedge block 24 on the rotary member 22 be presented in the path of the latch 16 as the latter moves outwardly from the shed its curved end portion will meet the wedge and cause the latter to disconnect the needle carriage 12 from the actuator or slide 3, but should a wedge be absent from the rotary member 22 then the

latch will still operatively engage the needle carriage 12 with the actuator or slide 3 and perforce cause the needle carriage 12 and its connecting needle to move into the shed on the next inward movement of the actuator or slide.

From the construction described it will be noted that the rotary member 22 is caused to partake of its rotary movement under the action of the pawl 29 when the actuator or slide 3 moves towards the shed and as the actuator returns to its outward position the pawl will partake of its idle movement and the rotary member will remain at rest to either present or fail to present a wedge block 24 to the latch 16 as the latter moves outwardly with the actuator. In order that the rotary member 22 may be held from accidental movement during the period that it is at rest, the bracket 21 has secured thereto the spring arm 40, Figs. 1 and 9, provided with a rounded end 41 which may engage a recess 42 in the rotary member 22 and thus act as a brake to hold the rotary member in its established position.

Should a wedge block 24 be positioned by the rotary member in the path of the latch 16 as it moves outwardly to the position indicated in Figs. 1 and 2, the latch itself will ride up the inclined surface of the wedge and withdraw the shoulder 19 from the recess 20 in the needle carriage 12, but should the wedges be predeterminedly disposed on the rotary member 22 so that no wedge is presented to the latch 16 as it moves outwardly then the latch will engage the recess 20 on the needle carriage 12 and perforce cause inward movement into the shed of the needle associated therewith.

As a precautionary measure and to insure that the pawl 29 may unerringly engage the ratchet teeth of the ratchet wheel 28 and rotate the latter and the rotary member 22 as the actuator or slide 3 moves inwardly, a light spring 43 may act upon the pawl 29, as indicated in Fig. 1.

From the construction thus far described it will be apparent that the needle selector mechanism is automatic in its character and whether or not it shall connect a needle to the actuator or slide 3 will depend upon whether or not a wedge block 24 is positioned by the rotary member to engage the end of the latch 16 as the latter moves outwardly. In other words, if the rotary member which acts as a pattern presents a wedge block in position to be engaged by the latch 16 the latch will automatically release the needle carriage from the actuator and conversely, if there is no wedge thus presented to the latch 16, the latter will remain in engagement with or pass into engagement with the needle carriage, with the result that on the next inward movement of the actuator the

needle connected with the carriage will be moved inwardly.

As a convenient means for connecting the link 6 to the actuator or slide 3 a pin 44 is extended from the actuator or slide 3 to such an extent that it will not cause interference with the movement of the latch 16.

In the construction hereinbefore described one of the needles is permanently attached to the actuator or slide 3 and enters the shed on each inward movement of the slide or actuator while the other needle 9 will move into the shed only when the needle selector mechanism prescribes that movement.

In the construction illustrated by Figs. 5, 6, 7 and 8 which show a modification of the invention and its amplification of the control of any one of a plurality of needles, each needle may be connected to the actuator or slide under the dictates of the rotary member or wedge carrying wheel and in this modified construction the stud 23 has mounted upon it a rotary member or wedge carrying wheel for each of the plurality of needles employed, so that any one or more of a series of needles may be automatically connected to or disconnected from the actuator at the will of the operator who will so position the wedge blocks on the rotary members as to present or fail to present a wedge block to the latches connected to the respective needles as the latter are withdrawn from the shed.

In the modification and inasmuch as there are two separately actuated needles, the needle guide or rail is formed in duplicate, as indicated in Fig. 7, the two 45 and 46 being connected by a clamp or screw 47 and each presenting a guide or rail for the respective needle carriages 48 and 49. In this construction, as will be evident from Figs. 6 and 7, each of the needle carriages is distinct and separate from the others and the upper needle 50 is carried by the gooseneck arm 51 of the needle carriage 49 while the lower needle 52 is connected to the lower carriage 48, the result being that when either one of these carriages is connected to the actuator its associated needle will be moved into and out of the shed and either one or both may be given this movement according to the dictates of the needle selector mechanism.

In the modification, as indicated is Fig. 5, there are two rotary members 53 and 54, each being provided with one or more wedge blocks 55 and 56. Mounted upon the actuator or slide 3, as indicated in Fig. 5 is a latch 57 for connecting or disconnecting one of the needle carriages to the actuator or slide in accordance with the dictates of the rotary member or wedge carrying wheel 53, and similarly the other needle carriage is provided with a latch 58 under control of the wedge carrying wheel or rotary member 54. Both of the latches 57 or 58 are pivotally

secured to the actuator as at 59 and 60 respectively and are normally under the influence of the springs 61 and 62.

Rotary movement may be given to the rotary members 53 and 54 in the modification, as shown by Figs. 5, 6, 7 and 8, by substantially the same ratchet and pawl mechanism, as indicated in Fig. 1 and hereinbefore described, and the latches themselves may be of the same general construction to connect or disconnect any one or more of the needles to the actuator, as prescribed by the rotary member and its wedge blocks.

From the construction described it will be apparent that the present invention provides an automatic needle selector mechanism whereby one or more of a series of needles may be connected to or disconnected from the actuator.

What is claimed is:—

1. In a loom, the combination of weft inserting needles, for introducing weft threads into the shed, an actuator for the needles, a latch for operatively connecting a needle to the actuator, and a rotatable member having latch engaging blocks mounted thereon for determining when the latch shall connect or fail to connect a needle to the actuator.

2. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuating slide for the needles, a latch for operatively connecting a needle to the slide, a rotatable member, and a wedge block secured to the rotatable member and positioned by rotation of said member for determining when the latch shall connect or fail to connect a needle to the actuating slide.

3. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuating slide for operating the needles, a latch for operatively connecting a needle to the slide, a rotatable member, means for intermittently rotating said member, a block mounted on the rotatable member and positioned by rotation of said member to engage or fail to engage the latch for determining when the latch shall connect or fail to connect a needle to the actuating slide.

4. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuating slide for operating the needles, latches for operatively connecting the needles to the slide, a rotatable member, means for intermittently turning said member, blocks mounted on said member and positioned by rotary movement of said member to engage the latch on a retracting movement of the associated needle that the needle may be disconnected from the actuating slide.

5. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuating slide for operat-

ing the needles, a latch for operatively connecting a needle to the slide, and a needle selector comprising a rotary member, a block secured to the rotary member, means for turning the rotary member to position the block in predetermined relation with the latch that the latter may connect or fail to connect a needle to the actuating slide.

6. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuating slide for operating the needles, a latch for operatively connecting a needle to the slide, a needle selector comprising a rotary member, a block secured to the rotary member, and means for turning the rotary member to position the block in predetermined relation with the latch during the inward movement of the actuating slide and permitting the rotary member to remain at rest during the outward movement of the slide that the latch may or may not connect a needle to the slide in accordance with the position of the block.

7. In a loom, the combination of weft inserting needles for introducing weft threads into the shed, an actuator for operating the needles, a latch for connecting a needle to the actuator, a rotary member, a wedge block mounted on the rotary member, ratchet and pawl mechanism for rotating said member step-by-step and for placing the wedge block in predetermined position with respect to the latch and thereby determine whether a needle may or may not be operatively connected to the actuator for inserting its weft thread into the shed.

8. In a multiple needle loom, the combination of an actuator for operating any one or more of the needles, latches for operatively connecting any one of the needles to the actuator, a needle selector mechanism for determining which one or more of the set of needles shall be connected to the actuator, and comprising a movable member, blocks detachably secured to the movable member for controlling the latches and determining by the position of the blocks which one or more of the needles of the set shall be operatively connected to the actuator.

9. In a multiple needle loom, the combination of an actuator for moving any one or more of the needles into the shed, a latch for each needle for connecting the needle to the actuator, a needle selector mechanism for determining which of the needles shall be connected to the actuator and comprising a wedge carrying wheel, means for turning the wheel to a predetermined position during the inward movement of the actuator to position a wedge relatively to a latch that the latter may be disengaged from the associated needle on the outward movement of the actuator when the wedge is in one position and permit the latch to remain in connecting relation

with the needle when the wedge is in another position.

10. In a multiple loom, the combination of an actuator for moving any one or more of the needles into the shed, a latch for each needle for connecting the needle to the actuator, a needle selector mechanism for determining which of the needles shall be connected to the actuator and comprising a wedge carrying wheel, means for turning the wheel to a predetermined position during the inward movement of the actuator to position a wedge relatively to a latch that the latter may be disengaged from the associated needle on the outward movement of the actuator when the wedge is in one position and permit the latch to remain in connecting relation with the needle when the wedge is in another position, and a brake to prevent turning movement of the wedge wheel when the wedge has been moved to its predetermined position.

11. In a multiple needle loom, the combination of an actuator for moving any one or more of the needles into the shed, a latch for each needle pivotally mounted on the actuator to connect a needle to the actuator, a needle selector mechanism for determining which of the needles shall be connected to the actuator and comprising a wedge carrying wheel, means for turning it to a predetermined position during the inward movement of the actuator to position a wedge relatively to a latch that the latter may be disengaged from the associated needle on the outward movement of the actuator when the wedge is in one position and permit the latch to remain in connecting relation with the needle when the wedge is in another position.

12. In a multiple needle loom, the combination of an actuator for moving any one or more of the needles into the shed, a latch

for each needle for connecting it to the actuator, and a needle selector mechanism comprising a movable wedge for engagement by the latch to disconnect a needle from the actuator when the wedge is moved into a predetermined position.

13. In a multiple needle loom, the combination of an actuator for moving any one or more of the needles into the shed, latches for connecting any one or more of the needles to the actuator, and a needle selector mechanism for determining which of the needles shall be connected to the actuator on any pick, comprising a rotary member, wedge blocks for connection with the rotary member in predetermined order, means for turning the rotary member to present a blank space to one of the latches when the associated needle is to be connected to the actuator and present a wedge block for engagement by one of the latches when the associated needle is to be disconnected from the actuator.

14. In a multiple needle loom, the combination of an actuator for moving any one or more of the needles into the shed, latches for connecting any one or more of the needles to the actuator, and a needle selector mechanism for determining which of the needles shall be connected to the actuator on any pick, comprising a rotary member, wedge blocks for connection with the rotary member in predetermined order, ratchet and pawl means for turning the rotary member step-by-step to present a blank space to one of the latches when the associated needle is to be connected to the actuator and present a wedge block for engagement by one of the latches when the associated needle is to be disconnected from the actuator.

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