

Dec. 19, 1944.

J. STUER

2,365,362

MAGAZINE LOOM WITH FEELER AT THE FRONT OF THE MAGAZINE

Filed March 5, 1940

3 Sheets-Sheet 1

FIG. 1.

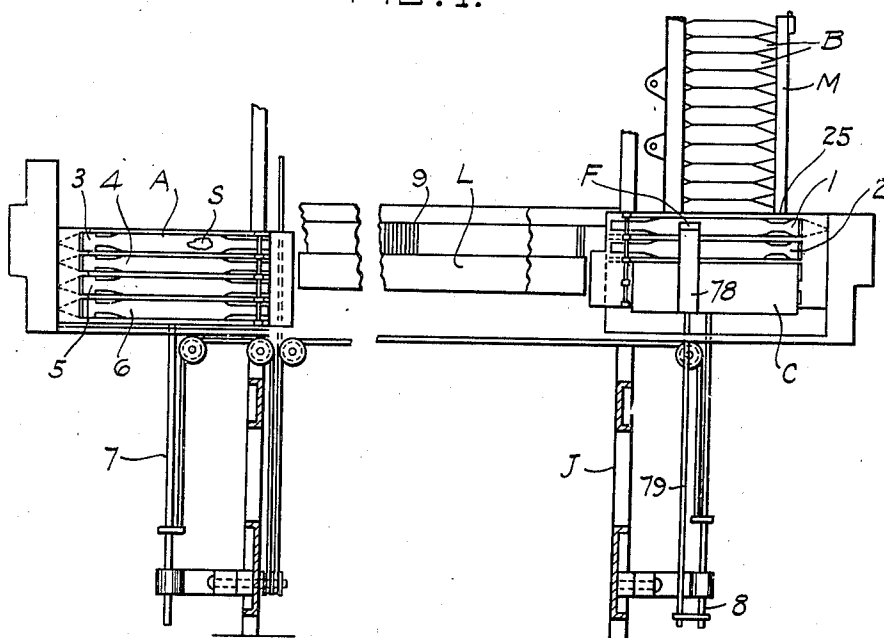


FIG. 2.

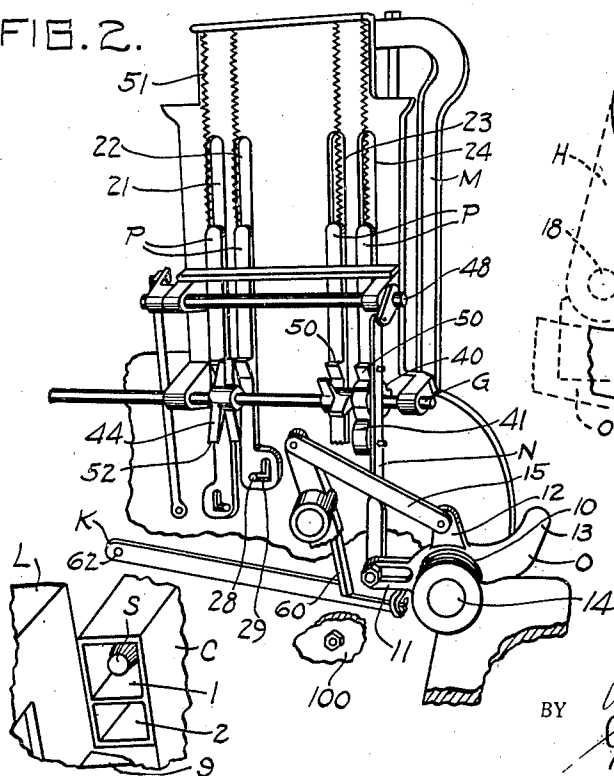
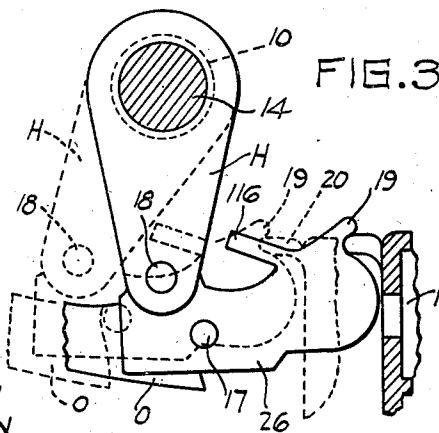


FIG. 3.



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FIG. 4.

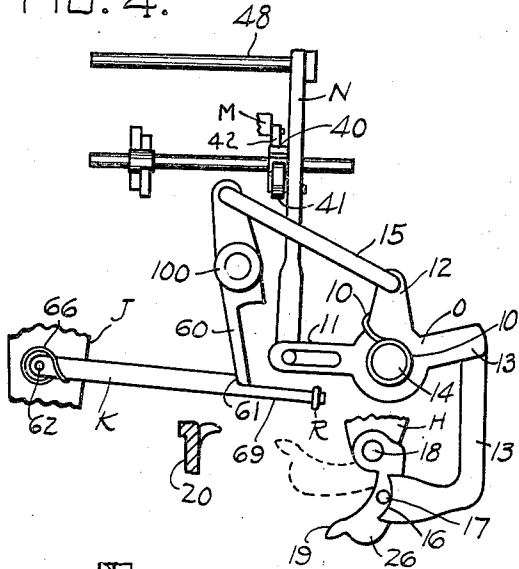


FIG. 5.

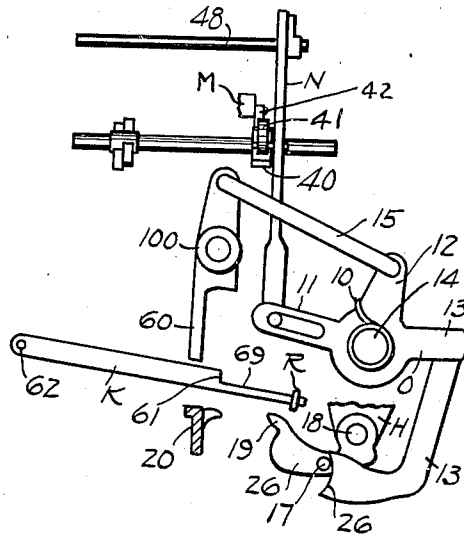


FIG. 6.

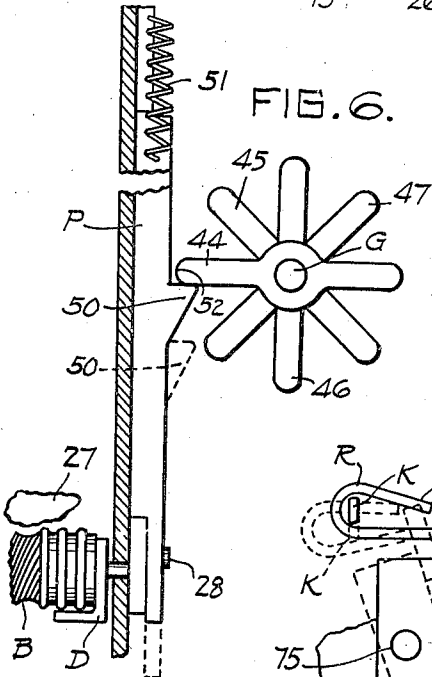


FIG. 7.

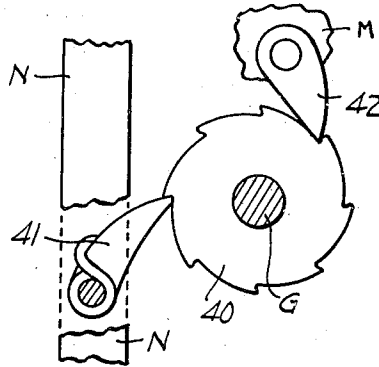
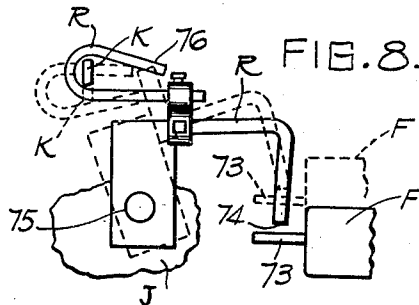


FIG. 8.



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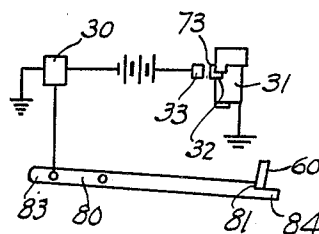
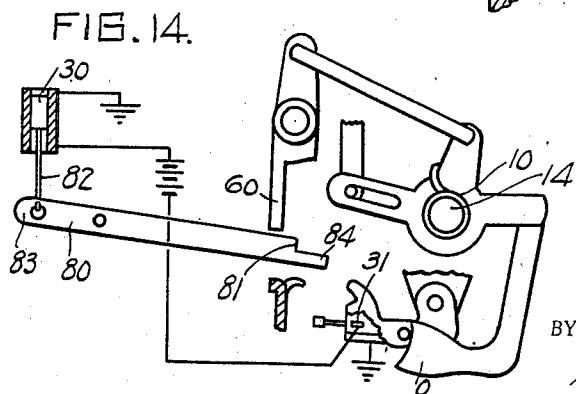
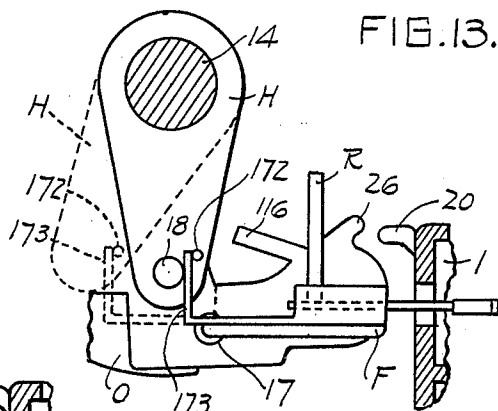
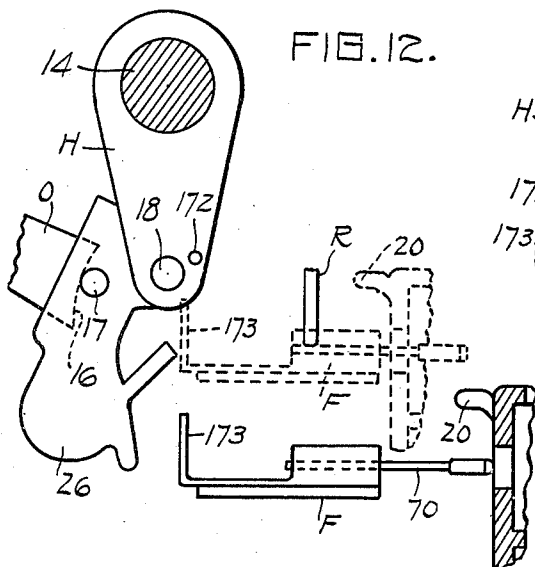
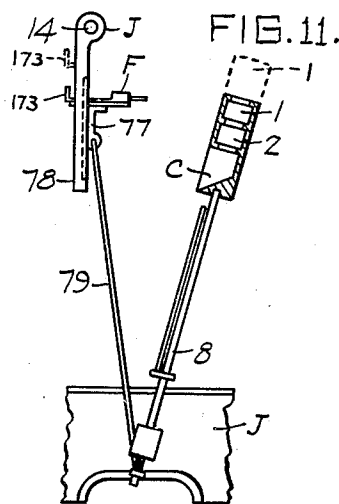
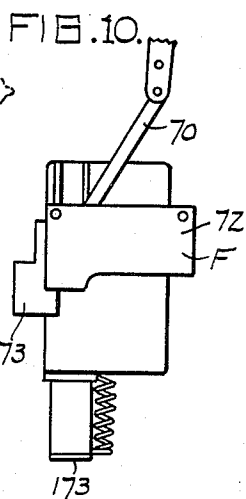
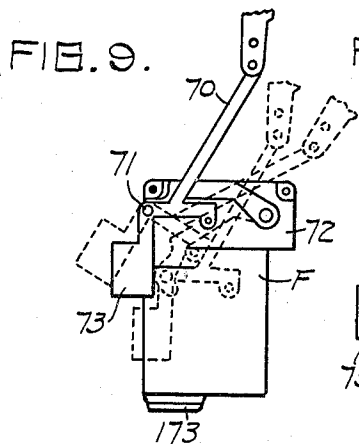
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2,365,362

MAGAZINE LOOM WITH FEELER AT THE FRONT OF THE MAGAZINE

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3 Sheets-Sheet 3



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2,365,362

MAGAZINE LOOM WITH FEELER AT THE
FRONT OF THE MAGAZINE

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Application March 5, 1940, Serial No. 322,308

5 Claims. (Cl. 139—233)

This invention relates to automatic looms. There are plain looms attached to each of which is a magazine for holding a substantial number of bobbins, such magazine being of the rotary or the fixed type, the magazine being associated with a feeler which is brought in contact with a bobbin in a shuttle, usually when the lay beats up, the parts being so arranged that when the thread or filling on the bobbin in a working shuttle has almost run out or is near depletion, the feeler moves in a different way from when the bobbin is full and sets the transfer devices in such a way that a new, full bobbin is forced into the shuttle, thus forcing out the old bobbin and taking its place. This is called a transfer.

There are also looms in each of which on either one side or both sides, there is a movable shuttle box with a number of cells, each to receive a shuttle when it is picked across on the lay beam.

Pattern mechanism is provided to move the boxes on either one side or both sides to bring the desired cell or cells to the level of the race on the lay beam to discharge or receive a shuttle. These shuttles may be provided with bobbins, the thread of which is a different color or quality or the bobbins in all the shuttles may contain thread of substantially the same character.

As a rule with such fancy looms, when a bobbin is near depletion or exhaustion, the loom must be stopped and a new bobbin put in its place by hand. With such looms there is no need of a feeler or of transfer mechanism.

There are also looms in which on one side there is a shifting shuttle box or drop box with a plurality of shuttle cells while on the other side there is a single stationary shuttle box associated with a magazine and feeler and transfer device, the magazine containing, if desired, bobbins of different colored thread, there being also a provision for indicating that the bobbin of a particular color or kind in a particular shuttle is near depletion so that a full bobbin of the same character can automatically take the place of the bobbin which is near depletion. Such looms are provided with what is known as a color indicating mechanism which causes the bobbin of the right color to be transferred into the right shuttle.

It has been found that even two bobbins from the same spinning and twisting frame differ somewhat and it has been found desirable to have these shuttles, even with the same thread, alternately picked across as this produces a more

uniform cloth. This is accomplished in various ways, one way being shown in patent to Baker for "Loom for mixing filling," No. 2,093,629, September 21, 1937.

My present device is for the purpose of providing a loom in which there are three or more shuttles which follow one another in picking in a pre-arranged sequence, there being on one side a drop box or movable shuttle box having a plurality of shuttle cells, preferably four, while on the other side, there is a movable shuttle box or drop box with two cells in a position under a bobbin magazine. As shown, this magazine is not of the rotary type but of the fixed type with a plurality of vertical bobbin guide ways associated with what are known as cradles, one at the bottom of each guide way, and vertical slide bars each of which operates a cradle together with a transferer, all similar to another application of mine pending herewith on Bobbin transfer mechanism for looms with stationary magazine, filed June 29, 1940, Serial No. 343,230.

The particular feature of this invention is the use of a feeler on the magazine side of such a loom but at the front instead of at the back with the feeler moving up and down in the body of the loom in accordance with the up and down movement of the shuttle box under the magazine. This feeler follows the top cell of this box under the magazine.

As shown, I use such a feeler on the front on the magazine side associated with and operating actuator mechanism similar to that shown in my pending application for United States Letters Patent Serial No. 250,055, filed January 24, 1939, except that in that application, the device is shown as operating a cutter and a transfer dog with a rotary magazine while in this, it is used with a fixed, multiple guide slot magazine and with movable shuttle boxes or drop boxes under such a magazine. The purpose of this device is to release such an actuator from a trigger arm which normally holds it and the actuator spring out of action.

I can use a feeler with a mechanical connection to this trigger arm or I can use a feeler which closes a switch in an electric circuit which circuit operates a magnet or solenoid which disengages such a trigger arm.

I will call the stationary loom structure including the ends, braces, stud shafts and breast beam, the "loom body" to distinguish that part from the lay and the other moving parts.

With any of the usual shuttle shifting arrange-

ments, the sequence of the shuttles in any particular box can be arranged as in the patent to John J. McCann and to myself, Joseph Stuer, July 11, 1939, No. 2,166,071. In that case, a shuttle box with two cells under a rotary magazine is used where in this case, a box with two cells under a stationary magazine is used. In this application the feeler is at the front while in the Patent No. 2,166,071, it is at the back.

In operating this device as shown for a single pick loom, there is a shuttle in the bottom box when the shuttle to be felt is picked into the top box. The lay moves forward and the shuttle in the top box moves up, being felt as it moves, and when the lay moves back, the shuttle in the bottom box is picked so that when the lay again moves forward and the transfer is accomplished in the top box, there is no shuttle in the bottom box.

The time interval between feeling and transfer is, therefore, almost exactly one complete picking interval including the time between which the lay moves slightly forward and then back and then almost to the front.

From the start of feeling to the end of transfer is slightly more than one full pick.

In the drawings, Fig. 1 is a diagrammatic front elevation of a well known type of loom with movable drop boxes on each side and a stationary magazine, there being two boxes only on the magazine side, this being the preferred arrangement for my attachments, the working parts being broken away to expose the background.

Fig. 2 is an isometric view from the front left of a loom with my devices in place.

Fig. 3 is an elevation from the right of a transferrer and its dog when the dog is first engaged by the bunter in full lines, and in dotted lines showing the extreme movement of the bunter and dog during transfer.

Figs. 4 and 5 are details as from the left showing the position of the actuator, dog and bunter before and after the actuator is released from the trigger arm.

Fig. 6 is a detail partly in section as from the back showing one of the magazine slides and with the paddle wheel which moves it.

Fig. 7 is a detail showing the two pawls which control the movement of the paddle wheel and shaft.

Fig. 8 is a detail showing the preferred type of rocker arm and trigger arm in full lines in the normal position and in dotted lines after the actuator has been released.

Fig. 9 is a plan view of a feeler with its top plate removed. In full lines it shows the normal position of the feeling finger and in dotted lines its position when it is pushed back and in other dotted lines, when it slips on a bobbin.

Fig. 10 is a plan view of a feeler when its slide and feeling finger are retracted during transfer.

Fig. 11 is an elevation as from the right showing the manner in which the feeler slide is moved up and down.

Figs. 12 and 13 are side elevations similar to Fig. 3, showing the position of the bunter, dog, feeler, and other parts at different stages of the operation.

The full lines in Fig. 12 show the position of the parts when the feeler is about to enter the shuttle cell and the dotted lines when the feeler first engages the rocker arm. The full lines in Fig. 13 show the bunter going back at the position where the rocker arm has released the dog and the dog has just come up into transferring posi-

tion while the dotted lines show the feeler slide withdrawn by the transferrer at the end of its transfer action on the next pick after the one shown in full lines.

Fig. 14 is a diagram somewhat similar to Figs. 4 and 5, showing a trigger arm released by a solenoid the electric circuit through which is controlled by a feeler carrying contacts.

Fig. 15 is another diagram showing a feeler of the electric contact carrying type in another location.

L is the lay while 9 is the race. A represents the shuttle box assembly on the side of the loom opposite the magazine including the cells; 3, 4, 5, 6 vertically movable by mechanism indicated by 7.

C represents the shuttle box assembly of two shuttle cells 1 and 2 which are movable vertically by any usual mechanism, such as 8.

M is the magazine with four vertical guide ways; 21, 22, 23 and 24, the bottoms of which come together at 25 so that a bobbin can slip or roll down to that position on runways. The bobbin shifting is obtained by means of cradles such as D at the bottom of the vertical part of each guideway each operated by one of the four slide bars, P, P, P, P. This construction is substantially the same as usual but my control devices are as follows:

G is the sliding shaft of color control which is caused to rotate step by step by a ratchet 40 moved by pawl 41 pivoted to the link rod N and 42 is a check or lock gravity pawl so that where, as shown, there are eight teeth on the ratchet, it is moved one-eighth of a revolution by the pawl 41 and then held in that position by pawl 42.

44, 45, 46 and 47 represent paddles fixed to this shaft G each having fingers extending in opposite directions. These fingers are so arranged as shown in Fig. 6, that their ends 52 are one-eighth of a circumference apart. On each slide bar P is a nose such as 50 and each slide bar P is normally held up by a spring such as 51.

As shown in Fig. 6, preferably one paddle finger is normally horizontal and rests on a nose 50 so that as it moves down, it moves a bar P down but releases it before such finger has moved forty-five degrees.

The parts are so arranged that as the shaft G is moved step by step, the end 52 of one of the fingers will move forty-five degrees engaging a nose 50 on a slide bar P moving it down against its spring 51 whereby it rocks one of the cradles D thereby spilling out the bottom bobbin on that particular runway but when the end 52 passes beyond the nose 50 it allows the spring 51 to return the slide P to its usual position. This allows the cradle D after dropping the bobbin, to turn back into a position to receive the next bobbin above.

As shown, each cradle is pivoted and has a pin 28 which enters a slot 29 carried by a slide P, the slot being of such L shape that when the slide is forced down, the cradle tips out its bobbin and when the slide moves up, the cradle moves into receiving position, all in a well known manner.

To operate the pawl 41 and the ratchet 40, I pivot the pawl 41 to the link N which extends from the revoker shaft 48 to an adjusting slot in arm 11 of actuator O so that it is moved up and down with the actuator O. This actuator O is free to move on a stud 14 and has another arm 12 which connects by rod 15 with the cutting mechanism 100.

A third arm 13 of this actuator O extends around and down and then towards the back and ends at 16 in a position to engage a stud 17 carried by the transfer dog 26 pivoted at 18 on the transferer H and extending back at 19 in a position to be engaged by the bunter 20 carried by the lay L when the lay beats up provided this part 19 of the transfer dog is lifted when the spring 10 is allowed to operate. This spring 10 provides the motive power for actuator O and tends to move it to the position shown in Fig. 5.

This spring 10 is prevented from operating by the latch arm 60. The end of arm 60 engages a notch 61 on a trigger arm K pivoted at 62 and must be released to permit spring 10 to move the arms 11, 12, and 13.

To release this arm I can use various devices operated from a feeler at the front of the magazine which moves with its top cell.

As shown, a mechanical feeler F or an electrical feeler 31 is carried by a slide 77 vertically slidable in a guideway in a bracket 78 fastened to the loom body J. This slide is caused to move up and down with the top cell 1 of shuttle box assembly C by a rod 79 which connects slide 77 with the bottom of mechanism 8, which raises and lowers the assembly C in a well known manner, the bottom of rod 79 being pivotally connected to mechanism 8 near the bottom and near the pivots of the lay.

I can use a feeler F as shown in Fig. 9, of a known type with a feeling finger 70 pivoted at 71 and carried by a slide 72, the finger 70 being connected to a plate 73 which, when the finger 70 slips on the bare bobbin and moves on its pivot 71 is projected under the end 74 of a rocker R pivoted at 75 on the body J of the loom and extending out at 76 over the free end 69 of the trigger arm K and preferably around it in a loop so that both must move up and down together. When feeler finger 70 pivots and plate 73 is moved under the end 74 of the rocker arm, as feeler F is carried by slide 77 and as the top cell 1 of this assembly is still moving upward, this plate 73 rocks the rocker arm and releases the trigger arm K.

As shown in Figs. 14 and 15, I can also use a medially pivoted trigger arm 80 with a notch 81 and connected by a wire 82 with a solenoid device 30 which is connected to and controlled by a feeler device 31 including a switch 32 to open and to close the circuit indicated by 33. The feeler device 31 is at the front of the magazine and movable up and down with the top cell 1, being carried by a slide such as 77 as in the mechanical construction.

In either construction, a pin 172 on the transferer H can engage a pin 173 on a slide such as 72 and pull the feeler finger such as 70 out of the shuttle during transfer.

When this feeler 31 slips on the bare barrel of a bobbin it closes a circuit for the solenoid 30 which pulls the wire 82 and lifts the end 83 of this trigger arm 80 thus depressing the other end 84 and releasing the end of the arm 60 from notch 81 thus permitting the spring 10 on stud 14 to lift the arm 11 with the link N and pawl 41 and turn the shaft G one-eighth of a revolution and at the same time causing the part 16 of the actuator O to engage stud 17 thus swinging upward the dog 26 of the transferer H into position to be struck by the bunter 20. As the hammer part 27 of the transfer mechanism, which forces the new bobbin into the shuttle, is connected to and operated by this dog 26, the bobbin is transferred. As it is necessary to reset

the parts by moving the arm 60 back to be engaged by the notch 61 or 81, I provide a light spring 66 on arm K.

When the feeler releases the trigger arm from the actuator O, the actuator O moves instantly to set the parts for transfer and transfer is accomplished by the bunter 20 on lay L engaging dog 26 on the next pick. As the lay continues to move forward during transfer, the bunter and dog move the arm 13 of the actuator forward and arm 12 and link 15 back which allows the arm 60 to again be engaged and held by the notch 61 or 81 on trigger arm K or 80. As the lay moves back, dog 26 no longer engages bunter 20 and drops from the dotted line position to the full line position shown in Fig. 4 and the parts are now reset.

The bunter 20 and dog 26 can be so adjusted that the bunter is moving down in an arc and, during transfer, the dog is moving with it so that the box C is being held up by the dog as well as by mechanism 8.

The action of bunter 20 on dog tip 19 and dog pivot 18 and dog stop 116 is such that, as shown in Figs. 3 and 13, pivot 18 is resisting the downward, forward pressure of bunter 20 and is therefore holding up box mechanism C.

This arrangement of a dog pivoted to a transferer arm with a bunter carried by the top of a drop box at a point higher than the dog pivot can be used under any type of magazine.

The feeler, the transfer dog, rocker arm and bunter must all be correctly adjusted with reference to each other because if the rising feeler moved the rocker arm or solenoid too soon thus releasing the trigger arm and allowing the actuator to throw up the dog, this dog might hit the bunter before it moved back from its extreme forward position.

In Fig. 12, in full lines, is shown the position of the dog at the time when the feeler first comes in contact with the bobbin in the shuttle. In the dotted position is shown the feeler, the shuttle and the bunter as they move upward, the bunter and shuttle moving also forward. The dotted lines show the extreme forward position of the bunter, the dog then still being in the down position.

In Fig. 13, the feeler has moved up a still greater distance and in so doing has brought pin 173 up behind pin 172 and has tripped the trigger arm K and has started the arm 13 of actuator O to throw the dog up into position for transfer. In the meantime, however, the shuttle and the bunter have been moving up and back so that the bunter has moved back just out of the path of the dog as shown in Fig. 13. After this, the lay shuttle and bunter continue to move further back and then on the forward movement during the next pick, the bunter engages the dog forcing it and the transferer back to accomplish the transfer and also moving back pins 172 and 173 and the slide 72 of the feeler carrying the feeling finger 70 so as to take it out of the shuttle.

If the feeler is at the back of the magazine, it moves when the lay is in the back position and sets the parts for transfer so that as the lay beats up, the transfer could be made immediately if the shuttle with the bobbin to be transferred was in the right position at the front of the loom but the time interval is so short that I find it desirable and in this application do arrange the feeler on the front side below the magazine and so movable as to follow the top cell and to indicate transfer near the forward movement instead of near the back. With this arrangement,

the parts are set for transfer during one forward beat up and the transfer is made on the next beat up.

The advantage of a feeler at the front instead of at the back and on the magazine side, which does not move back and forth but does move up and down with the top cell of the shuttle box carried by the lay, is that there is no delay in transfer as it occurs at the next pick after indication.

My feeler of this type, whether electrically or mechanically connected can be used to trip or cock any one of many transfer or other mechanisms of any loom and I claim it broadly as a new actuating device, but as limited by the numbered claims for any loom with a vertically movable multiple cell drop box under a magazine. It can be used to operate the gate of the well known chopper action.

I claim:

1. The combination in an automatic loom having a stationary magazine carried by the loom body on one side with a plurality of bobbin guideways and with bobbin transfer mechanism cooperating with the magazine, together with a vertically reciprocating shuttle box at each end of the lay and carried thereby, each box having a plurality of shuttle cells, at least two operating shuttles and mechanism to move each shuttle box; the bobbin transfer mechanism including a dog pivoted to a transfer arm with a stop for the dog fixed to the transfer arm, and a bunter carried at the top cell of the shuttle box on the magazine side in a position higher than the dog pivot to engage the free end of the dog, of a feeler slidably mounted on the loom body at the front of the magazine, means to move the feeler in timed relation to the rising and the falling movements of the top cell of the shuttle box on the magazine side; actuating mechanism including a spring to move the transfer mechanism to transferring position which actuating mechanism is held out of action by a trigger arm; and said trigger arm; with connections actuated by and connected to the feeler between the feeler and the trigger arm to release the trigger arm from the actuating mechanism.

2. The combination in an automatic loom having a stationary magazine carried by the loom body on one side with a plurality of bobbin guideways and with spring stressed bobbin transfer mechanism cooperating with the magazine and normally held out of transferring position, together with a vertically reciprocating shuttle box carried at each end by the lay and carried thereby, each shuttle box having a plurality of shuttle cells, at least two operating shuttles and mechanism to move each shuttle box, the bobbin

transfer mechanism including a dog pivoted to a transfer arm with a stop for the dog fixed to the transfer arm, and a bunter carried at the top of the shuttle box on the magazine side in a position higher than the dog pivot; of a feeler slidably mounted on the loom body at the front of the magazine, means to move the feeler in timed relation to the rising and the falling movements of the top cell of the shuttle box on the magazine side; with mechanism, actuated by and connected to the feeler, to release the bobbin transfer mechanism when the feeler indicates near exhaustion of thread on a bobbin and to initiate action of said mechanism; and mechanism to drop the bottom bobbin in some one of the magazine guideways into position to be transferred.

3. In a bobbin-changing loom using a plurality of shuttles and having vertically shifting shuttle boxes, a reserve bobbin magazine and a weft feeler all at the same side of the loom; bobbin transfer mechanism including a dog pivoted on a transfer arm and a stop to limit its upward pivotal movement on the transfer arm, and a bunter carried at the top of the shuttle boxes on the magazine side in a position higher than the dog pivot to engage the dog; a vertically movable member at said end of the loom connected to the shifting shuttle boxes to rise and fall as said shuttle boxes rise and fall, said weft feeler mounted on said movable member for movement therewith to detect the weft in the upper shuttle box as the latter rises; and mechanism set in action while the weft feeler is moving vertically when weft exhaustion is indicated thereby to move the dog into position to be engaged by the bunter.

4. In a bobbin-changing loom using a plurality of shuttles and having a reserve bobbin magazine and vertically shifting shuttle boxes under the magazine together with a weft feeler; bobbin transfer mechanism including a dog pivoted on a transfer arm and a stop to limit the upward pivotal movement of the dog on the transfer arm, and a bunter carried at the top of the shuttle boxes on the magazine side in a position higher than the dog pivot to engage the free end of the dog.

5. In a bobbin-changing loom using a plurality of shuttles and having a reserve bobbin magazine and vertically shifting shuttle boxes under the magazine, together with a weft feeler; bobbin transfer mechanism including a dog pivoted on a transfer arm and a bunter carried at the top of the shuttle boxes on the magazine side in a position higher than the dog pivot to engage the free end of the dog.

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