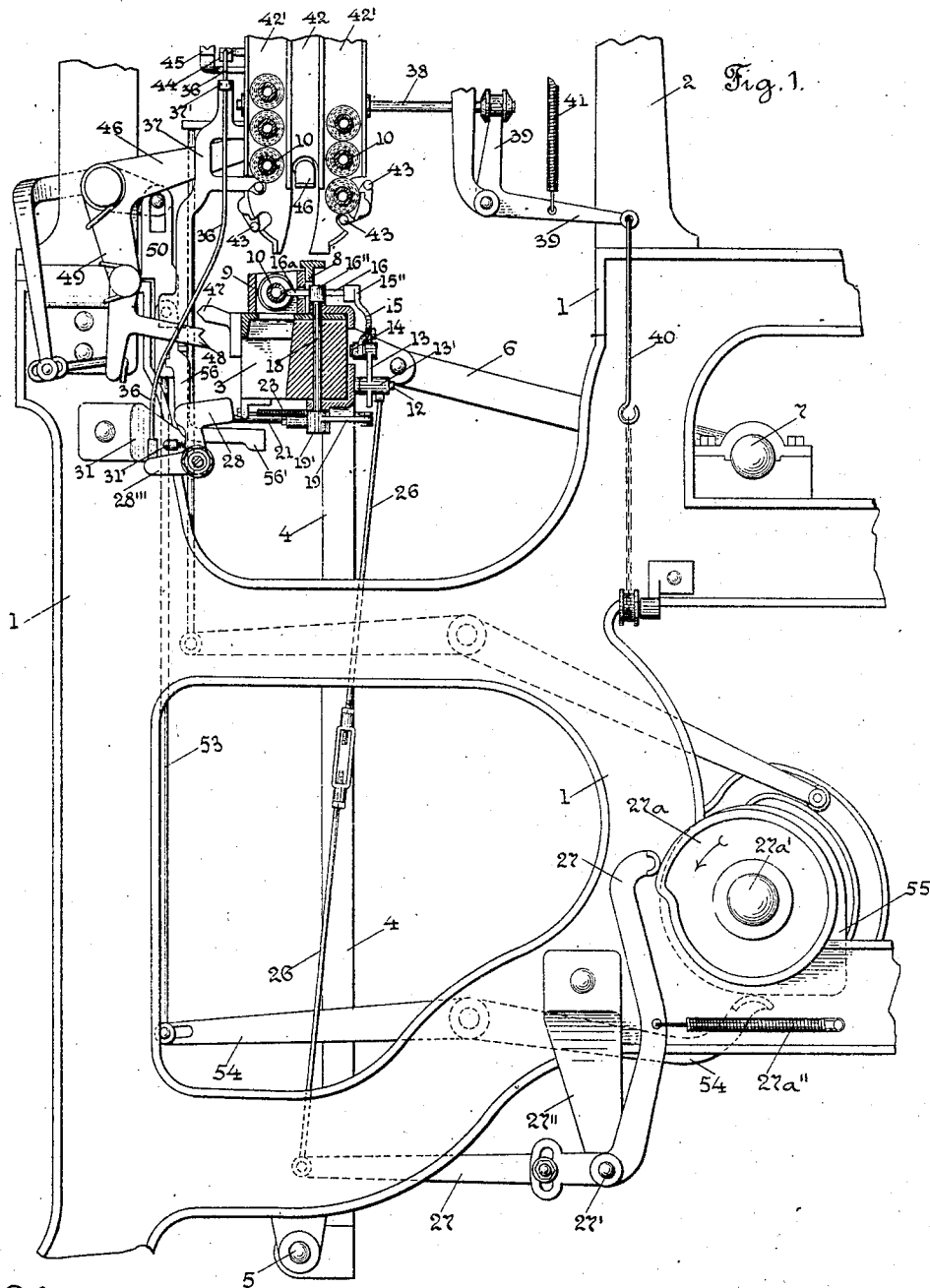


G. F. HUTCHINS.
 AUTOMATIC WEFT REPLENISHING LOOM.
 APPLICATION FILED MAY 18, 1908.

932,131.

Patented Aug. 24, 1909.

3 SHEETS—SHEET 1.



Witnesses
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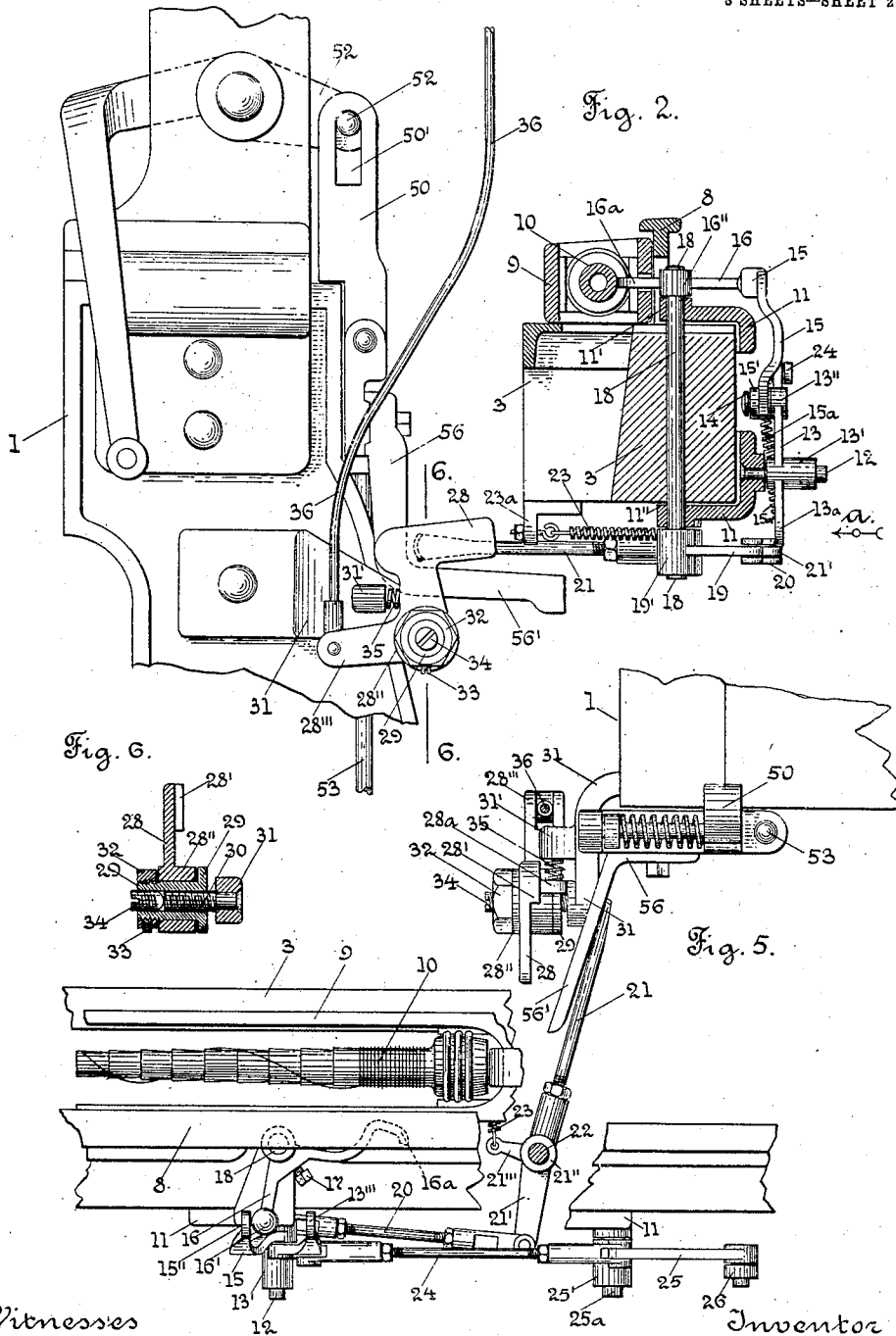
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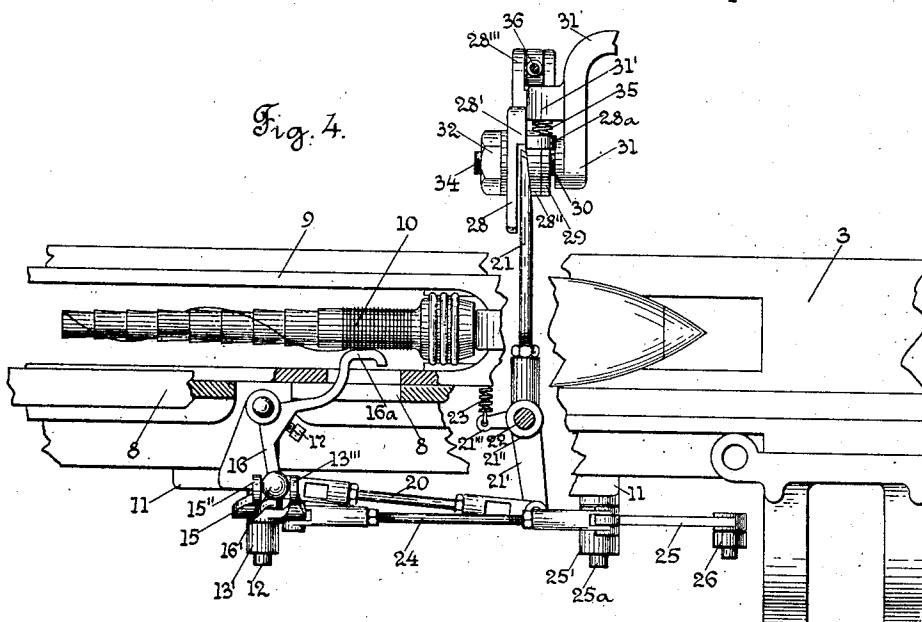
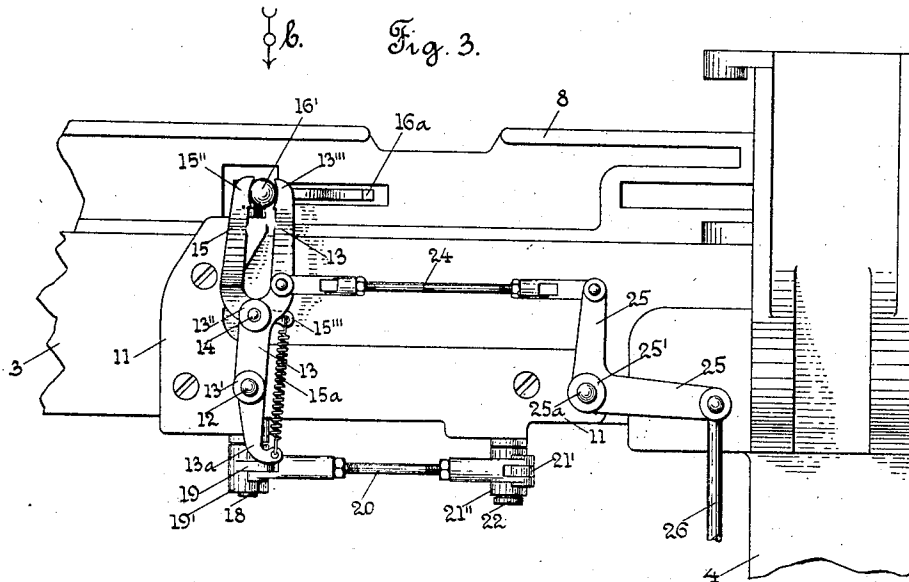
Witnesses
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 3 SHEETS—SHEET 3.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

AUTOMATIC WEFT-REPLENISHING LOOM.

932,131.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed May 18, 1908. Serial No. 433,421.

To all whom it may concern:

Be it known that I, GEORGE F. HUTCHINS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Automatic Weft-Replenishing Looms, of which the following is a specification.

My invention relates to automatic weft replenishing looms, and particularly to that class of looms which have a stationary magazine for bobbins or filling carriers at one end of the lay, with two or more sets of compartments or guide-ways for superposed bobbins or filling carriers, each set preferably of a different color or character, and shifting or change shuttle boxes at the other end of the lay, and mechanical filling detecting mechanism to detect practical or substantial exhaustion of filling in the bobbin or filling carrier in the active shuttle, to put into operation the filling supply mechanism to supply fresh filling in said shuttle.

In my present improvements, the filling detecting mechanism, which corresponds to the filling detecting mechanism shown and described in my pending application for United States Letters Patent, Serial No. 322,680, is located at the magazine end of the loom, and on the back of the lay where the stationary shuttle box is located. The filling detector acts to detect the practical or substantial exhaustion of filling in the active shuttle as the lay comes forward, to put into operation mechanism to cause a change of filling in said shuttle, when it comes under the magazine the next time, which may be during the next forward movement of the lay, in case the same shuttle remains active, or if said shuttle is changed when it is returned to the shifting shuttle box end of the loom, then the movement caused by the filling detector will be delayed or held in abeyance until said shuttle is brought into action again.

I have shown in the drawings a detached part of a weft replenishing loom of the class referred to, with a stationary magazine of the type shown and described in the pending application for United States Letters Patent, Serial No. 415,629, combined with other mechanisms connected with the filling selecting mechanism, and the transferring mechanism, shown and described in other applications for patents now pending in the

Patent Office, with my improvements combined therewith, sufficient to enable those skilled in the art to understand the construction and operation of my improvements.

Referring to the drawings:—Figure 1 is a side view of the magazine end of a weft replenishing loom of the class referred to, with my improvements applied thereto; the magazine, stationary shuttle box, and the lay beam are shown in section. Fig. 2 shows, on an enlarged scale, the detecting mechanism shown in Fig. 1. Fig. 3 shows the filling detector at the back of the lay, looking in the direction of arrow *a*, Fig. 2. Fig. 4 is a plan view of the parts shown in Fig. 3, looking in the direction of arrow *b*, same figure. Fig. 5 corresponds to Fig. 4, but shows some of the parts in a different position, and also shows some parts not shown in Fig. 4, and Fig. 6 is a detail section, on line 6, 6, Fig. 2, looking in the direction of arrow *a*, same figure.

In the accompanying drawings, 1 is the loom side or end frame, 2 the loom arch, 3 the lay carried on the lay sword 4, which is pivoted at its lower end at 5, and operated, through the crank connector 6 by the crank shaft 7, in the usual way.

8 is a single stationary shuttle box at the magazine end of the loom, and 9 a shuttle having a bobbin 10 therein.

A stand 11, Fig. 3, is secured to the rear of the lay and carries a stud 12 on which is loosely pivoted the hub 13', see Fig. 2, of an upright lever 13. The upwardly extending arm of the lever 13 has a boss 13'' carrying a stud 14, on which is loosely mounted the hub 15' of a second upright lever 15. The upper enlarged ends 13''' and 15'', respectively, of the levers 13 and 15, are adapted to engage the ball shaped end 16' of the filling detector or feeler 16, said ball shaped end extending between said levers 13 and 15. A helically coiled contraction spring 15^a is connected at its upper end to an extension 15''' on the lever 15, and at its lower end to an outwardly extending arm 13^a on the lever 13, see Fig. 3. The spring 15^a acts to yieldingly hold the upper ends of the levers 13 and 15 in engagement with the ball shaped head or end 16' on the feeler 16.

The feeler 16 has its hub 16'' adjustably secured by a set screw 17, in this instance on the upper end of an upright shaft 18, and the

detecting end 16^a of the feeler 16 extends through an opening in the back wall of the shuttle box 8, see Fig. 4, and is adapted to feel against the filling 10 on the bobbin in the active shuttle.

5 The upright shaft 18 is loosely mounted at its upper and lower ends in bearings 11' and 11'' on the stand 11, and extends through the wooden portion of the lay beam 3, see Fig. 2.

10 The lower end of the shaft 18 has secured thereon the hub 19' of an arm 19, and to the end of the arm 19 is pivotally attached one end of an adjustable rod or connector 20; the other end of said connector 20 is pivotally attached to an extension 21' on the dagger 21, which has its hub 21'' loosely mounted on a stud 22 secured to the stand 11, see Fig. 3. A helically coiled contraction spring 23 is attached at one end to a lug or ear 21''' on the hub 21'' of the dagger 21, see Figs. 4 and 5, and at its other end to a stationary bracket 23^a on the lay beam, see Fig. 2. The spring 23 acts against the spring 15^a of the upright levers 13 and 15, but is not strong enough to overcome the action of the spring 15^a, but causes the feeler 16 to press very slightly against the filling on the bobbin when engaging said filling. To the lever 13 in this instance is pivotally attached one end of an adjustable rod 24; the other end of said rod is pivotally attached to one arm of an angle lever 25, having its hub 25' mounted on a stud 25^a on the stand 11. The other arm of the angle lever 25 is pivotally attached to the upper end of a connector 26; the lower end of said connector 26 is attached to one arm of a cam lever 27, see Fig. 1, which is pivotally mounted on a stud 27' on a bracket 27'' secured to the loom frame. The other arm of the cam lever 27 engages in this instance the periphery of a cam 27^a, which is fast on the bottom shaft 27^{a'}, and is held in engagement therewith by a helically coiled contraction spring 27^{a''}.

The rotation of the cam 27^a, through the cam lever 27, and the connector 26, will at the proper time move the lever 13 and the lever 15 pivoted thereon, and cause the filling detector 16 to be moved in and out of the shuttle.

The dagger 21, through the movement of the filling detector 16, the shaft 18, connector 20, and the extension 21', is adapted to be moved into and out of the path of a lever 28, which in this instance is provided with an offset 28', see Fig. 4, with which the end of the dagger 21 is adapted to engage, to move said lever 28, which lever has its hub 28'' in this instance mounted on a bushing 29, which is screwed onto a threaded bolt 30 secured in this instance in the inner end of a stand or bracket 31 secured to the end of the loom frame, see Figs. 2 and 6. A nut 32 is

screwed onto the threaded end of the bushing 29 to hold the hub 28'' of the lever 28 in proper position on said bushing, and a set screw 33 holds the nut 32 in place. The bushing 29 may be turned on its supporting bolt 30, to vary the lateral position of the lever 28, and a set screw 34 is screwed into the end of said bushing, to hold it in its adjusted position.

A small helically coiled expansion spring 35 bears at one end against an ear 28^a on the lever 28, and at its other end extends into a recess in a lug 31' on the stand 31. Said spring 35 acts to yieldingly move forward the lever 28. The lever 28 has extending out from its hub 28', an arm 28''', to which is pivotally connected the lower end of a rod 36. The upper end of said rod 36 is guidingly held in an extension 37' on a swinging frame 37, mounted on a longitudinal sliding rod 38. The longitudinal movement of the rod 38, in connection with the swinging frame 37, is controlled in this instance through a lever 39 and a connection 40 to a pattern surface, not shown, located at the opposite end of the loom. This mechanism is fully shown and described in a pending application in the Patent Office, Serial No. 415,629, and forms no part of my present invention.

A helically coiled contraction spring 41 is attached at one end to the lever 39, and at its other end to a stationary part of the loom, not shown, and acts to yieldingly hold the lever 39 and move the rod 38 in one direction.

The magazine 42 is in this instance of the stationary type, and has two vertically extending compartments or guide-ways 42' for two sets of bobbins 10. At the lower end of each compartment 42' is located a rocking support or cradle 43, to support and release the bobbins 10 as they may be selected by a pattern surface not shown, according to the longitudinal movement of the rod 38 and the swinging frame 37, to bring the upper hooked end of the upright rod 36 over an arm 44, or an arm 45, connected with the rocking supports or cradles 43, and the downward movement of the rod 36, through the engagement of the dagger 21 with the lever 28, will cause the rocking of a support or cradle 43, to allow the lowest bobbin 10 in a compartment to drop down and be supported by said cradle, as shown at the right in Fig. 1, and at the next forward movement of the lay, in case there is no change of shuttle boxes at the shifting shuttle box end of the loom, said bobbin 10 will be dropped to the discharging end of the magazine, and the transfer arm 46 of the transfer mechanism, through the engagement of the bunter 47 on the lay with the latch or dagger 48 on the transfer arm 49, will be operated to transfer a bobbin from the magazine into the shuttle, all as fully described in said application for a patent, Serial No. 415,629.

A vertically moving plate 50 is located at the front of the breast beam, see Fig. 2, and has an elongated slot 50' in its upper end, into which extends a stud 51 on an arm 52 connected with the transfer mechanism. To the lower end of the plate 50 is connected the upper end of a rod or connector 53; the lower end of said rod or connector 53 is attached to one arm of a centrally mounted cam lever 54. The other arm of said cam lever 54 is adapted to engage with and be operated by cam 55 fast on the bottom shaft 27^a.

To the upper end of the plate 50 is secured one end of an angle plate 56. The other end 56' of the angle plate 56 extends inwardly toward the lay, and is inclined outwardly as shown in Fig. 5, so that the raising of the plate 50, preparatory to the operation of the transfer mechanism after the detection of substantially exhausted filling in the active shuttle, will, on the next forward movement of the lay, preparatory to the transfer of filling, raise the angle plate 56, and the inwardly extending end 56' of said plate 56 will be moved into the path of the dagger 21, and as the lay continues to move forward, the engaging end of the dagger 21 will travel along on said end 56', and through connections to the filling detector 16, will positively move and hold the filling detector out of and away from the shuttle, as shown by broken lines in Fig. 5, to allow of the free transfer of the substantially exhausted bobbin from the shuttle, and the insertion of a new bobbin, as will be understood by those skilled in the art.

The operation of my improvements will be readily understood by those skilled in the art.

In the normal operation of the loom, the engagement of the feeler 16 with the filling on the bobbin in the shuttle, will hold the feeler away from the bobbin, and through the rock shaft 18, arm 19, connector 20, and extension 21' on the dagger 21, will hold the dagger out of the path of the lever 28 on the forward movement of the lay. When the filling on the bobbin in the active shuttle is substantially exhausted, as shown in Fig. 4, the filling detector 16^a will enter the shuttle as shown, and through the shaft 18, arm 19, connector 20 and extension 21' on the dagger 21, will move the dagger 21 into the path of the lever 28, and the engagement of said dagger, on the forward movement of the lay, with said lever 28, will cause the operation of the selecting mechanism of the magazine above described, and cause the proper bobbin in the magazine to drop down, preparatory to being transferred into the active shuttle. On the next forward movement of the lay, in case there is no change of the shuttles at the box end of the loom, the bobbin is dropped to the lower end of the magazine, through the operation of the re-

leasing mechanism connected with the cradle 43, preparatory to being transferred, and the transferring mechanism is operated and the fresh bobbin transferred into the active shuttle to take the place of the substantially exhausted bobbin therein. During the transferring operation the filling detector 16 is held away from the shuttle, as shown by broken lines in Fig. 5, by the engagement of the dagger 21 with the inwardly extending end 56' on the plate 56, as will be fully understood by those skilled in the art.

It will be understood that the details of construction of my improvements may be varied if desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a weft replenishing loom having a magazine for bobbins or filling carriers at one end, a filling detector mechanism at the magazine end of the loom to detect substantial exhaustion of filling in the active shuttle, comprising a filling detector carried on the lay to engage with the filling in the shuttle, intermediate connections from said filling detector to a dagger carried on the lay, and said dagger, adapted to put into operation mechanism connected with the weft replenishing mechanism on the substantial exhaustion of filling in the active shuttle.

2. In a weft replenishing loom having a magazine for bobbins or filling carriers at one end, a filling detector mechanism at the magazine end of the loom to detect substantial exhaustion of filling in the active shuttle, comprising a filling detector carried on the lay at the rear of the stationary shuttle box, to engage with the filling in the shuttle through an opening in the rear of the stationary shuttle box, intermediate connections from said filling detector to a dagger carried on the lay, and said dagger, adapted to put into operation mechanism connected with the weft replenishing mechanism on the substantial exhaustion of filling in the active shuttle.

3. In an automatic weft replenishing loom having a stationary magazine at one end of the lay with a plurality of compartments or guide-ways for superposed bobbins or filling carriers, and shifting or change shuttle boxes at the other end of the lay, a mechanical filling detecting mechanism located at the magazine end of the loom and on the back of the lay, to detect practical or substantial exhaustion of filling in the active shuttle as the lay comes forward, and to put into operation mechanism to cause a change of filling in said shuttle when it comes under the magazine the next time.

4. In a weft replenishing loom having a magazine for bobbins or filling carriers at one end, a filling detector mechanism at the magazine end of the loom to detect substan-

- 5 tial exhaustion of filling in the active shuttle, comprising a filling detector carried on the lay to engage with the filling in the shuttle, intermediate connections from said filling detector to a dagger carried on the lay, and said dagger adapted to be moved into position to engage a lever connected with the selecting mechanism of the magazine, and said lever.
- 10 5. In a weft replenishing loom having a magazine for bobbins or filling carriers at one end, a filling detector mechanism at the magazine end of the loom to detect substantial exhaustion of filling in the active shuttle, comprising a filling detector carried on the lay to engage with the filling in the shuttle, intermediate connections from said filling detector to a dagger carried on the lay, and said dagger, adapted to be moved into position to engage a lever connected with the selecting mechanism of the magazine, and said
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- 20

lever, and means for adjusting the lateral position of said lever.

6. In a weft replenishing loom having a magazine for bobbins or filling carriers at one end, a filling detector mechanism at the magazine end of the loom to detect substantial exhaustion of filling in the active shuttle, comprising a filling detector carried on the lay to engage with the filling in the shuttle, intermediate connections from said filling detector to a dagger carried on the lay, and said dagger, adapted to be moved into position to engage a lever connected with the selecting mechanism of the magazine, and said lever, and means for engaging and moving said dagger to hold the filling detector out of the shuttle on the transfer of filling.
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