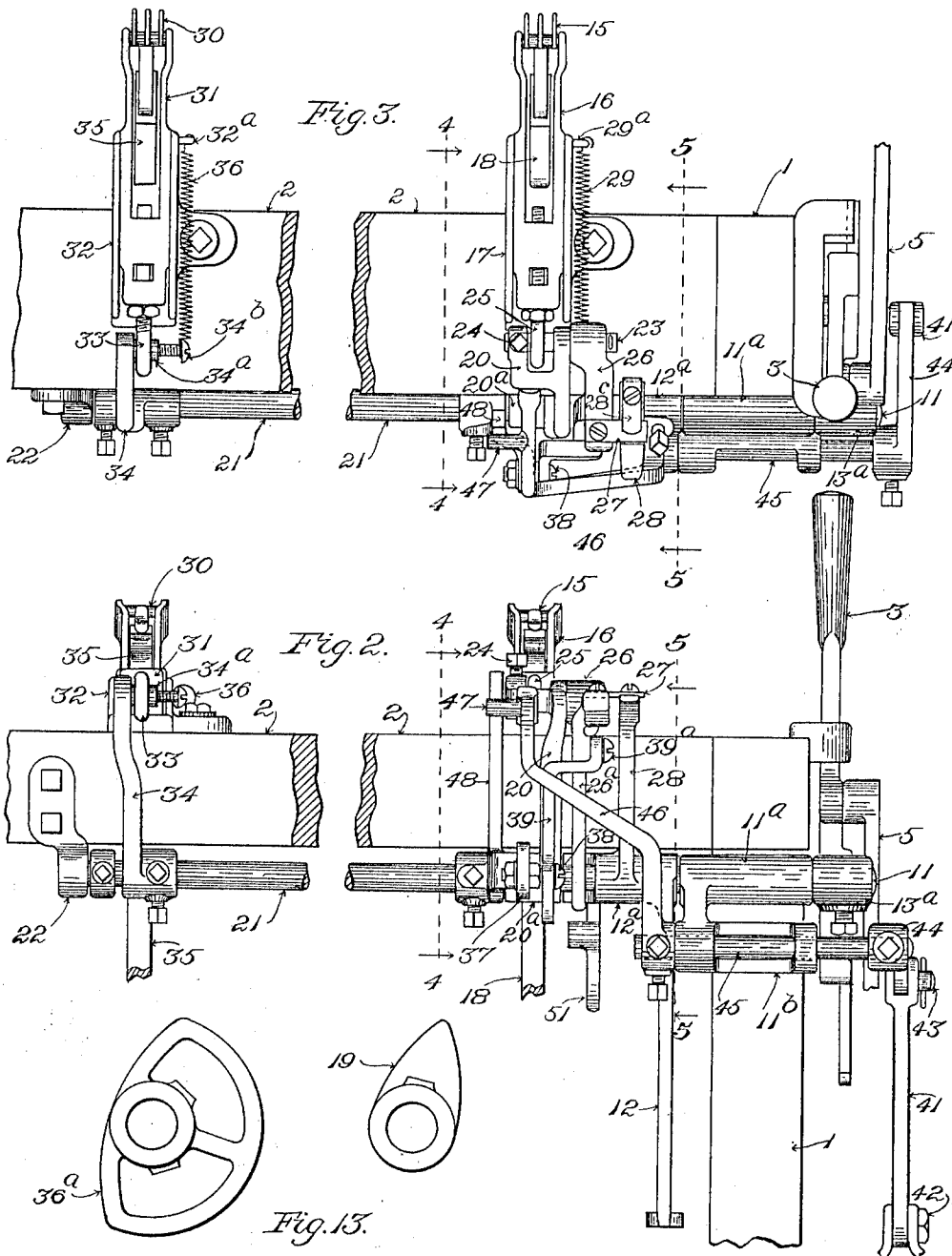


S. S. JACKSON.
 PICK FINDER DEVICE FOR LOOMS.
 APPLICATION FILED JUNE 10, 1909.

1,040,547.

Patented Oct. 8, 1912.

5 SHEETS—SHEET 2.



Witnesses:
 Oscar F. Hill
 Edith J. Anderson

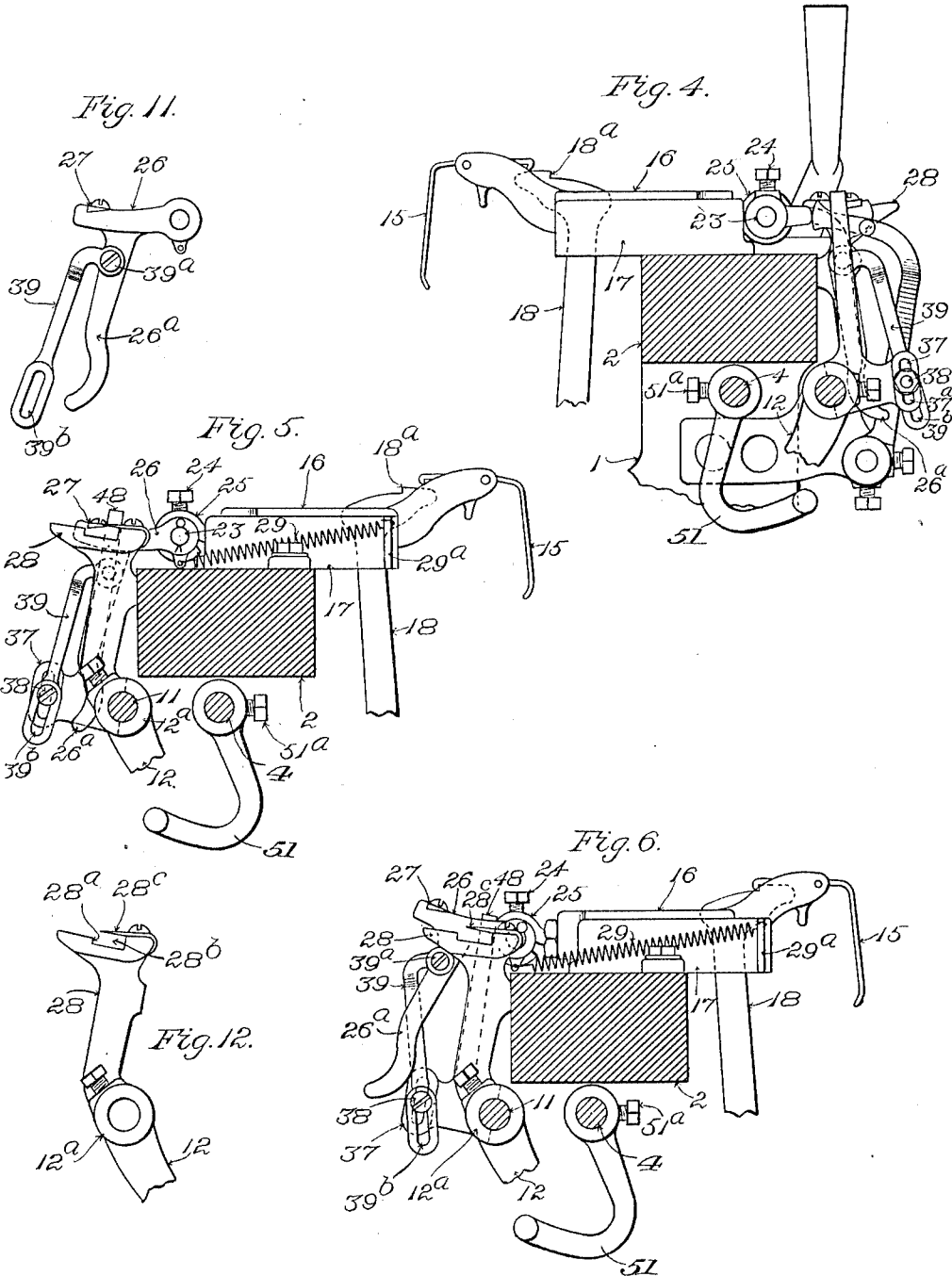
Inventor:
 Simon Schoon Jackson
 by Chas. F. Randall
 Attorney.

S. S. JACKSON.
 PICK FINDER DEVICE FOR LOOMS.
 APPLICATION FILED JUNE 10, 1909.

1,040,547.

Patented Oct. 8, 1912.

5 SHEETS—SHEET 3.



Witnesses:
 Oscar F. Hill
 Edith J. Anderson

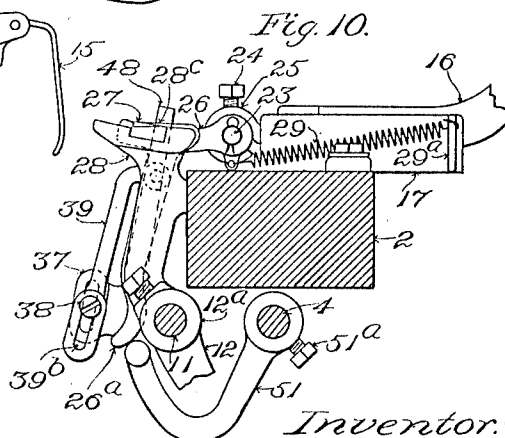
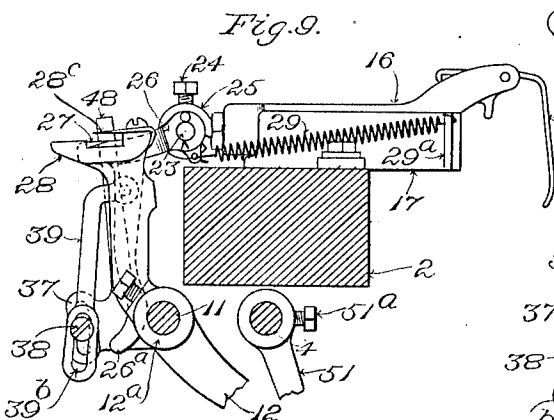
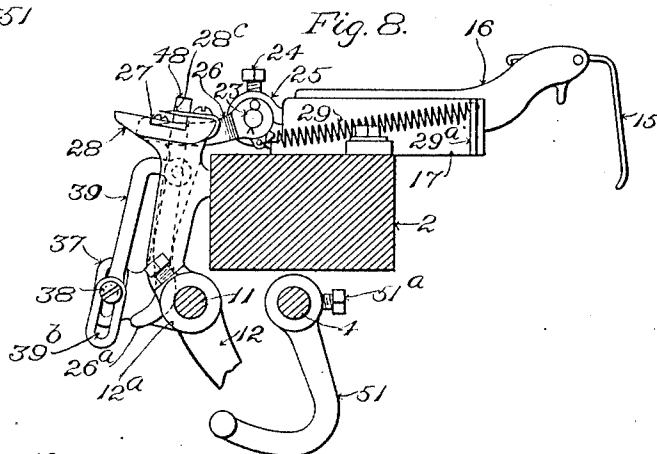
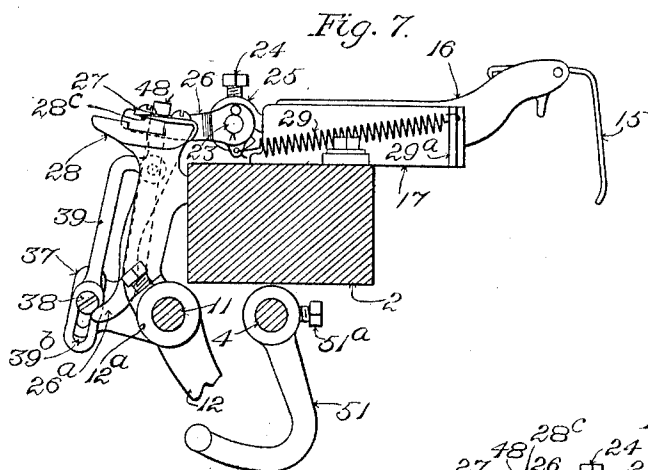
Inventor:
 Simon Schoon Jackson
 by Chas. F. Randall
 Attorney.

S. S. JACKSON.
 PICK FINDER DEVICE FOR LOOMS.
 APPLICATION FILED JUNE 10, 1909.

1,040,547.

Patented Oct. 8, 1912.

5 SHEETS—SHEET 4.



Witnesses:

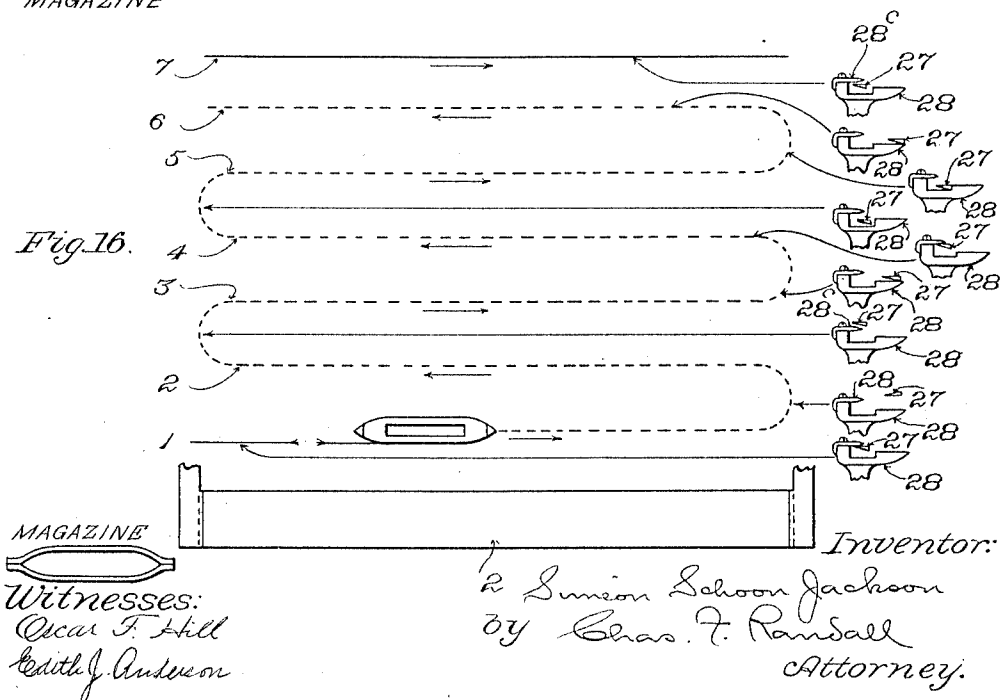
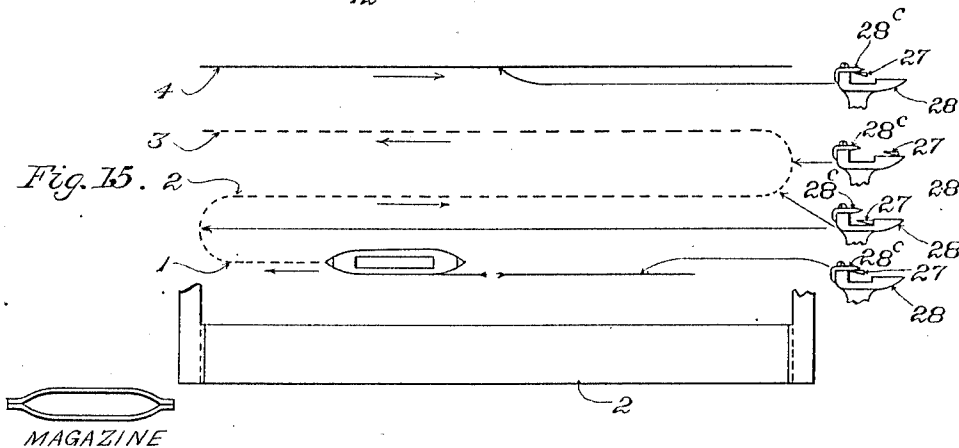
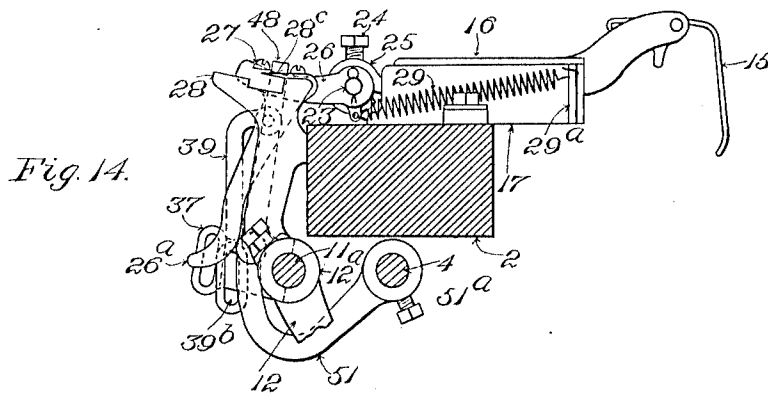
Oscar F. Hill
 Edith J. Anderson

Inventor:

Simon Schoon Jackson
 by Chas. F. Randall
 Attorney.

1,040,547.

5 SHEETS--SHEET 5.



UNITED STATES PATENT OFFICE.

SIMEON SCHOON JACKSON, OF READVILLE, MASSACHUSETTS, ASSIGNOR TO THE STAFFORD COMPANY, OF READVILLE, MASSACHUSETTS, A CORPORATION OF NEW JERSEY.

PICK-FINDER DEVICE FOR LOOMS.

1,040,547.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed June 10, 1909. Serial No. 501,316.

To all whom it may concern:

Be it known that I, SIMEON SCHOON JACKSON, a citizen of the United States, residing at Readville, in the county of Norfolk, State of Massachusetts, have invented a certain new and useful Improvement in Pick-Finder Devices for Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The invention resides in pick-finder devices which are constructed and arranged to operate, in case of deficiency of weft, to cause the first pick after resumption of weaving with fresh weft to be introduced into a reopening of the proper shed to receive it, *i. e.*, in case of failure of weft, the shed in which such failure took place, in whichever direction of pick the failure occurred.

20 The invention provides for tripping automatic weft-replenishing instrumentalities into action, or for automatically tripping the shipper-devices to cause the driving-power to be unshipped to arrest the weaving action, or for tripping the said instrumentalities into action and in addition tripping the shipper devices so that the replenishing operations may be performed while the weaving operation is suspended, the loom being automatically restarted on the completion of the replenishing operations.

30 Embodiments of the invention may be variously constructed, arranged, and combined, and may be employed in looms using various numbers of harnesses and weaving goods with different numbers of shed-formations to the round or repeat of the pattern.

40 The accompanying drawings show an embodiment of the invention which is constructed and contrived for either three-harness weaving or five-harness weaving.

50 In the drawings,—Figure 1 of the drawings shows in side elevation a portion of a loom having an embodiment of the invention applied thereto, the parts being arranged to find the pick in three-harness weaving in case of failure of the weft or filling in a pick in either direction. Fig. 2, Sheet 2, is a front elevation of certain of the parts of Fig. 1. Fig. 3, Sheet 2, is a plan view of the parts of Fig. 2. Fig. 4, Sheet 3, is a view in vertical section in the plane of the dotted lines 4, 4, of Figs. 2 and 3, looking in the direction indicated by the arrows at the ends of such lines. Fig. 5, Sheet 3, is a detail view in section in the plane of the dotted

lines 5, 5, of Figs. 2 and 3, looking in the direction indicated by the arrows at the ends of such lines. Fig. 6, Sheet 3, and Figs. 7, 8 and 9, Sheet 4, are views of the same parts as Fig. 5, showing them in successive positions assumed in operation. Fig. 10 is a view showing the positions of certain of the said parts during the stoppage of the loom. Fig. 11, Sheet 3, is a detail side elevation of the arm 26, tripping dog 27, and link 39. Fig. 12, Sheet 3, is a similar view of the arm 28. Fig. 13, Sheet 2, shows the two cams by which the respective weft-hammers or goose-necks are actuated. Fig. 14, Sheet 5, is a detail view showing the adjustment for five-harness weaving. Fig. 15, Sheet 5, is a diagram illustrating the operation in three-harness weaving when deficiency of weft or filling is detected in the pick toward the magazine side of the loom. Fig. 16, Sheet 5, is a diagram illustrating the operation when deficiency is detected in the pick toward the driving side of the loom.

Having reference to the drawings,—A portion of one side-frame of a loom is represented at 1, Figs. 1, 2, 3, and 4, and portions of the breast-beam are represented at 2, 2, Figs. 2, 3, etc. For the purpose of indicating the relation between the devices in which the invention more immediately resides and the power-controlling devices of the loom, the shipper-handle 3 is represented in Figs. 1, 2 and 3, and the shipper rockshaft on which the shipper-handle is fixed is indicated at 4 in the various views, and Figs. 1, 2 and 3 show a portion of the length of the rod 5 through which the power-shipping and brake devices (not shown) are more immediately controlled from the shipper-handle. The said devices may be substantially as in U. S. Letters Patent No. 945,722, dated January 4, 1910. The shipper-handle is shown in the position that is occupied thereby while the power is applied and the loom is running. To assist in showing one manner in which the pick-finder devices operate to arrest the taking-up of the woven cloth, and also effect the letting-back of the cloth, the worm-gear of the take-up is shown at 6, Fig. 1, its actuating worm at 7, the rotating shaft on which such worm is fixed is shown at 8, and a detent- and let-back pawl of well-known construction is shown at 9, the supporting stud therefor being indicated at 10, such stud being carried by

the bearing 40 for the front end of the worm-shaft 8.

At 11 is the tripping rockshaft from which are tripped into action the instrumentalities that are utilized to produce the required change in the action of the loom. The said tripping rockshaft is supported by a long bearing 11^a, Figs. 3 and 4, forming part of a stand 11^b attached to the front of the side-frame 1. It is shown provided with a finger 12, represented in Figs. 1 and 2, only a portion thereof being shown in the other views, the said finger being fixedly mounted by means of its hub or sleeve 12^a upon the inner end of said rockshaft 11, at the inner side of bearing 11^a. The finger is operatively combined, in practice, as in the case of the finger 43 of the Letters Patent aforesaid, with devices for automatically effecting replenishment of the working weft-supply, so that when the tripping rockshaft and finger are turned the said devices are called into action and thereby the automatic replenishment is brought about. The precise character of the weft-replenishing devices, or mode of operation thereof, is not material so far as the broad principles of the invention are concerned, since such broad principles admit of being employed in connection with various types and constructions of devices of such class, whether contrived to effect replenishment by insertion of a fresh weft-supply into a working shuttle on the lay of a loom, or by replacement of a spent or failed working shuttle by a fresh one. The replenishing devices and the connection of finger 12 therewith may be, for instance, as in the Letters Patent aforesaid. The tripping rockshaft 11 is shown provided also with a lug 13, Fig. 1, fixed by means of its hub 13^a upon the outer end of such rockshaft, at the outer side of bearing 11^a, and arranged to engage a lug or shoulder 14 on the shipper-handle 3. By reason of such engagement, forward turning movement of the tripping rockshaft acts through the lugs 13 and 14 to operate the shipper-handle so as to unship the driving-power of the loom and stop the weaving action. In some cases, the employment of automatic weft-replenishing devices may be dispensed with, and after the loom has been stopped by the turning of the tripping rockshaft the replenishment of the working weft-supply may be effected by hand and the loom restarted by the weaver. So, also, in some cases, as when a dwell in the working of the loom is not required for the performance of the replenishing operations, the said turning movement may be utilized to call the replenishing devices into action without effecting unshipping of the driving power and arrest of the weaving action.

The particular arrangement of parts that is shown in the drawings is more especially

designed for employment in a replenishing loom of the well-known type in which the movement of finger 12 operates to trip a so-called change-shaft into rotation, at the same time that lug 13 trips the shipper-handle to unship the driving-power from the weaving instrumentalities and thereby suspend the weaving action, the change-shaft during its rotation actuating the various replenishing instrumentalities to occasion replenishment during the suspension of the weaving action, and finally restoring the shipper-handle to its former position and shipping-on the driving-power to resume weaving, itself then coming to rest. The side of the loom represented in Fig. 1, being that at which the shipper-handle is located, is the driving side. The magazine containing the reserve weft-supply is located at the opposite side of the loom, namely, at the left-hand side in Figs. 2 and 3.

The drawings show an application of an embodiment of the invention to a two weft-fork loom, although the invention is not necessarily restricted in all instances to the employment of weft-forks at the weft-detectors.

15 is the weft-fork that is employed at the driving side of the loom, it being mounted pivotally upon the rear end of its carrying slide 16, and the latter being supported and guided by the stand 17 fixed upon the breast-beam adjacent the said side. 18 is the actuator (weft-hammer or gooseneck) that coöperates with the said fork 15, the said actuator having the shoulder 18^a which, when the fork 15 is not tilted by the presence of weft or filling between its tines and the corresponding grid of the lay when the lay beats up after the pick to the driving-side, engages the tail 15^a of the said fork and moves the slide 16 forward in its guide-stand 17. At 19, Fig. 13, Sheet 2, is the cam by which actuator 18 is moved at the required time to feel for the tail of the fork 15.

Forward of the slide 16 an arm 20 is mounted by its hub 20^a (Figs. 2 and 3) loosely upon a rod or shaft 21 extending across the loom in line with tripping rockshaft 11. One end of rod or shaft 21 is supported by being entered into the bore of hub or sleeve 12^a of finger 12, and the other end thereof is supported by a bracket 22, Figs. 2 and 3, attached to the breast-beam and having a bearing into which such end of the rod enters. The rearwardly extending upper end of the arm 20 is branched, as shown in Fig. 3, the branches being separated transversely, and in holes made transversely through the two branches a pin 23 is mounted, the said pin being fixed in place by means of a clamping screw 24. A portion of the length of the pin projects at the outer side of the arm. The intermediate

portion of the pin passes through the eye of the forwardly-projecting portion of an eye-bolt 25 having its threaded stem screwed into the front portion of the slide 16. The said eye-bolt constitutes a longitudinally adjustable connection between the slide and the pin and arm.

Upon the projecting portion of the pin 23 an arm 26 shown in detail in Fig. 11, Sheet 3, is hung pivotally. This arm extends forward from the pin, and carries the tripping dog 27, the acting portion of which extends transversely outward above the upper end of an arm 28, shown separately in Fig. 12, Sheet 3, rising from the hub or sleeve 12^a which is fixed, as aforesaid, upon the tripping rockshaft 11. Hinged arm 26 has a downwardly-projecting finger 26^a, which shows most clearly in Fig. 11. If forwardly-acting pressure be applied to this finger it will operate to tilt the arm 26 so as to swing the tripping dog 27 upward above the upper end of arm 28, as in Fig. 16, Sheet 5. A contracting spiral spring 29, Figs. 1 and 3, having its rear extremity engaged with a lateral ear 29^a on the rear end of guide-stand 17 and its forward extremity engaged with a downwardly-extending ear of the hub-portion of arm 26, aids gravity in causing said arm and dog to tend to swing downward, and also acts with a tendency to draw the weft-fork-carrying slide 16 rearward and hold arm 28 in contact with the front surface of the breast-beam. The upper end of arm 28 is formed with a shoulder 28^a see more particularly Fig. 2, Sheet 3, at the rear of which is a pocket 28^b, the said pocket being partly covered by a lip 28^c constituted by a strip of metal which is fastened to the top of the said arm at the rear of the notch and projects forwardly over the latter. The clearance between the front end of the lip and the shoulder is sufficient to permit the dog 27 to pass in and out, and the depth of the pocket at the rear of the shoulder 28^a is sufficient to accommodate the dog. Should the dog occupy the pocket as in Fig. 8 at a time when the actuator 18 in moving forward engages by its shoulder 18^a with the tail 15^a of weft-fork 15 so as to move slide 16, arm 26, and the dog 27 toward the front, the engagement of the said dog with the shoulder 28^a will cause the arm 28 to move forward also, as in Fig. 9, turning the tripping rockshaft 11 so as to call the replenishing instrumentalities into action, or throw the shipper-handle so as to arrest the weaving action, or accomplish both results, as the case may be. Normally, however, the dog occupies a position elevated above the shoulder 28^a, as in Fig. 5, so that in making its first forward stroke it does not engage with the shoulder, and does not take arm 28 with it, but leaves the latter at rest.

When the parts are arranged and combined for three-harness weaving, the time of engagement of the dog 27 with the shoulder 28^a is controlled by means of the weft-fork 30, Figs. 2 and 3, located at the side of the loom opposite the driving side, namely, the magazine side of an automatic weft-replenishing loom.

31 is the carrying slide of weft-fork 30, and 32 is the guide-stand for the said slide, fixed upon breast-beam 2. The eye of the eye-bolt 3 adjustably applied to the front end of the slide 31 is engaged with a projection 34^a extending transversely from an arm 34 fixed upon the cross-shaft 21, so that as the slide moves forward and rearward in its guide-stand 32 on the breast-beam the said rod or shaft 21 shall be rocked. The actuator (weft-hammer or gooseneck) for the weft-fork 30 is shown at 35, Figs. 2 and 3, and the actuating cam 36^a for such actuator is shown in Fig. 13, Sheet 2. Engagement of the shoulder of the said actuator with the tail of the weft-fork 30 as the actuator is swung forwardly by the action of its cam 36^a, such engagement being permitted in consequence of absence of weft or filling from between the tines of such fork and the grid on the lay as the lay swings forward after the pick of the shuttle from the driving-side of the loom to the side at which fork 30 is located, will rock the shaft 21 forwardly. As the actuator swings rearwardly again, the slide 31 also is moved in the same direction, and the shaft 21 is rocked rearwardly, through the action of a contracting spiral spring 36, which has one end thereof engaged with a fixed ear 32^a projecting from the rear end of guide-stand 32, and the other end thereof engaged with a screw 34^b applied to the projection 34^a on the arm 34. Spring 36 holds the slide 31 normally in its rearward position, and the arm 34 drawn rearward close to the front surface of the breast-beam. An arm 37 fixed on cross-shaft 21 at the driving side of the loom is thereby held in an elevated position. For three-harness weaving the said arm 37 is provided with a laterally projecting screw-stud 38, the stem of which is arranged to work in a longitudinal slot 39^b in a link 39 having its upper end connected by a pivot 39^a (shown best in Figs. 6 and 11, Sheet 3) to the finger 26^a of arm 26. By engagement with the wall at the upper end of such slot the said screw-stud lifts the link and the arm 26 with its dog 27, and supports them in an elevated position so long as arm 37, aforesaid, retains its normal elevated position. The normal position of the dog 27, which it occupies while the weft-fork-slide 31 at the magazine side of the loom occupies its normal rearward position, is slightly elevated above shoulder 28^a of arm 28, and in

contact with the under surface of lip 28^c, as in Fig. 5, Sheet 3, the dog being pressed upward against the said under surface by the tensile force of the spring 36, transmitted through arm 34, cross-rod or shaft 21, arm 37, screw-stud 38, and link 39, to the arm 26 on which the dog is fixed. To enable the dog to be set to act as required with relation to the other parts, the screw-stud 38 is made vertically adjustable upon arm 37 by mounting it adjustably in a vertically-elongated slot 37^a in the said arm, as shown best in Fig. 4.

The means herein shown for arresting the taking-up action, and letting-back, whenever either weft-detector initially indicates weft-deficiency, comprises the vertically-movable bearing 40, Fig. 1, which receives the front end of the worm-shaft 8 and also carries the supporting stud 10 of the detent- and let-back pawl 9, the link 41, Figs. 1, 2 and 3, having its lower end pivotally connected to the said bearing at 42 and its upper end pivotally connected at 43 to a rearwardly projecting arm 44 fixed on the outer end of a short transversely-extending rockshaft 45 mounted in bearings in the stand 11^b, an arm 46 fixed upon the inner end of the rockshaft 45 and extending upward therefrom with its free upper end in contact with the transverse front surface of the branched upper end of the loose arm 20 which is connected to weft-fork slide 16, a projection 47 extending transversely from arm 46 toward the middle of the width of the loom, and an arm 48 fixed upon cross-rod or shaft 21 and extending up close behind the projection 47. Forward turning movement of rockshaft 45 will act through arm 44 and link 41 to raise the take-up worm 7 out of engagement with the teeth of the take-up worm-gear 6, so as to discontinue the driving of the latter and leave it free to recoil to the extent permitted by the detent- and let-back pawl 9. This action will take place in the operation of the loom, whichever weft-detector and its slide is initially advanced by the corresponding actuator. The fork 15 and its slide 16 will thus turn the rockshaft 45 by imparting forward movement to arm 20 so as to carry it against the arm 46 of said rockshaft and press the latter arm forward, and the fork 30 and its slide 31 will thus turn the said rockshaft in consequence of the forward turning movement of cross-rod or shaft 21 and its arm 48, causing such arm to engage with projection 47 of the said arm 46 of the rockshaft and press arm 46 forward. Whichever weft-detector acts first to detect weft-deficiency, it will operate to raise worm 7 out of engagement with worm-gear 6. Thereafter, each time the actuator 35 advances it will advance the weft-fork slide 31 and further suspend the taking-up action, and so on

until the counting of picks for the pick-finding has been completed. The deficiency of weft or filling having been remedied, the normal working of the weft-detectors will permit the taking-up devices to act regularly again.

The operation in pickfinding is hereinafter explained in detail.

Accidents sometimes happen in the case of automatic weft replenishing looms employing a change-shaft, as aforesaid, in consequence of the weaver inadvertently tripping the change-shaft into action while engaged in making adjustments, or in repairing warp or web, after having stopped the loom by hand by throwing the shipper-handle. If the weaver, in turning the loom over by hand, should inadvertently trip the change-shaft into action while his attention is occupied with the adjustments or repairs he is making, and the change-shaft should effectuate the replenishment and then in usual manner restart the weaving instrumentalities of the loom, he might be caught and injured. I employ a safe-guard or safety-device which, when the shipper-handle assumes the position in which the driving power of the loom is unshipped, moves the dog 27 into an inoperative position and holds it there so long as the shipper-handle remains in such position, so that in case the weaver in turning over the loom should bring about an advance of the weft-work 15 and its slide 16 and the arms 20 and 26, the said dog will miss the shoulder 28^a of arm 28, and consequently the advancing movement of the dog will have no effect in restarting the loom. To this end, the shipper rockshaft 4 has fixed thereon under the breast-beam a finger 51 having a transversely broadened free extremity adapted for engagement with the finger 26^a. This finger is so set upon the rockshaft 4 that, while the shipper-handle occupies the position shown in Figs. 1 to 4, into which it is moved for the purpose of shipping-on the driving-power, the said extremity is withdrawn downward and rearward from the said finger, leaving the finger 26^a and arm 26 free to swing without interference on the part of the finger 51, and the dog 27 capable of dropping into position to engage shoulder 28^b. When, however, the shipper-handle is moved to unship the driving-power so as to stop the loom, the turning of the shipper-rockshaft 4 carries the finger 51 around so that its extremity touches the finger 26^a, as in Fig. 10, Sheet 4, and in case arm 26 is down and the dog in position to engage with the shoulder 28^a tilts arm 26 upward so as to raise the dog above the shoulder 28^a and against the under side of the lip 28^c. So long as finger 51 occupies the position in which it is shown in Fig. 10 the dog cannot drop behind the shoulder. Consequently, if the weaver in

turning the loom by hand in making adjustments, or repairing the warps or web, should cause the actuator 18 to engage the tail of weft-fork 15 and move slide 16 and arms 20 and 26 forward, no harm can result, because in the uptilted position of the arm 26 the dog 27 will pass forward above shoulder 28^a without engaging therewith. I thus avoid danger of injury to the weaver.

10 The operation, in three-harness weaving, of the devices which have been described, is as follows:—The stud 38 is set so that the dog shall occupy normally the position in which it is shown in Fig. 5, Sheet 3, and in
15 connection with pick 1 in Fig. 15, Sheet 5. In case failure of weft or filling should take place on the pick from the driving side of the loom to the opposite (magazine) side thereof, so that there is no weft or filling
20 laid in the shed in position to be carried against the tines of the fork 30 at the latter side when the lay beats up following such pick, the said fork will remain untilted. The first portion of the advance of the actu-
25 ator (weft-hammer or gooseneck) 35 carries it far enough to take hold of the tail of fork 30 and push the slide 31 forward partway. This movement of the slide carries forward
30 the arm 34 of the cross-rod or shaft 21, and turns such cross-rod or shaft so as to lower the arm 37 of the latter and permit the arm 26 and its dog 27 to descend from their normal position shown in Fig. 5, wherein dog
35 27 is elevated above shoulder 28^a and in contact with the under side of lip 28^c, to their position shown in Fig. 8, Sheet 4, wherein the dog is in position to engage with the shoulder. This latter position of the dog is
40 represented in connection with pick 2 in Fig. 15. The said turning of the cross-rod or shaft also acts, through the engagement of its upwardly-extending arm 48 with the transverse projection 47 of the arm 46 of the rockshaft 45, to turn the said rockshaft so
45 as to cause it, through its connections with bearing 40 of the take-up shaft 8, to raise the latter shaft and disengage the worm 7 thereof from the teeth of the worm-gear 6, thereby arresting the take-up and permit-
50 ting the take-up devices to let-back to the extent allowed by the let-back pawl 9. Meanwhile, the succeeding shed has been opened and the shuttle picked back through such second shed from the magazine side to
55 the driving side. The cam 36^a of the magazine side completes the forward stroke of the actuator 35 and the dwell portion of such cam holds the actuator forward, keeping the slide 31 forward and the cross-rod
60 or shaft 21 turned so that the dog 27 remains down in the notch or pocket of the arm 28, and in position to engage with the shoulder 28^a, as above described. The lay now comes forward a second time and the
65 actuator (weft-hammer or gooseneck) 18 at

the driving side is advanced* by the action of its actuating cam 19, Fig. 13, while the actuator 35 at the magazine side retains its advanced position. There being no weft or filling in the shed to tilt the weft-fork 15 at the driving side of the loom, the shoulder 18^a of the advancing actuator 18 takes hold of the tail 15^a of the said weft-fork, so that the slide 16 on which the said weft-fork is pivoted is moved forward, carrying forward
70 the arms 20 and 26. The forward movement of arm 20 would cause it to act against the arm 46, but at this time the latter is being held forward by arm 48 of cross-rod or shaft 12 to continue holding the take-up shaft and its worm 7 in their uplifted position, main-
75 taining thereby the suspension of the taking-up action. As the arm 26 goes forward the dog 27, through its engagement with the shoulder 28^a, acts to move the arm 28 forward, as shown in Fig. 9, thereby turning the tripping rockshaft 11 so as, by means of
80 finger 12, to trip the replenishing instrumentalities into action, and by means of projection 13, to trip the shipper-handle so as to unship the driving power of the loom and apply the brake. As the shipper-handle and shipper-rockshaft are turned to effect the said unshipping, the finger 51 touches
85 the finger 26^a of the arm 26, turning the latter arm so as to raise the dog 27, lifting it out of the pocket of arm 28, permitting arm 28, as shown in Fig. 10, to swing rearward relative to the dog as shown in Fig. 15 at the beginning of the third pick. The mo-
90 mentum of the loom causes the opening of the third shed and the picking of the shuttle through such shed from the driving side to the magazine side, and the loom comes to rest with the shuttle in the shuttle-box at the magazine side. It will be perceived that,
95 beginning with the shed which failed to receive a proper weft or filling, and the picking of the shuttle through the said shed and incidental failure of the weft or filling, three
100 sheds have been opened, which is the number comprised in a round of the pattern, and there have been three picks of the shuttle, ending with the shuttle in the shuttle-box at the magazine side. The next shed to be
105 opened, namely, the fourth, is a repetition of the one in which failure of the weft or filling took place. Therefore, the shuttle being in the required box to permit replenishment to be effected, and it being assumed that re-
110 plenishment has been effected, the first pick following replenishment will be through the said reopened first shed, into which weft will be laid, and consequently the sequence of the pattern will be preserved without any
115 break due to absence of weft or filling from one of the sheds. As the shipping rockshaft 11 is automatically rocked to ship on the driving power for the purpose of restarting the loom, the finger 51 is lowered from its
120
125
130

position in Fig. 10 to its position in Fig. 5, out of reach of finger 26^a. Following the said pick to the magazine side there will be an advance of the actuator 35 at such side, and slide 34 will be moved forward as before, turning cross-rod or shaft 21 so as to lower the arm 26 and dog 27, and also raise the taking-up worm, but the weft that is laid in the fourth shed by the first pick after replenishment will tilt the fork 15 at the driving side so that the actuator 18 will advance idly, and as actuator 35 moves rearward the dog 27 will be returned to its starting position in Fig. 5, as shown in connection with pick 4 in Fig. 15, and the take-up worm will be lowered into mesh with take-up gear 6, and the normal action of the loom will be resumed.

It will be perceived that the action of the weft-detector devices at the magazine side of the loom in the operation just described is in part to leave the dog 27 free to assume its engaging position so that when, following the opening of the next shed and the pick from the magazine side, the weft-detector devices at the driving side of the loom operate, imparting forward movement to the said dog, the dog is effective to trip the replenishing instrumentalities into action and also trip the shipper-handle so as to bring about a stoppage of the weaving action for the purpose of enabling the replenishing operation to be conveniently performed. As previously referred to herein, in a loom of the class employing a change-shaft the latter automatically acts to ship on the driving power again and restart the weaving action after the replenishment has been consummated. In case failure of weft or filling should take place on the pick toward the driving side of the loom, the weft-fork 15 will remain untilted as the lay beats up. At the beginning of such pick the dog 27 occupies its normal position shown in connection with the unbroken part of pick 1 in Fig. 16, namely above the shoulder of arm 28, and pressing upward against the under side of lip 28^c. In the advance of the actuator (weft-hammer or gooseneck) 18 its shoulder 18^a will engage the tail 15^a of the weft-fork 15 and move the weft-fork slide 16 forward, moving forward with it the arms 20 and 26. Arm 20 in going forward will act against the arm 46 to swing the latter forward and turn the rockshaft 45 to arrest the taking-up and occasion the letting-back. The front portion of arm 26 is supported normally by the contact of the upper wall of slot 39^b in the link 39 with the stem of the stud 38 carried by the arm 37 of the cross-rod or shaft 21, and the upward pressure that is transmitted through the said stud from the spring 36 of weft-fork slide 21 tends to lift the arm and its dog. Consequently, as arm 26 goes forward such arm

swings upon the said stud 38 as a pivot, and the dog 27 will advance out from under the lip 28^c, Fig. 5, passing over the shoulder 28^a, and assuming in the forward portion of its stroke the elevated position in which it is shown in Fig. 6 and at the conclusion of the first pick in Fig. 16. As soon as the dog 27 clears the lip 28^c in its forward movement, the tensile force of the spring 36 will cause the said arm 26 and its dog 27 to rise so that as the actuator 18 moves rearward in the loom, permitting the spring 29 to draw the weft-fork slide 16 rearward to its original position, the dog 27 will pass back over the forward end of the lip 28^c, as shown in Fig. 7, and at the conclusion of the second pick in Fig. 16, and remain there. The second shed having been opened and the shuttle picked therethrough to the magazine side of the loom, the lay comes forward again. The actuator (weft-hammer or gooseneck) 35 being also advanced, the hook of the said actuator takes hold of the tail of the fork 30, which is untilted, owing to the absence of weft or filling from the said shed, and moves the slide 31 forward part way, swinging arm 34 forward and thereby turning cross-rod or shaft 21 and lowering the arm 37 and its stud 38 so that the said stud no longer supports the link 39 and arm 26, leaving the dog 27 resting upon the top of lip 28^c. The forward turning movement of the cross-rod or shaft 21 also causes its arm 48 to act against the projection 47 of arm 46 to keep the rockshaft 45 in its forwardly turned position and the taking-up worm 7 disengaged. The third shed having been opened, the shuttle picked therethrough to the driving side again, and the lay caused to beat up, the actuator 18 at the latter side is again caused to advance so as to engage with the tail of the weft-fork 15 and move forward the slide 16 and arms 20 and 26 once more. This movement of arm 20 is an idle one because arm 48 of cross-rod or shaft 21 is at this time acting against the arm 46 to continue the suspension of the taking-up action. The said forward movement of arm 26 carries the dog 27 forward from the lip 28^c, and as at this time arm 37 and its stud 38 are depressed the dog is permitted to drop upon the extension of the arm 28 in front of the shoulder 28^a, as shown at the conclusion of pick 3 in Fig. 16. As the actuator 18, slide 16, and arms 20 and 26 move rearwardly again, the dog 27 passes into the pocket 28^b of the arm 28 under the lip 28^c. As cam 36^a releases the actuator 35, permitting it to move backwardly to allow spring 36 to draw weft-fork slide 31 rearwardly, such spring operates to cause stud 38 to be raised so that it acts upwardly against the upper end of the slot 39^b of link 39, and presses the dog 27 upward against the under side of

lip 28^c as in Fig. 5, and as shown at the beginning of pick 4, Fig. 16. Following the opening of the fourth shed, the pick of the shuttle back from the driving side through such shed to the magazine side, and the beat-up of the lay, the actuator 35 at the magazine side comes forward once more, engaging the tail of the untilted fork 30, advancing the slide 31, and again rocking the cross-rod or shaft 21 so as to lower the stud 38 and permit the arm 26 and its dog 27 to descend from their position in Fig. 5 to their position in Fig. 8, and also at the conclusion of pick 4 in Fig. 16. The arm 48 also acts against projection 47 of arm 46 to lift the taking-up worm 7 again. Following the opening of the fifth shed, the pick of the shuttle therethrough from the magazine side to the driving-side, and the advance of the lay in beating-up, the actuator 18 advances, takes hold of the tail of the weft-fork 15, moving forward the slide 16 and arms 20 and 26 once more, the arm 20 again acting idly, and in this advance of the arm 26 the dog 27, being permitted to engage with the shoulder 28^a, acts against the said shoulder to carry forward the arm 28 as in Fig. 9, and at the conclusion of pick 5 in Fig. 16, turning the tripping rockshaft 11, and thereby tripping the replenishing instrumentalities into action, and also tripping the shipper-handle to arrest the weaving action, the turning of the shipper-handle and its rockshaft causing finger 51 to disengage the dog 27 from the shoulder of arm 28, permitting such arm to swing rearward relative to the dog as at the beginning of pick 6 in Fig. 16. The momentum of the loom keeps the weaving instrumentalities in motion until the sixth shed has been opened and the shuttle picked therethrough from the driving side to the magazine side, when the parts come to rest with the shuttle in the shuttle-box at the magazine-side of the loom, in readiness for enabling the first pick after replenishment to take place from such side through the seventh shed, which is a reopening of the shed in which failure took place. Consequently, the weaving is resumed without break in the pattern. The automatic turning of the shipper rockshaft 11 to bring about the resumption of weaving will lower finger 51 to its normal position in Fig. 5, the dog remaining in its normal position shown in connection with pick 7 in Fig. 16.

For five-harness weaving I remove the screw-stud 38 and thereby deprive the weft-detector (30) at the magazine side of the loom of its control over the dog. This does not interfere with the control of such weft-detector over the taking-up and letting-back. I may also, and in practice preferably will, remove the link 39. Also, as shown by Fig. 14, Sheet 5, I adjust the

curved safety-finger 51 by means of its clamping screw 51^a around somewhat upon the shipper-rockshaft 4 into a position thereon which will enable such finger by its engagement with the finger 26^a of arm 26, when the dog 27 in advancing has carried forward the arm 28 and caused the shipper to be moved to unship the driving power, to tilt the arm 26 high enough to raise the dog 27 above the lip 28^c, so that as the arm 26 and dog 27 move rearward after having been thus raised, the dog will pass back on top of the lip.

Assuming the parts to be arranged as just described for five-harness weaving and the shipper rockshaft 11 to have been turned to lower the finger 51 the operation is as follows:—In case failure of weft or filling should take place on the pick from the driving side of the loom to the magazine side thereof, the weft-fork 30 will remain untilted as the lay beats up. By the engagement of the advancing actuator 35 with the tail of such fork the slide 31 will be pushed forward, the arm 34 will be swung forward and the cross-rod or shaft 21 will be rocked, so that by means of its arm 48, acting against the transverse projection 47 of the arm 46 of the rockshaft 45, the latter rockshaft will be rocked to arrest the taking-up and effect the letting-back. The second shed having been opened and the shuttle picked therethrough from the magazine side to the driving side, the lay advances a second time but the fork 15 remains untilted. The advancing actuator 18 at the driving side takes hold of the tail of the weft-fork 15, moving forward the slide 16 and the arms 20 and 26. This forward movement of the arm 20 is an idle one. As arm 26 moves forward the dog 27 goes forward off the end of the lip 28^c. As the actuator 18, slide 16, and arms 20, 26, move rearward again in the loom, the dog 27 passes back under the lip 28^c into a position corresponding with that occupied by it in Fig. 8. The third shed having been opened, the shuttle picked therethrough from the driving side to the magazine side, and the lay caused to beat-up, the same action of the fork at the magazine side, etc., is repeated, and the suspension of the taking-up is continued. The fourth shed having been opened, the shuttle picked therethrough from the magazine side to the driving side, and the lay caused to beat-up, the weft-fork 15 remains untilted as before and is engaged by the advancing actuator 18, and the slide 16 and arms 20 and 26 are advanced again. This time the dog 27 acts against the shoulder 28^a of the arm 28 and carries the said arm forward, turning the tripping rockshaft 11 and tripping the replenishing instrumentalities into action and also tripping the shipper-handle to unship the driving power. The loom continuing to

run for an interval under momentum, the fifth shed is opened and the shuttle is picked through such shed to the magazine side and remains in the shuttle-box at such side when the loom comes to rest. The shuttle is now in proper position for replenishment and to be picked through the sixth shed after replenishment, the sixth shed being a reopening of the first, *i. e.*, the one in which failure of filling or weft occurred. As the shipper-rockshaft is turned to effect the shipping, which turning occurs almost instantaneously and while the actuator 18, slide 16, and arms 20 and 26 are in the forward position into which they have been moved, the finger 51 flies up into contact with the finger 26^a, and strikes the arm 26 upward so as to raise the dog 27 higher than the front end of the lip 28^c. As now the said actuator, slide, and arms move rearward in the loom, the dog 27 automatically resumes its starting position on top of the lip 28^c. In case failure of weft should take place on a pick from the magazine side to the driving side, the actuator 18 at the latter side, in its advance following the beat-up of the lay after such pick, will engage the untilted fork 15 and move slide 16 and arms 20, 26, forward, carrying dog 27 forward from the top of the lip 28^c so that it drops upon the forward portion of the head of arm 28, and causing the take-up worm to be raised to arrest the taking-up and effect the letting-back. The rearward movement of the said actuator, slide and arms will carry the dog back under the lip 28^c so that it will drop behind shoulder 28^a, and also lower the take-up worm. Following the opening of the second shed, the pick from the driving-side to the magazine-side, and the beat-up of the lay, the actuator 35 in its advance will engage the tail of the untilted weft-fork 30 and move slide 31 and arm 34, rocking cross-rod 21 and raising the take-up worm again, holding it elevated for a time. Following the opening of the third shed, the pick from the magazine-side to the driving-side, and the beat-up of the lay, the actuator 18 will engage the tail of the untilted fork 15 and moving slide 16 forward as before will cause the dog 27 to act against the shoulder 28^a of arm 28, so as to turn the tripping rockshaft 11 and trip the replenishing instrumentalities into action and also trip the shipper-handle to unship the driving-power. The momentum of the loom causing the opening of the fourth shed, and the picking of the shuttle therethrough, the loom will come to rest after the fourth pick with the shuttle in the shuttle-box at the magazine side, in readiness for replenishing. The first pick after replenishing will be through the fifth shed, such being a reopening of the fifth shed of that repeat of the pattern which had just been completed prior

to the failure of weft or filling. Consequently, two picks of weft will be contained in such shed, although for a portion of the width of the cloth such two picks may be separated by an intervening portion of a pick of weft contained in that portion of the first shed which received a portion of the pick that failed. This irregularity, however, will not be conspicuous in goods woven in a sateen weave with five harnesses, and as it will not occur very frequently the goods will not be marked down in quality on account thereof.

What is claimed is:—

1. In a loom, in combination, weft-detector devices detecting for picks to the respective sides of the loom, a dog which is advanced by the said devices when the latter find weft-deficiency on the pick in one direction a member which when engaged by the advancing dog is actuated to bring about the required result in the working of the loom, and means normally acting to prevent such engagement but actuated by the weft-detector devices to permit the dog to engage when the said devices find weft-deficiency on the pick in the other direction.

2. In a loom, in combination, weft-detector devices detecting for picks to the respective sides of the loom, a dog which is advanced by the said devices when the latter find weft-deficiency on the pick in one direction, a member having a shoulder to be engaged by the said dog, and which, when such shoulder is thus engaged, is actuated by the dog to bring about the desired result in the working of the loom, and means normally acting to prevent the dog from engaging the shoulder, but actuated by the weft-detector devices to permit the dog to engage when the said devices find weft-deficiency on the pick in the other direction.

3. In a loom, in combination, weft-forks respectively detecting for picks in the respective directions, a dog which is advanced when one of such weft-forks detects failure of weft on the pick in one direction, a member which when engaged by the advancing dog is actuated to bring about the required result in the working of the loom, and means normally acting to prevent such engagement but actuated under control of the other weft-fork when the latter detects failure of weft on the pick in the other direction to permit the engagement to occur.

4. In a loom, in combination, weft-forks respectively detecting for picks in the respective directions, weft-fork carriers, a dog operatively connected with one of such carriers and actuated by the movement of the latter when the corresponding fork detects weft-failure on the pick in one direction, a member which when engaged by the advancing dog is actuated to bring about the required result in the working of the loom,

dog-controlling means operatively combined with the other weft-fork carrier, by which engagement of said dog and said member is prevented normally, and operated by such carrier to permit such engagement when the corresponding weft-fork detects weft-failure on the pick in the opposite direction.

5. In a loom, in combination, weft-detectors respectively detecting for picks in the respective directions, slides with which such detectors are combined, a dog operatively connected with one of such slides and actuated by movement of the latter taking place when the corresponding detector detects weft-failure on the pick in one direction, a member which when engaged by the advancing dog is actuated to bring about the required result in the working of the loom, a rockshaft extending transversely of the loom, operatively combined with the said dog to control its engagement with the said member, and operated by the slide of the other weft-detector to permit such engagement when the latter weft-detector detects weft-failure on the pick in the opposite direction.

6. In a loom, in combination, weft-detectors respectively detecting for picks in the respective directions, a dog operatively combined with one of such weft-detectors and actuated when such weft-detector detects weft-failure on the pick in one direction, a member which when engaged by the dog, when the latter is actuated, is made operative to bring about the required result in the working of the loom, a spring operatively combined with the said dog and acting to hold the same normally in non-engaging position, and means actuated by the other weft-detector, when the latter detects weft-failure on the pick in the other direction, to cause such dog to engage with the said member, to actuate the latter.

7. In a weft-replenishing loom, the combination with a member which when actuated is operative to call the replenishing instrumentalities into action, a dog normally ineffective to engage and actuate the said member, and weft-detector devices acting for picks from the magazine side of the loom and actuating said dog in case of weft-deficiency in a pick in such direction, of weft-detector devices acting for picks toward the magazine side of the loom and in case of weft-deficiency occurring first on a pick in such direction rendering the said dog effective to engage and actuate the member aforesaid.

8. In a loom, the combination with a member which when actuated is operative to arrest the weaving action, a dog normally ineffective to engage and actuate the said member, and weft-detector devices acting for picks toward one side of the loom and actuating the said dog in case of weft-de-

ficiency on a pick in such direction, of weft-detector devices acting for picks toward the opposite side of the loom and in case of weft-deficiency occurring first on a pick in such direction rendering the said dog effective to engage and actuate the member aforesaid.

9. In a loom, the combination with a member which when actuated is operative to arrest the weaving action, a dog normally ineffective to engage and actuate the said member, weft-fork devices acting for picks toward one side of the loom and actuating the said dog in case of weft-failure on a pick in such direction, of weft-fork devices acting for picks toward the opposite side of the loom and in case of weft failure occurring first in a pick in such direction rendering the said dog effective to engage and actuate the said member.

10. In a loom, in combination, weft-detector devices detecting for picks to one side of the loom, a dog which is advanced by the said devices when the latter detect weft-deficiency, a member which when engaged by the advancing dog is actuated to bring about the required result in the working of the loom, means normally acting to prevent such engagement, and weft-detector devices detecting for picks to the opposite side of the loom, and when weft-deficiency is ascertained thereby operating the said means to permit the dog to engage.

11. In combination, a weft-detector, a dog operatively connected therewith and actuated on detection of weft-deficiency by such weft-detector, and a tripping-member having a shoulder and adjacent lip for co-action with the said dog.

12. In combination, a weft-detector, a laterally-projecting dog operatively connected with the said weft-detector and actuated on detection of weft-deficiency by such weft-detector, and a tripping-member having a shoulder with which said dog in its advance may engage, and also having a lip under or over which the dog may pass.

13. In combination, a weft-detector detecting for picks in one direction, a dog operatively connected therewith and actuated on detection of weft-deficiency by such weft-detector on picks in such direction, a tripping-member having a shoulder and also having an adjacent lip under or over which the said dog may pass, and a weft-detector detecting for picks in the opposite direction, in operative control of the said dog, and permitting it to engage the said shoulder as a result of weft-deficiency on picks in the latter direction.

14. In combination, a weft-detector detecting for picks in one direction, a dog operatively connected therewith and actuated on detection of weft-deficiency by such weft-detector on picks in such direction, a trip-

ping-member having a shoulder and also having an adjacent lip under and over which the dog may work, and a weft-detector detecting for picks in the opposite direction, in operative control of the said dog.

15 15. In pick-counting devices for looms, in combination, a weft-detector detecting for picks to one side of the loom, a dog operatively connected therewith and actuated in
20 case of weft-deficiency on a pick to such side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip to control the action of the dog, a weft-detector detecting for picks to the other side
25 of the loom, and means normally acting to prevent engagement of the dog with the shoulder and actuated by the latter weft-detector in case of weft-failure on a pick to the latter side to permit such engagement to
30 take place in the working of the dog.

16. In pick-counting devices for looms, in combination, a weft-detector detecting for picks to one side of the loom, a dog operatively connected therewith and actuated in
25 case of weft-deficiency on a pick to such side, a transmitting member having a shoulder for engagement by the dog and a lip which controls the action of the dog, a weft-detector detecting for picks to the other side of
30 the loom, means normally acting to prevent engagement of the dog with the shoulder and actuated by the latter weft-detector in case of weft-deficiency on a pick to the latter side to permit such engagement to take place
35 in the working of the dog, and means to restore the dog to normal position.

17. In pick-counting devices for looms, in combination, a weft-detector detecting for picks to one side of the loom, a dog operatively connected therewith and actuated in
40 case of weft-deficiency on a pick to such side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, a
45 weft-detector detecting for picks to the other side of the loom, means normally acting to prevent engagement of the dog with the shoulder and actuated by the latter weft-detector in case of weft-failure on a pick to
50 the latter side to permit such engagement to take place in the working of the dog, and a tripping member actuated by the said transmitting member and which restores the dog to normal position for restarting.

55 18. In pick-counting devices for looms, in combination, weft-detector devices detecting for picks to the respective sides of the loom, a dog actuated under control of said devices in case of weft-deficiency on a pick
60 to one side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, means normally acting to prevent engagement of the dog with the shoulder and
65 actuated by the weft-detector devices in case

of weft-failure to permit such engagement to take place in the working of the dog, and means to restore the dog to normal position for restarting.

19. In pick-counting devices for looms, in combination, weft-detector devices detecting for picks to the respective sides of the loom, a dog actuated under the control of said devices in case of weft-deficiency on a pick to one side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, means normally acting to prevent engagement of the dog with the shoulder and actuated by the weft-detector devices in case of weft-deficiency on a pick to the other side to permit such engagement to take place in the working of the dog, and a tripping member actuated by the said transmitting member and restoring the dog to
85 normal position for restarting.

20. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, and means for restoring the dog to normal starting position.

21. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, and a member actuated by the said transmitting member to bring about a change in the action of the loom and restoring the dog to normal position for restarting.

22. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, and a shipper actuated by the said transmitting member and restoring the dog to normal position for restarting.

23. In pick-counting devices for weft-replenishing looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the said dog and a lip which controls the action of the dog, said member serving to trip the replenishing instrumentalities into action, and a shipper actuated by the said transmitting member and acting to restore the dog to normal position for restarting.

24. In pick-counting devices for looms, in combination, weft-detector devices detecting for picks to the respective sides of the loom, 130

a dog actuated under control of said devices in case of weft-deficiency on a pick to one side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, means normally acting to prevent engagement of the dog with the shoulder and actuated by the weft-detector devices in case of weft-deficiency on a pick to the other side to permit such engagement to take place in the working of the dog, and a shipper actuated by the said transmitting member and restoring the dog to normal position for re-starting.

25. In pick-counting devices for weft-replenishing looms, in combination, weft-detector devices detecting for picks to the respective sides of the loom, a dog actuated under control of said devices in case of weft-deficiency on a pick to one side, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, said member serving to trip the replenishing instrumentalities into action, means normally acting to prevent engagement of the dog with the shoulder and actuated by the weft-detector devices in case of weft-deficiency on a pick to the other side to permit such engagement to take place in the working of the dog, and a shipper actuated by the said transmitting member and restoring the dog to normal position for restarting.

26. In pick-counting devices for weft-replenishing looms, in combination, a weft-detector detecting for picks to one side of the loom, a dog actuated in case of weft-deficiency indicated by such weft-detector, a transmitting member for tripping weft-replenishing instrumentalities into action, having a shoulder for engagement by the dog and a lip which controls the action of the dog, a weft-detector detecting for picks to the other side of the loom, means normally acting to prevent engagement of the dog with the shoulder and actuated by the latter weft-detector in case of weft-deficiency on a pick to the latter side to permit such engagement to take place in the working of the dog, and a shipper actuated by the said transmitting member and restoring the dog to normal position for restarting.

27. In combination, a weft-detector detecting for picks in one direction, a dog actuated on detection of weft-deficiency by such weft-detector on picks in such direction, a take-up arresting device also thus actuated, a tripping member having a shoulder and also having an adjacent lip under and over which the dog may work, and a weft-detector detecting for picks in the opposite direction, in operative control of the engagement of the dog with the shoulder, and also operatively combined with the said

take-up arresting device to actuate the latter.

28. In a loom, in combination, weft-forks at opposite sides of the loom, movable carriers therefor, a dog operatively combined with one of said carriers and actuated thereby, a transmitting member having a shoulder adapted to be engaged and operated by the said dog and a lip which controls the action of the dog, means combined with the other carrier and controlling the engagement of the dog with the said shoulder, and a take-up arresting shaft independently actuated by each of the respective carriers.

29. In a loom, in combination, weft-forks at opposite sides of the loom, movable carriers therefor, a dog operatively combined with one of said carriers and actuated thereby, a transmitting member having a shoulder adapted to be engaged and operated by the said dog and a lip which controls the action of the dog, a take-up arresting shaft having an arm by which it is actuated through advance of one of the said carriers, and a cross-rod which is rocked by the advance of the other carrier and having an arm which engages the said arm of the said arresting shaft to actuate the latter.

30. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, and means to restore the dog to normal starting position, adjustable to vary the said starting position relative to the lip, to thereby vary the count preceding actuation of the said member.

31. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member having a shoulder adapted to be engaged by the dog and a lip which controls the action of the dog, a tripping member actuated by the said transmitting member, and a device actuated by said tripping member to restore the dog to normal starting position, adjustable to vary the said starting position relative to the lip, to thereby vary the count preceding actuation of the said members.

32. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in case of weft-deficiency, a transmitting member deriving its actuation from the said dog, counting devices by which such action is caused to take place after a predetermined number of picks, and adjusting means to vary the count to a different number of picks.

33. In pick-counting devices for looms, in combination, weft-detector devices, a dog actuated under control of the said devices in

case of weft-deficiency, a transmitting member actuated by the said dog, counting devices by which such action is caused to take place after a predetermined number of 5 movements of the dog, and adjusting means to vary the number of movements taking place before actuation of the transmitting member.

34. In a loom, in combination, a weft-detector, a dog actuated under the control thereof, a member having a shoulder adapted to be engaged by the dog and a lip which controls the engagement, and a shipper and a device connected therewith which renders 15 the dog ineffective to actuate the said member while the shipper is unshipped.

35. In a loom, in combination, a weft-detector, a dog actuated under the control thereof, a member having a shoulder adapted to be engaged by the dog and a lip which controls the engagement, a shipper, a shipper-rockshaft, and a finger carried by said rockshaft which throws said dog out of 20 engaging position while the shipper is unshipped.

36. In a loom, in combination, a weft-detector, a dog actuated under the control thereof, a tripping-member adapted to be engaged by the dog and actuated by the latter, a rest which normally holds said dog 35 out of engaging position, a shipper, and means whereby when the shipper is unshipped the dog is prevented from assuming the said engaging position.

37. In a loom, in combination, a weft-fork, a weft-fork slide, a tripping member, a dog through which the said member derives motion from the slide, a rest which normally holds said dog out of engaging 40 position, a shipper, and means acting when the shipper is unshipped to prevent the dog from assuming the said engaging position.

38. In a loom, the combination with a weft-detector, and a tripping device, of a 45 dog in connection with one of such elements and a shoulder and rest in connection with

the other thereof with which said dog interacts, the said rest retarding engagement of the dog and shoulder with each other, and the dog entering between the rest and 50 shoulder in the interaction of the parts, and the said engagement resulting in actuation of the tripping device.

39. In a loom, the combination with a weft-detector, and a tripping device, of a 55 dog in connection with one of such elements and a lip and shoulder in connection with the other thereof with which the dog interacts, the said lip retarding engagement of the dog and shoulder with each other, and 60 the dog entering between the lip and shoulder in the interaction of the parts, and the said engagement resulting in actuation of the tripping device.

40. In a loom, the combination with a 65 weft-detector, and a tripping device adapted to be operated under the control thereof, of a dog in connection with one of such elements and a shoulder and rest in connection with the other thereof with which said dog 70 interacts, the said rest controlling the normal relations of the dog and retarding engagement of the dog and shoulder with each other, and the said engagement resulting in actuation of the tripping device. 75

41. In a loom, the combination with a weft-detector, and a tripping device adapted to be operated under the control thereof, of a dog in connection with one of such elements and a lip and shoulder in connection 80 with the other thereof with which the dog interacts, the said lip controlling the normal relations of the dog and retarding the engagement of the dog and shoulder with each other, and the said engagement resulting in 85 the actuation of the tripping device.

In testimony whereof I affix my signature in presence of two witnesses.

SIMEON SCHOON JACKSON.

Witnesses:

CHAS. F. RANDALL,
EDITH J. ANDERSON.