W. WILLIAMSON & J. COLLINSON.

WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED MAY 7, 1904.

899,586. **Patented Sept. 29, 1908.**

2 SHEETS—SHEET 1.

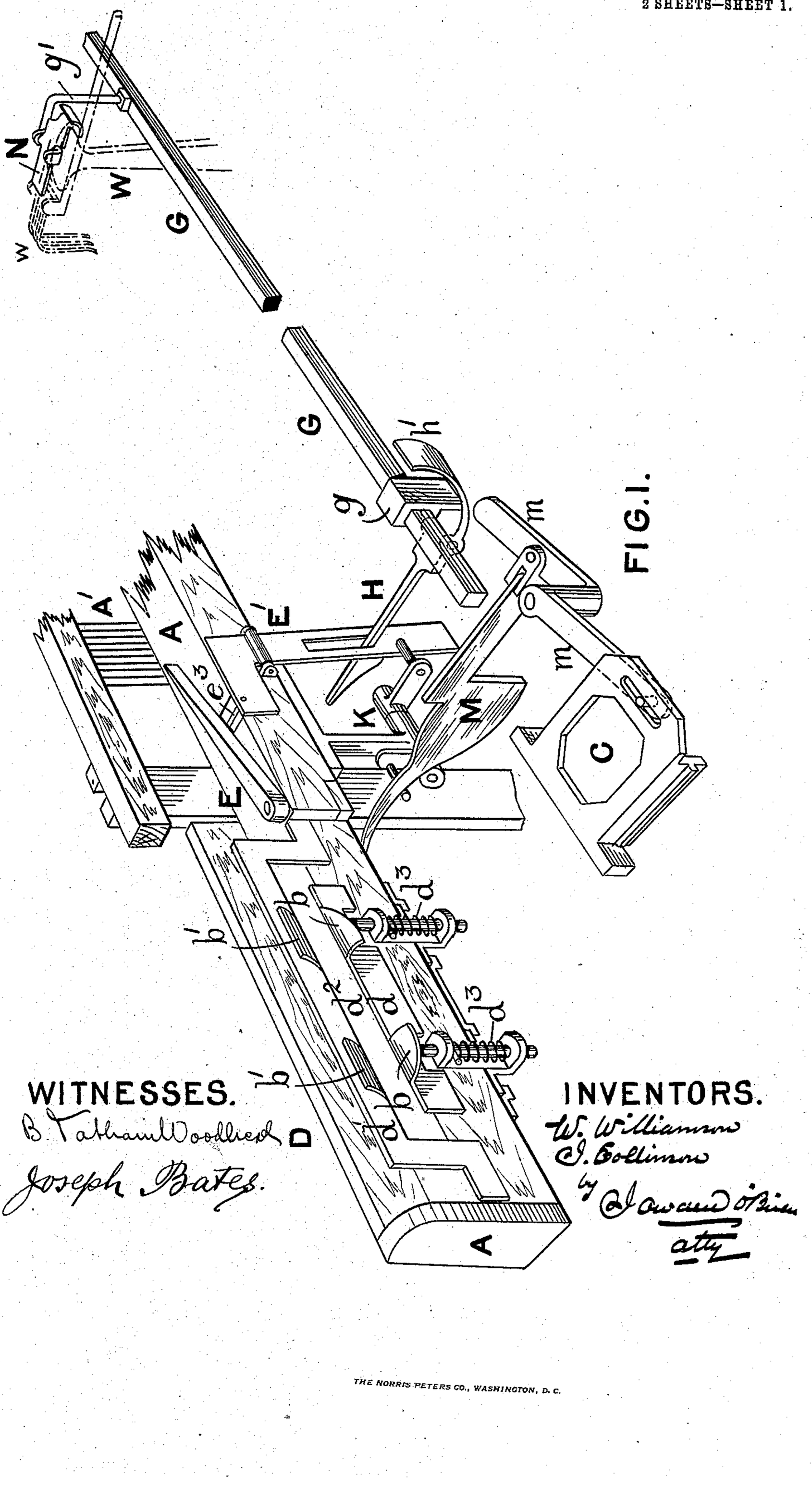

FIG. I.

WITNESSES.

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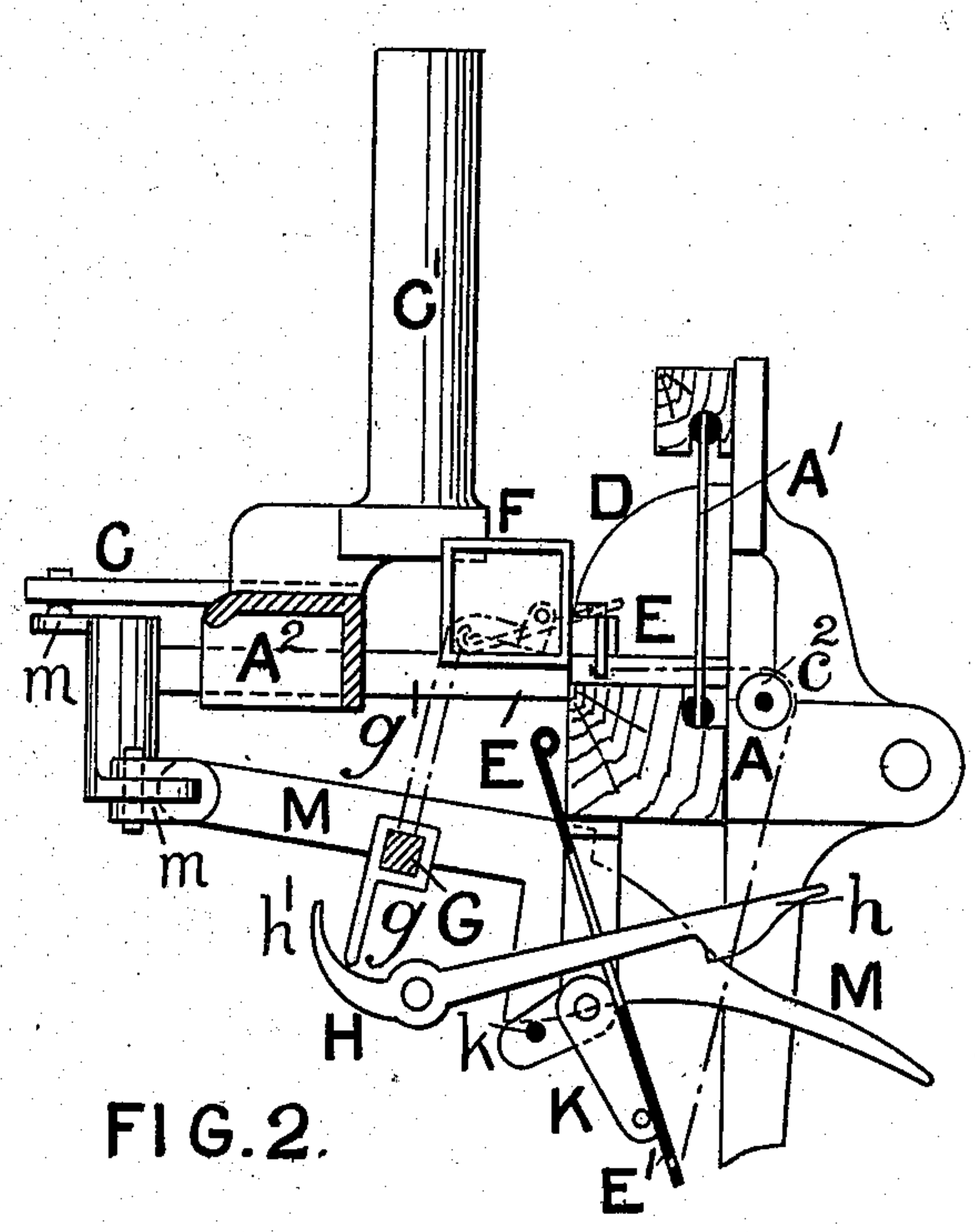

FIG. 2.

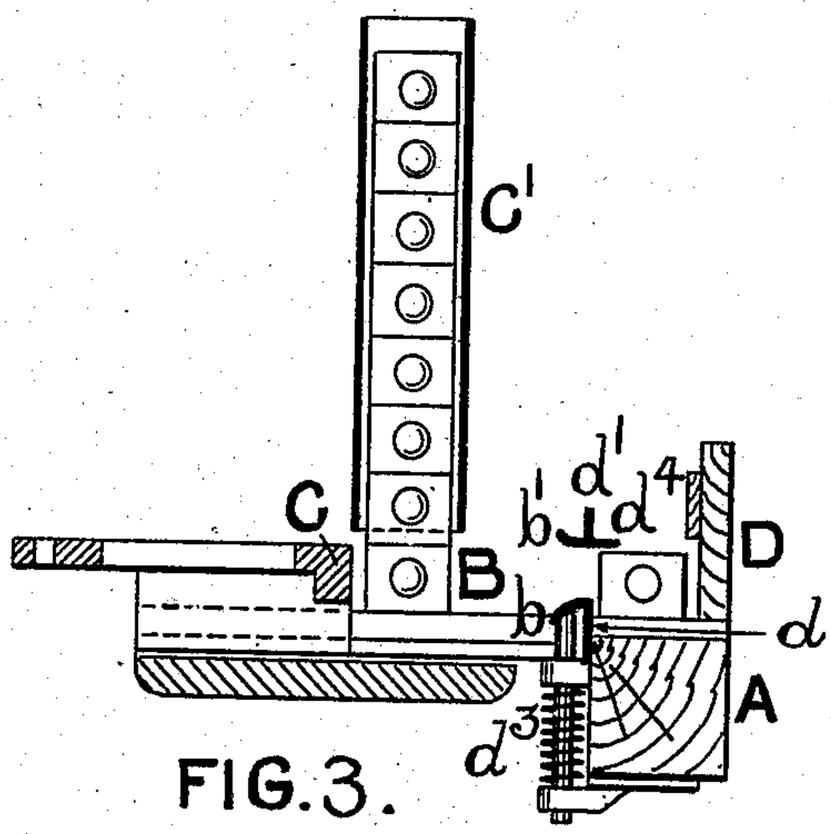

FIG. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

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WEFT-REPLENISHING MECHANISM FOR LOOMS.

No. 899,586. Specification of Letters Patent. Patented Sept. 29, 1908.

Application filed May 7, 1904. Serial No. 206,958.

To all whom it may concern:

Be it known that we, WILLIAM WILLIAMSON and JOHN COLLINSON, British subjects, and residents of Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Weft-Replenishing Mechanism for Looms, of which the following is a specification.

This invention relates to mechanism for changing the shuttles in looms on the failure or absence of weft, and is designed to provide a simple and effective mechanism for discharging or ejecting the spent shuttles from the shuttle box, and for supplying fresh shuttles thereto.

It consists essentially (1) in constructing the shuttle box with an opening in the front, sufficiently wide to admit the shuttle, and a sliding front divided into two parts, one part or both parts moving vertically to admit the shuttle through the opening, and closing again to retain the shuttle in position during working; (2) a pivoted or swiveling lever in the shuttle race capable of being turned across the shuttle race to divert the shuttle from its path, and eject the shuttle down an inclined chute placed at the side; (3) and mechanism for operating the ejecting lever and for operating the pusher which forces the fresh shuttle into the shuttle box operated by the forward movement of the slay, when the shuttle is nearly exhausted, or the weft yarn breaks.

The invention will be fully described with reference to the accompanying drawings, in which sufficient of a loom is shown to illustrate the invention.

Figure 1. perspective view of the several parts which constitute the invention shown in relative positions. Fig. 2. transverse section through the slay and breast beam of the loom showing the operative parts of the invention in normal working position at the "beat up" of the slay. Fig. 3. detail section through the shuttle box and shuttle magazine, after the "beat up" of the slay as in Fig. 2.

The slay A, the reed A′, the breast beam A^2, the weft hammer W, and the parts of the loom not shown in the drawings are all of the usual construction and operated in the usual way.

The shuttle box D at one end of the loom, is constructed with the back and bottom of the usual form, and with the front in two parts d d', with a space d^2 between them through which a shuttle B can be passed into the shuttle box. The space d^2 is not sufficiently wide when in working or normal position to admit the shuttle, and therefore one of the parts, preferably the bottom front part d, is made to move or slide vertically downwards to receive the shuttle B, and upwards again to retain the shuttle in position in the shuttle box when working. The part d is held in position by the springs d^3 against the pressure of which it is moved downwards, and by which it is raised again when the shuttle is passed through (see Fig. 3).

The lower part d and the upper part d' of the shuttle box front are provided with inclined projections or lugs b b' which direct (or guide), the shuttle B between them, and serve to press the movable part d downwards to admit the shuttle as it is forced forward by a pusher C, and the upper part is also provided with a strip d^4 to prevent the shuttle turning over.

The shuttles B are stored in a magazine C′, erected on the breast beam A^2 in front of the shuttle box D, and the shuttles are delivered therefrom to the shuttle box as required by the reciprocating slide or pusher C.

At or near the front edge of the mouth of the shuttle box D, a turning or switch lever E is placed. This lever can be pivoted to be drawn diagonally across the shuttle race (see Fig. 1), for the purpose of preventing the shuttle entering the shuttle box D, and ejecting the spent shuttle from the loom. Or the lever may be placed in a diagonal slot and raised vertically into the path of the shuttle. The shuttle is deflected into a chute with an inclined bottom affixed to the front of the slay A, down which the shuttle travels into a suitable receptacle. The chute is open at one side and is placed in front of the shuttle race inclined towards the end of the slay to deliver the shuttle, the position in front of the slay and shuttle race being such as not to be caught between the slay and the breast beam.

The turning or switch lever E, is pivoted at one end, and the other end is free to be drawn or moved horizontally across the shuttle race. The movement of the switch lever E is effected by a lever E′ connected to it by a cord or band passing over a grooved pulley c^2 rotating on a stud affixed to the slay, the lever being pivoted to the front of the slay A. It is returned to and held in normal position by a spring. Or the lever

E′ may be connected direct to the switch lever E, by a link by which it is moved across the shuttle race as the lever is drawn forward by the hook H, the lever E′ being pushed back by a spring and pusher. In a modification the switch lever is set in a slot and raised by an arm, attached to the lever E′ placed below an incline on the underside of the switch lever. The movement given to the switch lever E to eject the spent shuttle from the loom, and the movement given to the pusher C to project a fresh shuttle into the shuttle box, are obtained direct from the oscillating movement of the slay A, the parts being brought into operative position to engage the slay by the movement of a rod G, rocked by the movement of the weft hammer W.

Pivoted below the rod G, is a hooked lever H with a hook *h* at one end, and a projecting tail piece *h′* at the other. The hooked lever H projects through a slot e^2 in the lever E′ and the hook *h* is held up out of contact or engagement with the edge of the slot or pin e^2 by the finger *g* on the rocking rod G, depressing the tail piece *h′*. (See Fig. 2.) When the rod is rocked to the position shown in Fig. 1. the lever H falls and the hook *h* engages the lever E′. As the slay recedes the lever E′ is held by the hook, causing the switch lever E to be drawn across the shuttle race to eject the shuttle. A bell crank lever K is pivoted to a bracket below the slay one arm of which lever rests against the lever E′ and the other arm under a lever M. The movement of the lever E′ moves the bell crank lever K, and brings the pin *k* under the lower side of a lever M of irregular shape, and lifts it into the path of the slay A, so that at the next forward stroke or "beat up" the slay comes into contact with the lever M, and carries it along with it.

The lever M is connected to a horizontal lever *m* which at its other end is connected with the pusher C, so that each time the lever M is forced along by the slay, the pusher C is propelled in the reverse direction to meet the advancing shuttle box D, and propel a shuttle B from the magazine into the shuttle box. The pusher C and levers M and *m* are drawn back again when the slay recedes by the spring connected to the lever *m* by a band. Thus, by the turning or rocking of the shaft G, the mechanism to eject the spent shuttle is first set in motion, and thereby the mechanism to insert a fresh shuttle into the shuttle box is subsequently operated, so that a fresh shuttle cannot be inserted before the other has been ejected.

The rocking rod G extends along the front of the loom, and is operated from the weft hammer W when the weft breaks or is absent. The rod G at the weft fork end carries a projecting arm or finger *g′*, upon which a rocking lever N is pivoted which can be raised into the path of the weft hammer W, by any suitable mechanism, and when it is so raised the weft hammer rocks the shaft G, and by moving the finger *g* brings the shuttle changing mechanism into operating position. The pivoted rocking lever N of the rocking rod G may be brought into operation by a lever or otherwise when the yarn is nearly exhausted in the shuttle.

If it is desired to change the shuttle when the yarn is broken or absent, this can be done by connecting the upright finger of the rocking shaft G with the horizontal lever, by means of a bracket, so that each time the weft fork *w* engages the weft hammer W, the shaft G is rocked and the shuttle changing mechanism brought into operation. A notch is cut out of the lever so as to clear the knocking off handle and not stop the loom.

What we claim as our invention and desire to protect by Letters Patent is:—

1. In weft replenishing mechanism for looms, the combination with the loom slay A, the reed A′, the breast beam A^2, a shuttle magazine C′ mounted on the breast beam, and shuttle box D, of a pusher C sliding upon guides to propel the shuttle, a shuttle box front in two parts *d d′* provided with a space d^2 between them through which the shuttle is injected, means for positioning the shuttle pusher C to be operated by the slay and means for ejecting the spent shuttle.

2. In weft replenishing mechanism for looms, the combination with the breast beam A^2 a shuttle magazine C′ mounted thereon a pusher C and mechanism for positioning the shuttle pusher C to be operated by the slay of the shuttle box D, the front plate *d′* fitted thereto, the front plate *d* mounted on brackets with a space d^2 between the said plates and capable of sliding up and down, the springs d^3 to retain the plate in normal position.

3. In weft replenishing mechanism for looms, the combination with the loom slay A, the reed A′, the breast beam A^2, a shuttle magazine C′ mounted on the breast beam, and shuttle box D, of a pusher C sliding upon guides to propel the shuttle, a shuttle box front in two parts *d d′* provided with a space d^2 between them through which the shuttle is injected, means for positioning the shuttle pusher C to be operated by the slay and a switch lever E placed diagonally across the slay A in front of the shuttle box to move horizontally to deflect the spent shuttle and eject it from the loom.

4. In weft replenishing mechanism for looms, the combination with the loom slay A, the reed A′, the breast beam A^2, a shuttle magazine C′ mounted on the breast beam, and shuttle box D, of a pusher C sliding upon guides to propel the shuttle, a shuttle box front in two parts *d d′* provided with a space d^2 between them through which the shuttle

is injected, means for positioning the shuttle pusher C to be operated by the slay, a diagonal switch lever on a vertical pivot, on the slay to deflect and eject the spent shuttle, means by which the oscillating movement of the slay operates the pusher and deflector, and means for throwing such mechanism into operation on the failure of the weft thread.

5. In weft replenishing mechanism the combination with the shuttle magazine C′ pusher C, and deflecting lever E, of a pivoted lever *m* connected to the pusher, and operating lever M connected with the pusher lever *m* an operating lever E′ connected with the deflecting lever E to move it into the path of the shuttle, a hooked lever H engaging with the operating lever E′, a connecting lever K to connect the lever E′ with the lever M to raise the latter into the path of the slay, a longitudinal shaft G, a finger *g* on one end to engage the hooked lever H, and a finger g^2 on the opposite end to engage the weft stop motion.

6. In weft replenishing mechanism, the mechanism for controlling the operation of the shuttle injector and the shuttle ejector, comprising a longitudinal bar G oscillated by the weft stop motion on the failure of the weft thread, a finger on one, a hooked lever, controlled by a finger on said bar, an operating lever caught by the hook and held against the backward movement of the slay to move the shuttle ejecting lever, and a second lever simultaneously lifted into the path of the slay, and operated by the next forward movement of the slay to inject a fresh shuttle into the shuttle box.

7. In weft replenishing mechanism for looms, the combination with a rod rocked by the weft stop motion on the failure of the weft, of a lever pivoted to the slay which is drawn back as the slay recedes a shuttle ejector operated thereby, and a second lever pivoted to the loom frame which is raised and pushed forward by the advancing slay and shuttle injector operated thereby substantially as described.

8. In weft replenishing mechanism, the combination with the weft stop motion, of a rock shaft, a hooked lever on a fixed pivot which is raised or lowered as the shaft rocks and a lever pivoted to the slay with which the hook engages and a shuttle ejector operated by said lever as the slay recedes, substantially as described.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses.

WILLIAM WILLIAMSON.
JOHN COLLINSON.

Witnesses:
J. OWDEN O'BRIEN,
H. BARNFATHER.