

E. S. STIMPSON.
 AUTOMATIC WEFT REPLENISHING LOOM.
 APPLICATION FILED NOV. 12, 1907.

964,580.

Patented July 19, 1910.

3 SHEETS—SHEET 1.

FIG. 1.

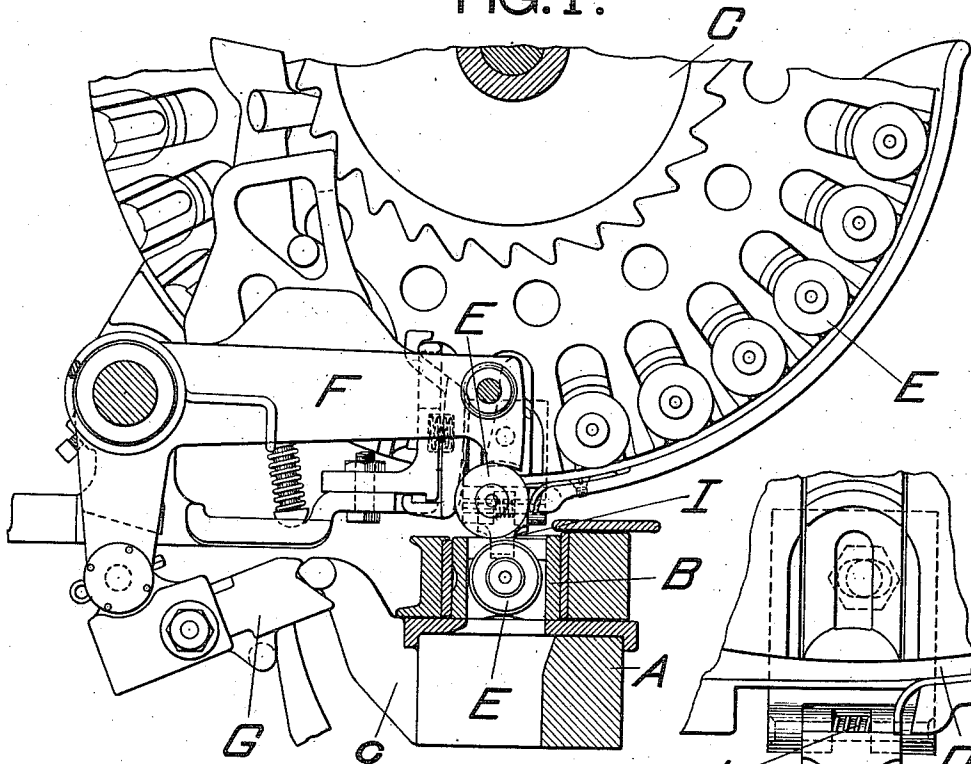


FIG. 2.

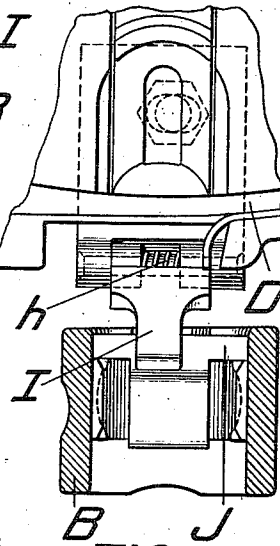
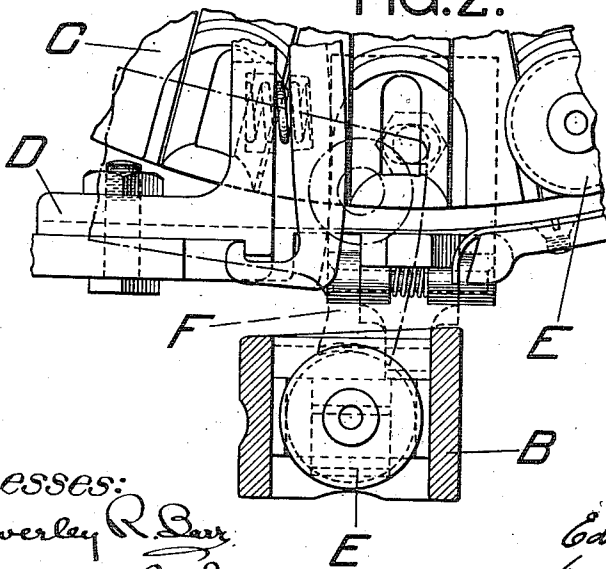


FIG. 3.

Witnesses:
 Beverly R. Barr
 Eugene W. Bond.

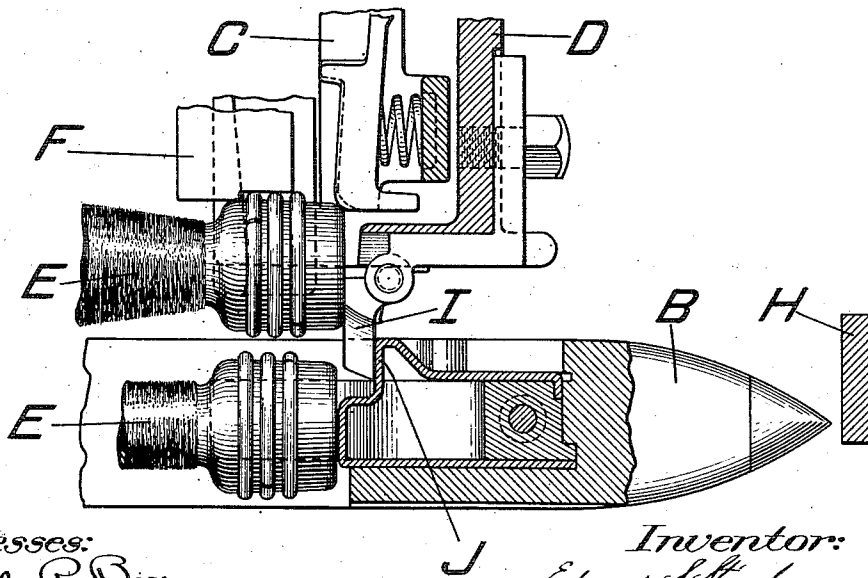
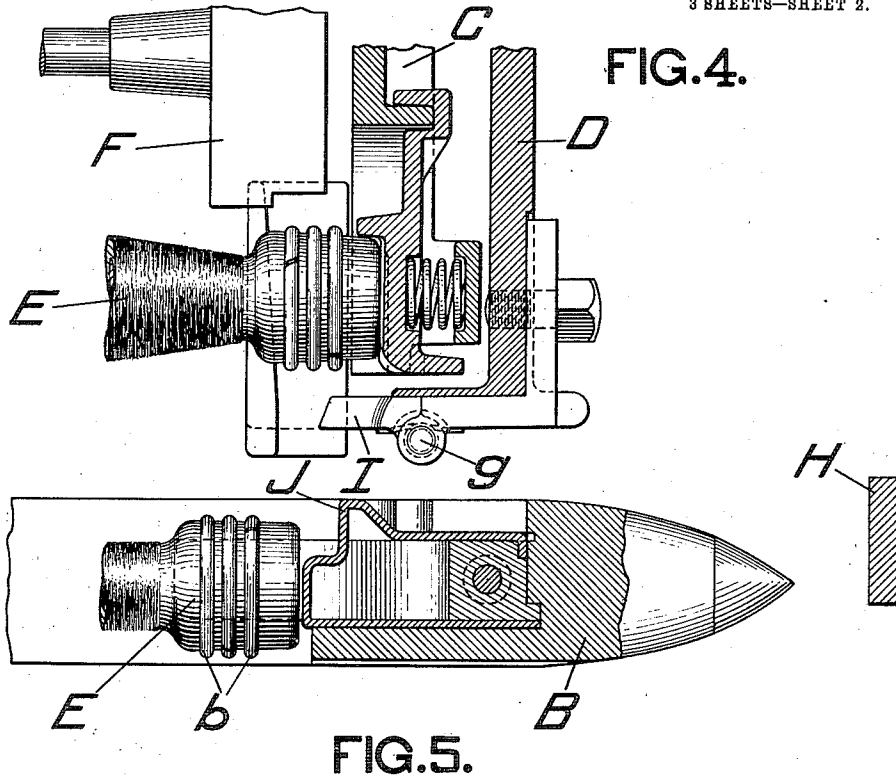
Inventor:
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 His Attorney

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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

FIG. 6.

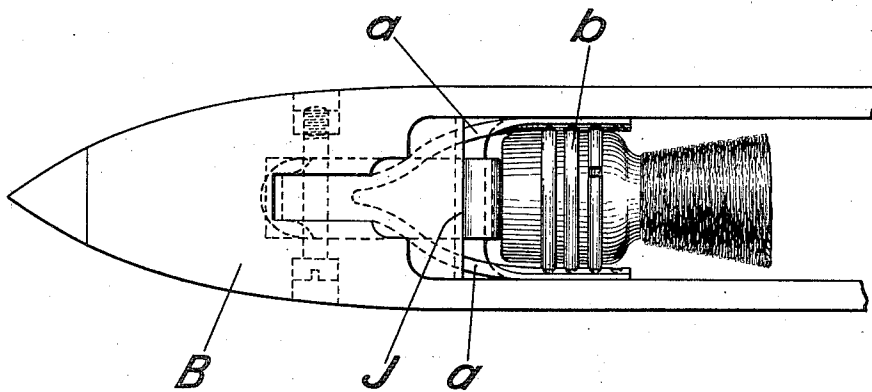


FIG. 7.

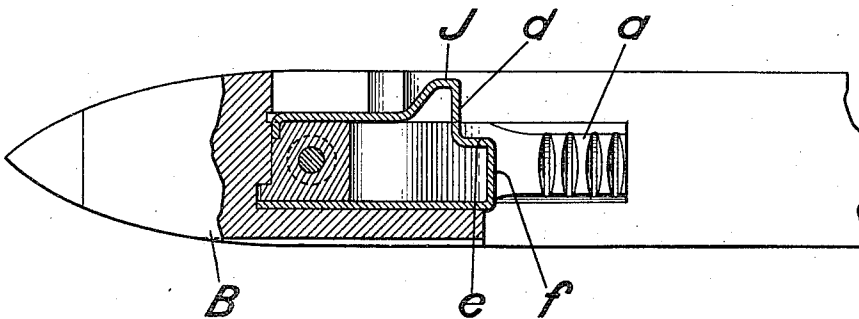
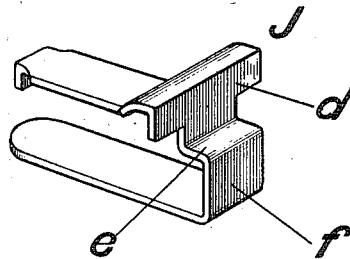


FIG. 8.



Witnesses:
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UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF PORTLAND, MAINE, AND HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

AUTOMATIC WEFT-REPLENISHING LOOM.

964,580.

Specification of Letters Patent. Patented July 19, 1910.

Application filed November 12, 1907. Serial No. 401,831.

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, of Hopedale, 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.

In the now well-known "Northrop" or "Draper" loom, the principles of which are described in United States Letters Patent No. 529,940, dated November 27, 1894, wherein weft-replenishment is effected by ejecting the spent weft-carrier (bobbin, cop-spindle, or the like) from the working shuttle and transferring a fresh weft-carrier from a magazine or hopper into the working shuttle, it is highly important that the shuttle should be properly positioned with respect to the magazine containing the spare weft-carriers when the weft-replenishing action takes place. In order to secure this proper relative position between shuttle and magazine the looms in commercial practice have been provided with two expedients. In case the shuttle is too near the middle of the loom when the weft-replenishing mechanism is called into action, the transferring operation is prevented by means of a "shuttle feeler" which, coming in contact with the misplaced shuttle, renders the transferring mechanism inactive, as set forth in United States Patent No. 529,943, November 27, 1894. On the other hand, should the shuttle be too far out from the middle of the loom, the transferring mechanism acts and reliance is had upon the construction of the shuttle which is set forth in United States Letters Patent No. 538,507, dated April 30, 1895. This patent shows an automatically threading shuttle equipped with weft-carrier holding jaws (such as are more fully set forth in United States Letters Patent No. 454,807, dated June 23, 1891) which are grooved to grasp and hold projecting ribs on the weft-carrier, and the shuttle chamber permits the concurrent ejection of the spent weft-carrier and reception of a fresh weft-carrier. This construction requires that the weft-carrier should be accurately placed in the shuttle in order that the jaws may securely grasp and hold an inserted weft-carrier. As shown in Patent No. 538,507, just mentioned, the shuttle is provided with an inclined bridge in the vicinity of the weft-carrier holding jaws which en-

gages the butt end of a fresh weft-carrier while being transferred and thereby directs the weft-carrier to the holding jaws in case the shuttle occupies a position too far from the middle of the loom. While this provision of an inclined directing bridge has been employed in the very large number of Northrop or Draper looms which have been put into commercial use, its action has not been wholly satisfactory. As will be evident from an inspection of the drawings of the aforesaid Patent No. 538,507, a relative longitudinal movement between the misplaced shuttle and the incoming weft-carrier takes place while the spent weft-carrier is being ejected under the impact of the incoming weft-carrier. At the same time, the incoming weft-carrier is being pressed down by the transferrer, whose frictional contact with the weft-carrier tends to interfere with any longitudinal movement of the weft-carrier. It also may happen during the transferring action that the projecting ribs of the incoming and spent weft-carriers may interlock and hence interfere with the relative longitudinal movement between the incoming weft-carrier and the misplaced shuttle. The result is that weft-carriers are sometimes broken, and occasionally the inserted weft-carrier is inefficiently grasped by the shuttle jaws so that a portion of the weft-carrier may be outside of the boundaries of the shuttle with resulting damage to the warp. While these objections are not sufficient to offset the many and conspicuous advantages of the commercial Draper looms, nevertheless they are serious and it is important that they should be obviated.

The object of the present invention is to cure the stated difficulties and it is effected by mechanism which moves the shuttle itself longitudinally toward the middle of the loom when too far out, this shuttle placing action taking place when the weft-replenishing mechanism is brought into action and in advance of any contact between the incoming and outgoing weft-carriers and before the incoming weft-carrier comes into contact with the shuttle jaws, or any part of the shuttle. The shuttle feeler is retained so that the transferring mechanism is rendered inactive in case the shuttle is too near the middle of the loom when the weft-replenishing mechanism is called into action; while, on the other hand, should the shuttle

be too far out at the critical moment, the new shuttle placer moves the shuttle longitudinally and inwardly into just the right position relatively to the magazine to receive the incoming weft-carrier.

One embodiment of the present improvements is illustrated in the accompanying drawings, in which—

Figure 1, is a vertical section through the lay, transferring mechanism and a portion of the magazine of the modern form of the Northrop or Draper loom showing the present improvements and illustrating the transfer in the act of inserting a fresh weft-carrier, the period illustrated being just in advance of the incoming weft-carrier contacting with the spent weft-carrier. Fig. 2, is a similar section on a larger scale of a portion of the mechanism shown in Fig. 1, showing the transfer in its most depressed position and illustrating the fresh weft-carrier in position within the shuttle. Fig. 3, is a similar section illustrating the shuttle placer in the same position as in Fig. 1, but on a larger scale, this figure simply illustrating the relation between the shuttle placer and the shuttle. Fig. 4, is a longitudinal section through the shuttle and the neighboring portion of the weft-replenishing mechanism, illustrating the shuttle in a misplaced position too far from the middle of the loom. Fig. 5, is a section similar to Fig. 4, illustrating the parts just after the shuttle placer has acted and, hence, by comparison with Fig. 4, indicating the effect of the shuttle placer in moving the misplaced shuttle toward the middle of the loom. Fig. 6, is a plan view of the end of the shuttle which is equipped with the weft-carrier jaws. Fig. 7, is a longitudinal vertical section of the same end of the shuttle. Fig. 8, is a perspective view of the shuttle abutment against which the shuttle placer acts.

The drawings show, with sufficient fullness to enable the present improvements to be understood, certain of the ordinary parts of the well-known Draper loom in one of the present commercial forms.

A, is the lay; B, is the shuttle with its resilient weft-carrier holding jaws *a*, *a*; C, is the spare weft-carrier magazine; D, is a portion of the fixed stand or framework on which the magazine is mounted; E, E, are weft-carriers, each with projecting annular ribs *b*, *b*, at its butt end; F, is the swinging transferer; G, is the transferer dog which, when the weft-replenishing mechanism is called into action, is moved up into position to be struck by the bunter *c*, on the lay; and H, is the shuttle feeler which prevents action of the transferer in case the shuttle is misplaced and is too near the middle of the loom. The shuttle feeler is shown only in Figs. 4, and 5, and in section, since its rela-

tion to the transferring mechanism is now so well known as to require no detailed illustration or description. It may, for example, be arranged as illustrated in Patent No. 529,943, above mentioned, or as shown in more recent United States Letters Patent, as, for example, in Patent No. 664,790, dated December 25, 1900. All of these parts act and cooperate in the same way as customary in the Draper loom. The added parts illustrated in the present drawings relate to the devices for moving the shuttle longitudinally into correct position relatively to the magazine in case the shuttle is too far out (that is, away from the middle of the loom) at the moment when a transfer of weft-carriers is to take place. The principal illustrated factors in placing the shuttle in correct position are a shuttle placer I, on the magazine stand, and an abutment J, carried by the shuttle. The abutment J, within the shuttle has a vertical face *d*, extending the entire width of the shuttle chamber. Conveniently, as shown, the abutment is part of a piece of sheet metal pressed into suitable shape for secure attachment to the shuttle body, no part of the same extending beyond the outer boundaries of the shuttle. Beneath the abutment proper there is a horizontal ledge *e*, and a vertical wall *f*, which are located between the shuttle jaws *a*. The wall *f*, is close to the butt-end of the weft-carrier E, held by the jaws. This wall is distant from the abutment face to the extent of the ledge *e*, thus affording a space between the abutment face and the butt end of the bobbin for the action of the shuttle placer I.

The shuttle placer I, is best shown in Figs. 3, 4 and 5. It is pivotally connected at *g*, to the fixed stand D, of the spare weft-carrier magazine C, and is spring-restored to and maintained in a normal horizontal position, as shown in Fig. 4, by a spring *h*. When thus occupying its normal horizontal position the shuttle placer is directly beneath (but out of contact with) the butt of the weft-carrier in the magazine which is next to be transferred to the working shuttle, and is also directly beneath the driving end of the transferer F. The shuttle placer is also located directly over the shuttle box at the transferring end of the lay when the lay is at and near front center, as shown in Figs. 1, 2 and 3. Also, as shown in these figures, the portion of the shuttle placer which enters the shuttle chamber is sufficiently narrow as compared with the width of the shuttle chamber and the length of the abutment J, to allow for the traverse of the lay during the transferring operation. When a transfer is to take place, the transferer F, descends coming into contact with the butt end of the spare weft-carrier beneath it and forcing the same downwardly

first against the free end of the shuttle placer and then into the shuttle chamber, driving out the spent weft-carrier before it. During this downward movement of the fresh weft-carrier it swings the shuttle placer from the horizontal position shown in Fig. 4 to the vertical position shown in Fig. 5. Should the shuttle be then occupying a position too far out as compared with the middle of the loom and the position of the magazine, the shuttle placer will come in contact with the abutment J, and thereby force the shuttle longitudinally and inwardly and into correct position to receive the incoming weft-carrier. A comparison between Figs. 4 and 5, will indicate approximately the maximum distance that the shuttle can be moved by the shuttle placer, which is sufficient to provide for all contingencies which may arise in practice with respect to the outward displacement of the shuttle. As shown in Fig. 5, the shuttle is moved inwardly (relatively to the magazine and the middle of the loom) so as to bring its inner end close to the plane of the shuttle feeler I. Should the shuttle not be far enough out relatively to the magazine and the middle of the loom at the time a transfer is called, the shuttle feeler will encounter the shuttle and render the transferer inactive in the heretofore usual way. The shuttle feeler can be so located and the throw of the shuttle placer can be so regulated as to provide for all contingencies which may arise in practice. The slight play indicated in Fig. 5 not compensated for by the shuttle feeler and the shuttle placer is sufficiently taken care of by the grooves in the shuttle jaws and the shape of the projecting ribs *b*, on the weft-carriers. Even this slight play indicated need not exist, since the throw of the shuttle placer may readily be made sufficient to bring the ribs of the incoming bobbin directly in line with the grooves of the shuttle jaws. As shown in Fig. 5, the shuttle placer performs its office of moving the shuttle inwardly and longitudinally to the right place before the incoming shuttle in its descent touches the spent weft-carrier or comes into contact with the shuttle jaws. Consequently during the ejection of the spent weft-carrier by the incoming weft-carrier and during the passage of the ribs of the incoming weft-carrier into place between the shuttle jaws, there is no relative longitudinal movement between the incoming and outgoing weft-carriers and hence no liability of breakage nor of improper grasp of the inserted weft-carrier by the shuttle jaws. When the fresh weft-carrier reaches its position between the shuttle jaws, it is wholly free from the shuttle placer, which thereupon is restored to its normal horizontal position before the transferer C, rises, as shown in Fig. 2. An

important characteristic of this shuttle placer is that it acts only when a transfer is to be made and hence is subject to minimum wear only.

The present invention is not limited to the detailed mechanism illustrated and specifically described, it being obvious that other specific devices may embody the principle of the invention.

I claim:

1. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle with weft-carrier jaws and an abutment; a transferer to transfer a weft-carrier from the magazine to the shuttle and eject the spent weft-carrier; mechanism to prevent the action of the transferer in case the shuttle is misplaced inwardly relatively to the magazine when a change of weft-carriers is called; and a spring-restored shuttle-placer moved by the fresh weft-carrier when acted upon by the transferer, said shuttle-placer encountering said shuttle-abutment and moving the shuttle inwardly when the shuttle is too far out relatively to the incoming weft-carrier.

2. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle with weft-carrier jaws and an abutment; a transferer to transfer a weft-carrier from the magazine to the shuttle and eject the spent weft-carrier; mechanism to prevent the action of the transferer in case the shuttle is misplaced inwardly relatively to the magazine when a change of weft-carriers is called; and a shuttle-placer moved by the fresh weft-carrier when acted upon by the transferer, said shuttle-placer encountering said shuttle-abutment and moving the shuttle inwardly when the shuttle is too far out relatively to the incoming weft-carrier.

3. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle with weft-carrier jaws and an abutment; a transferer to transfer a weft-carrier from the magazine to the shuttle and eject the spent weft-carrier; and a shuttle-placer moved by the fresh weft-carrier when acted upon by the transferer, said shuttle-placer encountering said shuttle-abutment and moving the shuttle inwardly when the shuttle is too far out relatively to the incoming weft-carrier.

4. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle; a transferer to transfer a weft-carrier from the magazine to the shuttle; and a shuttle-placer moved by the fresh weft-carrier when acted upon by the transferer, said shuttle-placer encountering said shuttle and moving it inwardly when too far out relatively to the incoming weft-carrier.

5. An automatic weft replenishing loom

having, in combination, a magazine for spare weft-carriers; a shuttle; a transferer to transfer a weft-carrier from the magazine to the shuttle; mechanism to prevent the action of the transferer in case the shuttle is misplaced inwardly relatively to the magazine when a change of weft-carriers is called; and a shuttle-placer acted upon through the transferer, said shuttle-placer acting to move the shuttle inwardly when the shuttle is too far out relatively to the incoming weft-carrier.

6. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle; a transferer to transfer a weft-carrier from the magazine to the shuttle; and a shuttle-placer above the lay and acted upon through the transferer to position the shuttle relatively to the incoming weft-carrier.

7. An automatic weft replenishing loom having, in combination, a magazine for spare weft-carriers; a shuttle; a transferer to transfer a weft-carrier from the magazine to the shuttle; and mechanism entering the top of the shuttle and contacting with an interior part of the shuttle to move the shuttle into correct position relatively to the incoming weft-carrier.

8. In a loom provided with mechanism to replenish automatically the working shuttle with weft, in combination, a normally quiescent device located above the shuttle path and downwardly movable to engage and move the shuttle inward to thereby insure proper positioning of the shuttle at the time of weft replenishment, and means to effect

downward movement of said device automatically into engagement with the shuttle when the weft in the shuttle is to be replenished.

9. A loom having, in combination, mechanism to replenish automatically the working shuttle with weft, a shuttle placer located above the shuttle path and downwardly movable to engage and move the shuttle inward to thereby insure proper positioning of the shuttle at the time of weft replenishment, and means to effect downward movement of said shuttle placer automatically into engagement with the shuttle when the weft in the shuttle is to be replenished.

10. A loom having, in combination, mechanism to replenish automatically the working shuttle with weft, a shuttle placer located above the shuttle path and downwardly movable to engage and move the shuttle inward to thereby insure proper positioning of the shuttle at the time of weft replenishment, and means to effect downward movement of said shuttle placer automatically into engagement with the shuttle when the weft in the shuttle is to be replenished, said action being in advance of any contact between the incoming weft carrier and the shuttle.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD S. STIMPSON.

Witnesses:

GEORGE OTIS DRAPER,
ERNEST W. WOOD.