

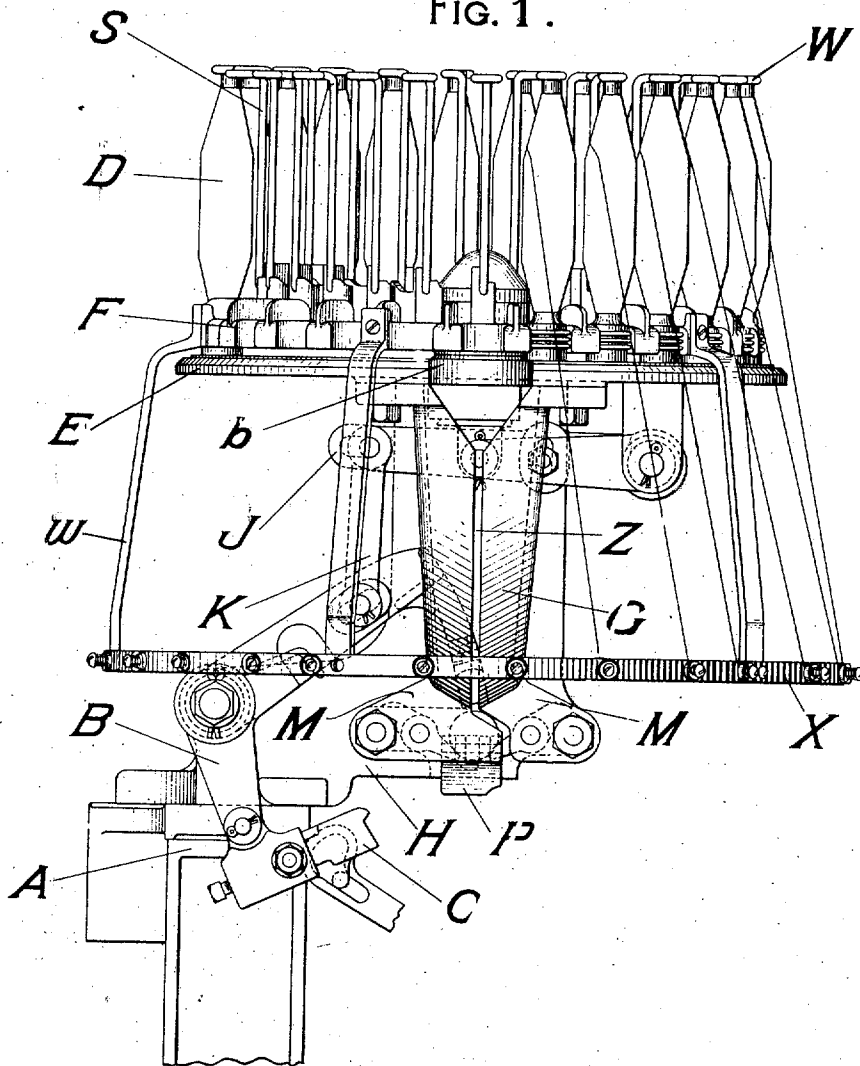
E. S. STIMPSON.
 AUTOMATIC WEFT REPLENISHING LOOM.
 APPLICATION FILED MAY 11, 1908.

972,942.

Patented Oct. 18, 1910.

5 SHEETS—SHEET 1.

FIG. 1.



Witnesses.

Eugene Bond
Carroll Aborn

Inventor.

Edward S. Stimpson
by Arthur S. Brown
his Attorney

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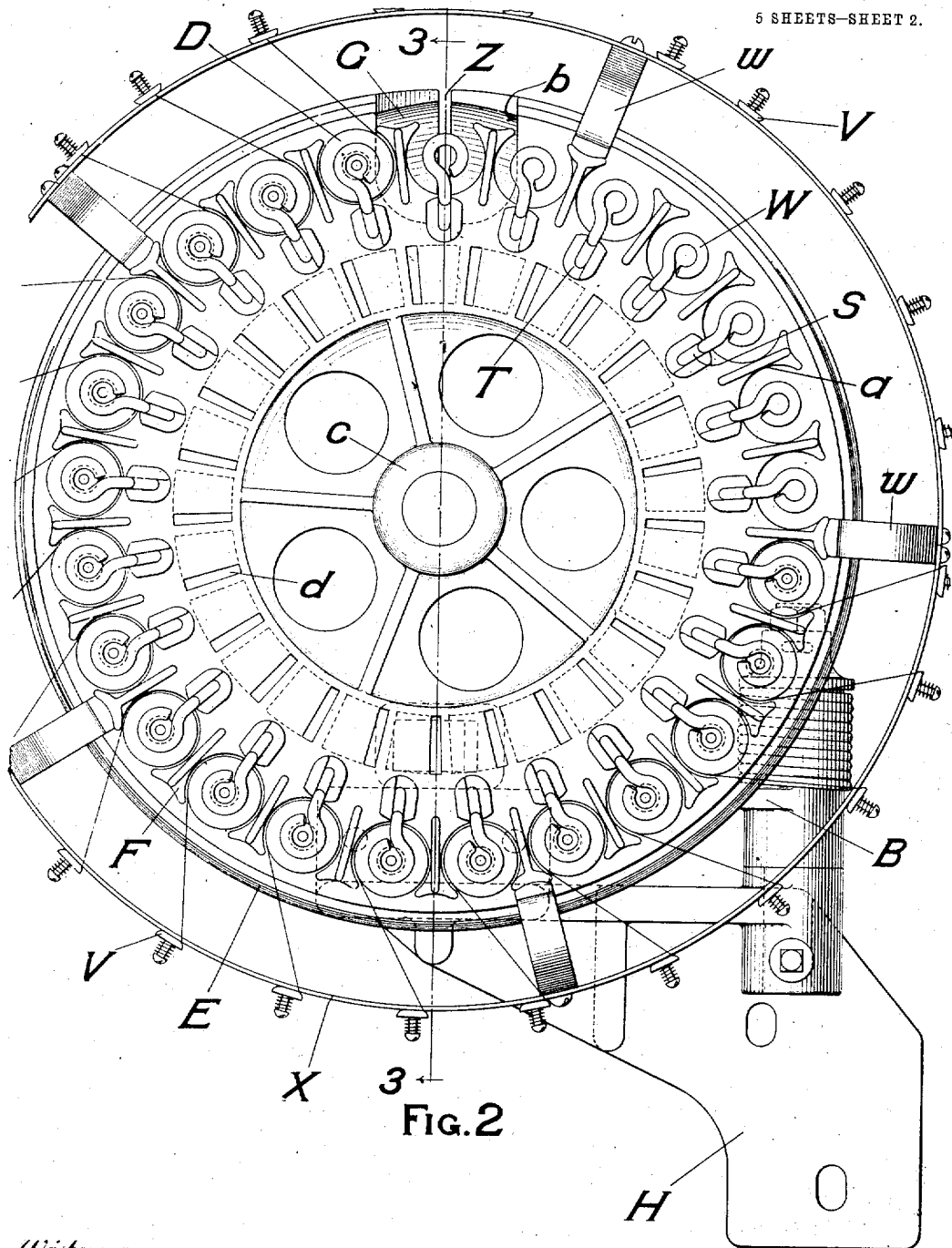


FIG. 2

Witnesses:

Eugene W. Bond.
 Charles C. O'Brien.

Inventor:

Edward S. Stimpson
 by Nathan S. Browne
 his attorney

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5 SHEETS-SHEET 3.

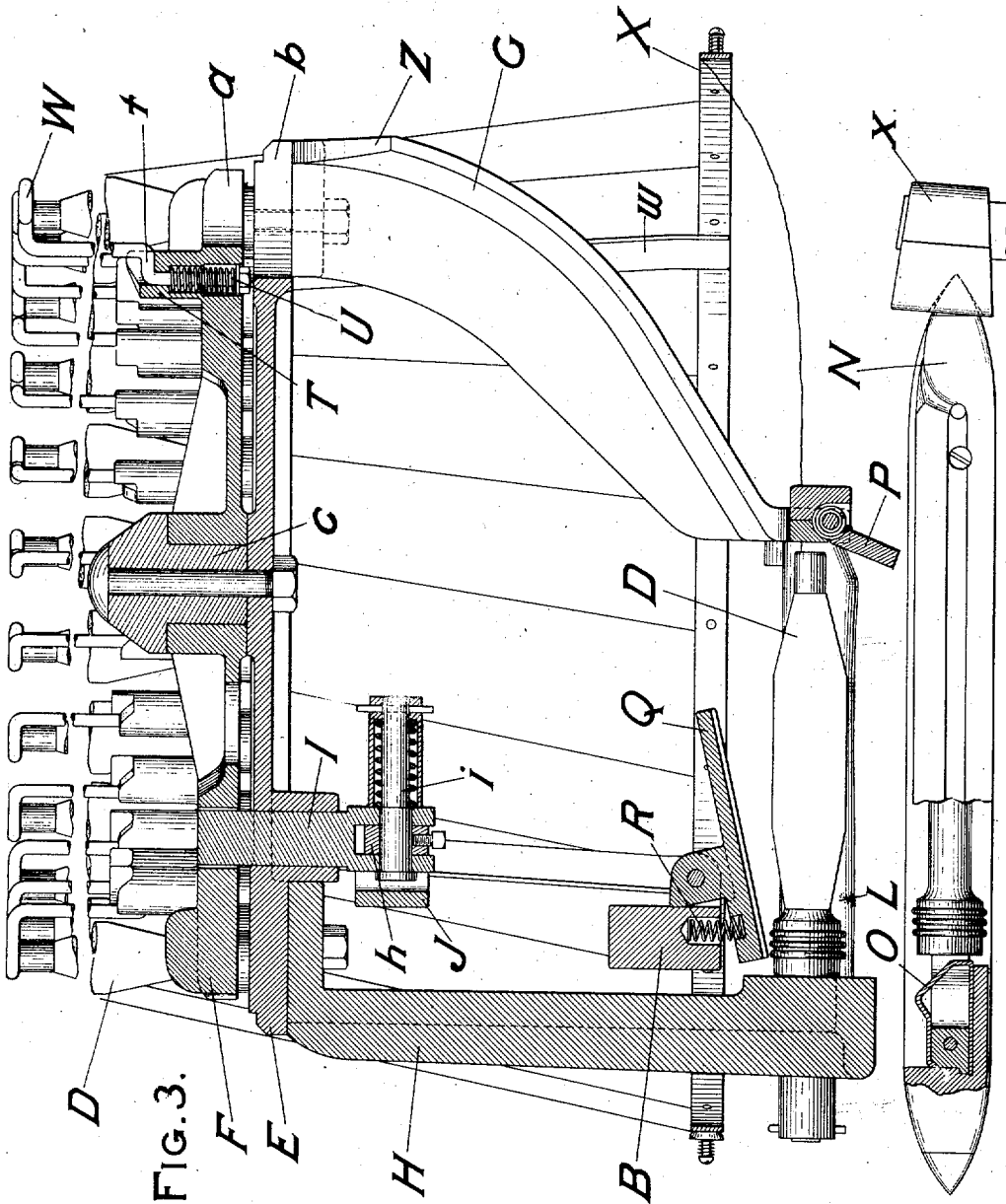


FIG. 3.

Witnesses.

Eugene Bond.
Caroline Osborn

Inventor:

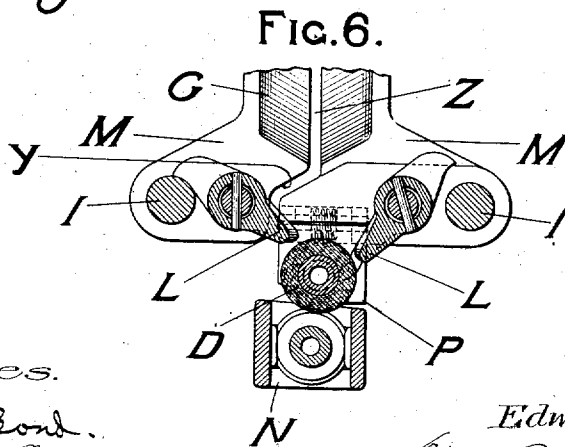
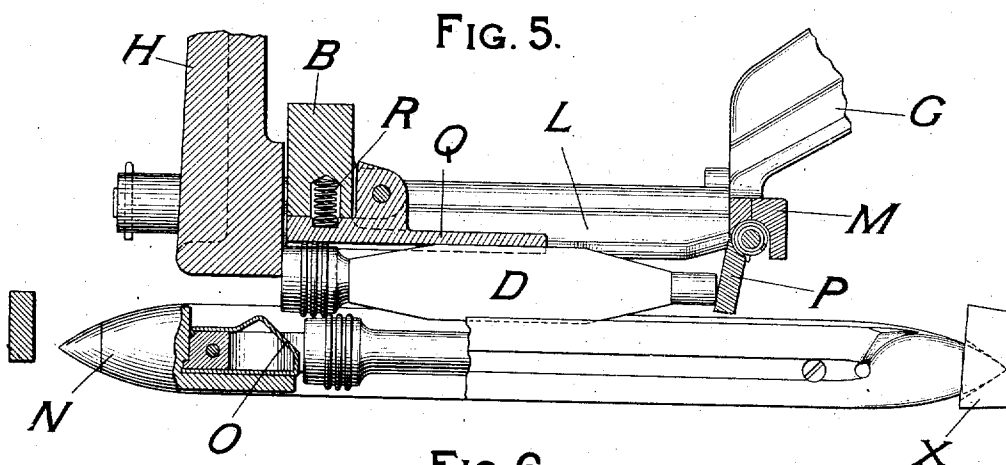
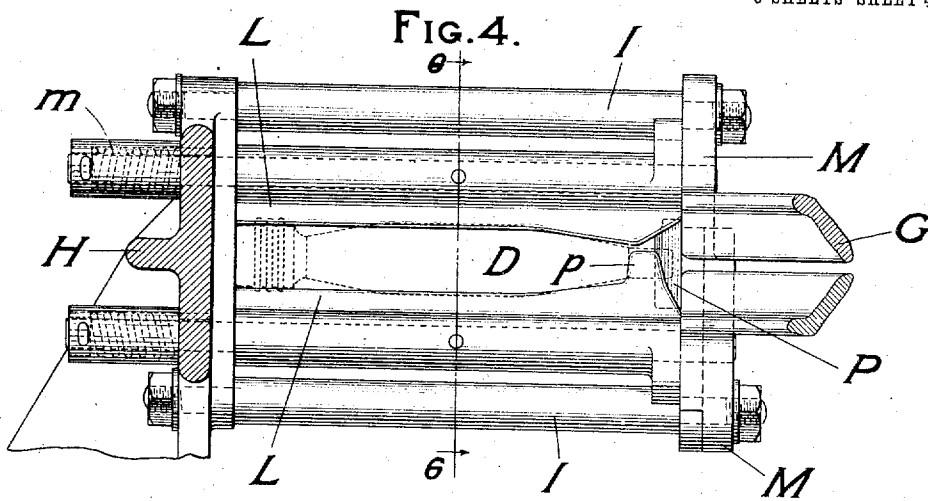
Edward S. Stimpson
 by *Arthur S. Brown*
 his attorney

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5 SHEETS-SHEET 4.



Witnesses.

Eugene Bond.
 Carolus Peterson.

Inventor:
 Edward S. Stimpson

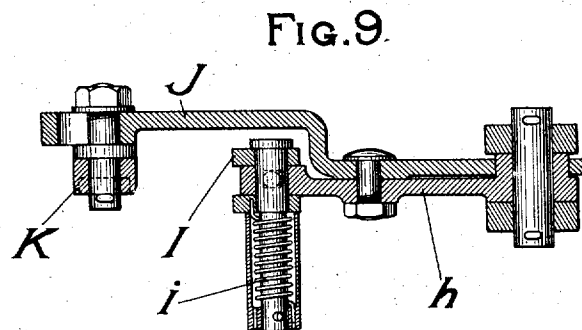
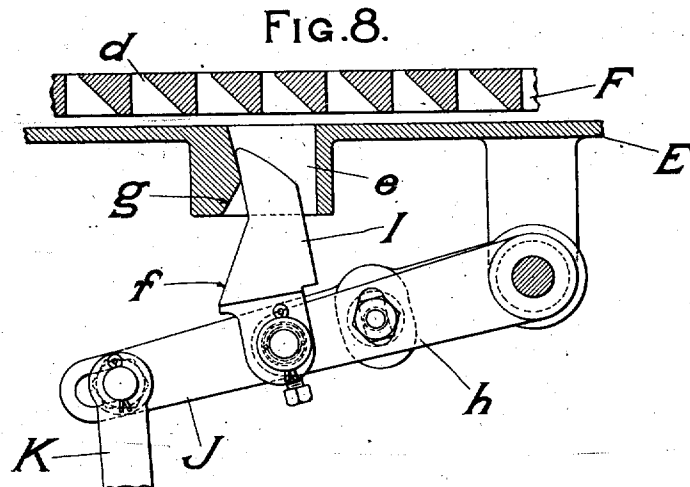
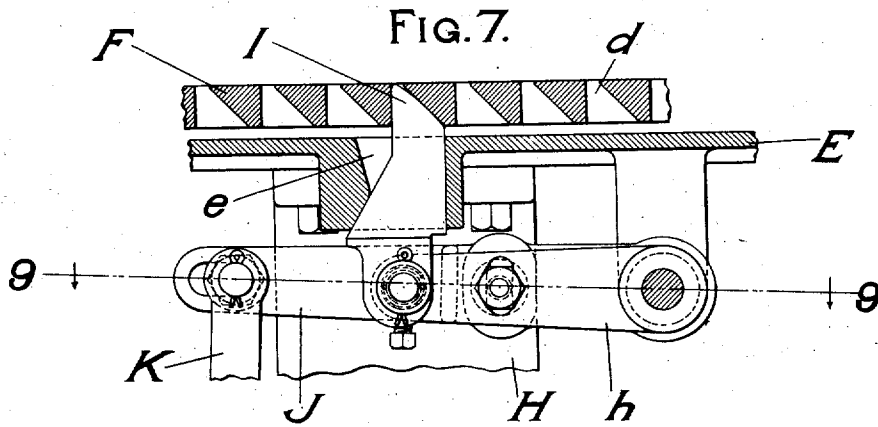
by Arthur Brown
 his attorney

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5 SHEETS—SHEET 5.



Witnesses.

Engene Bond.
 Caroline Ostrom

Inventor:

Edward S. Stimpson
 by Arthur S. Brown
 his Attorney

UNITED STATES PATENT OFFICE.

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

AUTOMATIC WEFT-REPLENISHING LOOM.

972,942.

Specification of Letters Patent.

Patented Oct. 18, 1910.

Application filed May 11, 1908. Serial No. 432,163.

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.

The present improvements relate to that class of automatic weft-replenishing looms wherein a fresh weft-carrier is substituted for a spent weft-carrier in the working shuttle of the loom, either when the working weft breaks or is exhausted or when the working weft approaches exhaustion, in the type of weft-replenishing looms adapted to so act. The now well-known Northrop or Draper loom shown, for example, in United States Letters Patent No. 529,940, Nov. 27, 1894, represents the type to which the present improvements relate.

The present improvements consist in the novel magazine for spare weft-carriers and the parts which directly cooperate therewith. In accordance with the present invention the magazine has a rotary feeder turning on a vertical axis, and the weft-carriers stand vertically. When replenishment has been effected the magazine is rotated one step, thereby bringing one of the weft-carriers into register with a guide-chute, through which it drops and by which it is directed into a weft-carrier holder, where it lies in a horizontal position directly over the shuttle-box at one end of the lay when the lay is at or near front center. The spare weft-carrier occupying the holder is then in coöperative relation with a suitable transferer ready to be transferred into the working shuttle when replenishment is required. In connection with this magazine are employed suitable appliances for taking care of the weft-ends of the several spare weft-carriers; appropriate means for automatically moving the feeder step by step; and suitable means for maintaining the spare weft-carriers in place in their vertical positions and for assisting their descent one by one to the holder.

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

Figure 1, is a view looking toward one

side of the loom and illustrating the present improvements, together with sufficient of the known parts of the loom to enable the invention to be understood. Fig. 2, is a plan view of the magazine and associated parts, a portion being broken away to enable the figure to be made on an ample scale. Fig. 3, is a vertical section of the magazine and associated parts in a plane indicated by the line 3—3 in Fig. 2, the spare weft-carriers and their retainers being broken away and foreshortened to permit illustration on an ample scale. Fig. 4, is a plan view of the holder which holds the active spare weft-carriers in transferring position. Fig. 5, is a vertical section through the holder, in the same plane as Fig. 3, showing the active weft-carrier in the act of being transferred to the shuttle. Fig. 6, is a cross-section in the plane indicated by the line 6—6 in Fig. 4. Figs. 7, and 8, are detail vertical sections of the magazine illustrating the feeding mechanism therefor in different positions. Fig. 9, is a horizontal section in the plane indicated by the line 9—9 in Fig. 7.

Fig. 1, is on a smaller scale than the remaining figures.

Referring to Fig. 1, A, is a portion of the front framework of the loom which supports the breast-beam and magazine; B, is the transferer, such as is commonly employed in the well-known Draper or Northrop loom; and C, is the usual transferer dog. These parts act in just the same way as in the well-known Draper loom. When replenishment is to be effected the transferer swings, thereby forcing the active spare weft-carrier downwardly into the working shuttle when occupying the shuttle-box at the supply side of the loom, and when the lay is at or near front center. The insertion of the fresh weft-carrier ejects the spent or nearly spent weft-carrier from the automatically threading shuttle.

The characteristic feature of the present invention is that the magazine is such that the spare weft-carriers D, (with a single exception to be hereinafter noted) stand vertically, as illustrated in Figs. 1 and 3. They stand in a circle upon a stationary horizontal plate E, being suitably spaced apart by

means of a horizontal rotary feeder F, provided at its periphery with recesses *a* (Figs. 2 and 3), to accommodate the weft-carriers. At one point in its periphery the weft-carrier supporting plate E, has an opening *b*, sufficiently large to permit the downward escape of any weft-carrier which is brought over it. This opening communicates with the upper end of a guide-chute G (Fig. 3), which curves downwardly and inwardly and terminates at its lower inner end at the horizontal holder, which is adapted to yieldingly support another spare weft-carrier D, in a horizontal position immediately below the active end of the transferrer B, this spare weft-carrier being herein referred to as the "active" spare weft-carrier. As soon as a transfer of a fresh weft-carrier into the shuttle has been effected, the horizontal feeder F, is rotated one step (in the direction in which the hands of a watch turn when looking at Fig. 2), thereby bringing one of the weft-carriers D, directly over the opening *b*, in the supporting plate E. Thereupon the said weft-carrier, being unsupported, drops down into the guide-chute G, and is directed thereby, butt end first, into the holder beneath the transferrer B, so that it occupies the horizontal position illustrated in Fig. 3, becoming the active spare weft-carrier ready to be inserted into the shuttle when the next replenishment is to be effected.

The stationary weft-carrier supporting plate E, of the magazine is secured to a bracket H, which is in turn fastened to the breast-beam or other stationary part of the loom. The feeder is a horizontal wheel turning on a vertical axis formed by a stationary boss *c*, fastened to the plate E, as shown in Fig. 3. The feeder F, is rotated step by step in advance, one step each time the transferrer B, acts. The feeder has a series of notches *d* (Figs. 7 and 8) on its underside into which enters a feed pawl I. This pawl extends through a guiding aperture *e*, in the plate E, and the pawl has an inclined face *f*, which is adapted to co-act with an inclined surface *g*, constituting one of the margins of the aperture *e*. The pawl I, at its lower end is pivoted to a swinging arm *h*, as best shown in Fig. 9. The pawl is also connected with this arm *h*, by means of a spring *i* (Fig. 9), which turns the pawl into the position shown in Fig. 8, when the pawl is lowered out of the way of the feeder F. The arm *h*, is adjustably connected with a swinging lever J, the outer end of which is connected by a link K, with the upper arm of the transferrer B, as best shown in Fig. 1. When the upper arm of the transferrer B, is swung down to effect a transfer of weft-carriers, the feed pawl I, is likewise moved down to the position shown in Fig. 8, so that it no longer contacts with the feeder F. As

soon as this pawl is lowered out of contact with the feeder, its spring *i*, throws it forward into the position shown in Fig. 8. When a transfer has been completed and the transferrer B, swings upwardly to its normal position (in a customary manner and by the customary means), the pawl I, likewise rises and enters the next succeeding notch *d*, in the feeder F, being directed into the same by the spring *i*, which forces the point of the pawl into contact with the adjacent margin of the aperture *e*. When the point of the pawl has entered this notch *d*, its inclined face *f*, encounters the stationary surface *g*, whereby the pawl is swung, against the resistance of its spring, to the position shown in Fig. 7. This moves the feeder F, to the right, as shown in Figs. 7 and 8, thus moving the feeder one step, and sufficiently far to bring the leading weft-carrier D, over the opening *d*, so that it drops down into the transferrer trough.

The weft-carrier holder comprises two parallel yielding swinging plates L, L, best shown in Figs. 4, 5 and 6. Each plate L, is pivotally mounted at its inner end in a portion of the bracket H, and at its outer end in a plate M, integral with the lower end of the guide-chute G (and constituting a support therefor), said plate M, being secured by a horizontal bolt *l* (Fig. 4), to the bracket H. Each holder plate L, is normally upheld by a yielding spring *m*, shown in Fig. 4. When a weft-carrier drops by gravity, butt end first, it passes into the trough constituted by the then spring-uplifted plates L, beneath the transferrer B, and is stopped in proper position by its butt end encountering the bracket H, which constitutes an abutment therefor. When the transferrer B, descends and encounters the active weft-carrier in the holder, the plates L, yield and permit the downward passage of the spare weft-carrier into the shuttle N, beneath, as illustrated in Fig. 6.

It sometimes occurs that the spent weft-carrier in the shuttle is not exactly beneath the fresh weft-carrier when a transfer is made, as indicated in Fig. 5. To properly effect a transfer under such circumstances it has long been customary to provide the shuttle with an incline O, in order that when the fresh weft-carrier descends, it may encounter the incline and through the relative endwise movement of shuttle and weft-carrier thus resulting the weft-carrier may properly enter the shuttle and be held thereby. The present improvements include special means for insuring this relative lengthwise movement of shuttle and incoming weft-carrier.

Beneath the outer ends of the plates J, so as to be beneath the tip of the active spare weft-carrier D, is a spring-upheld guide-

plate P, as shown in Figs. 3 and 5. The transferer B, has a pusher Q, pivoted thereto and normally held in the inclined position shown in Fig. 3, by a spring R.

5 This pusher being held in this inclined position, affords ample room for the entrance of the dropping weft-carrier into the holder. This pusher extends rather more than half the length of the weft-carrier, reaching 10 from the butt outwardly, and it is shaped on its under side, as shown in Fig. 1, to conform to the curvature of the butt and weft on the weft-carrier. When the transferer descends, the pusher Q, first comes in contact with the butt of the weft-carrier, whereupon the spring R, yields, thereby bringing 15 the pusher into substantially the horizontal position shown in Fig. 5, so that it presses upon the body of the weft as well as upon the butt of the weft-carrier, thereby insuring a direct downward push upon the descending weft-carrier. During the descent of the weft-carrier its tip encounters the yielding tip-guide P, as shown in Fig. 25 5, the resistance of whose spring aids in preventing any outward longitudinal thrust of the descending weft-carrier, since it causes the tip-guide to press endwise upon the tip of the weft-carrier. The descending weft-carrier thus moves squarely downward, forcing out the spent weft-carrier beneath it from the shuttle, and, if the shuttle is then occupying the position shown in Fig. 5, the butt of the descending weft-carrier 30 encounters the incline O, and moves to the right, so that the entering weft-carrier is received at the right place in the shuttle. The front plate L, has a rearwardly extending lip p, at its outer end (Figs. 4, and 40 6), which extends over the tip-guide P, and beneath the tip of the active spare weft-carrier. This supports the tip until the weft-carrier contacts with the spent weft-carrier in the shuttle (Fig. 6), and insures the 45 square descent of the transferred weft-carrier.

It is important that the vertically standing spare weft-carriers should be retained in proper position in the magazine without accidentally jarring out; and it is desirable that each spare weft-carrier, when brought over the guide-chute G, should be started with some initial force in the right direction in its descent to the transferring holder. 55 For these purposes there is employed for each spare carrier in the magazine a yielding retainer S. As shown in Fig. 3, each retainer S, is a bent rod entering at its lower end a guiding and holding socket T, (see 60 Fig. 3) in which it is maintained by a spring U, which presses the retainer downwardly. At its upper end each retainer S, has an outwardly extending tip-engager W, which extends and fits over the tip of the correspond-

ing spare weft-carrier. The spring U, 65 presses this tip-engager down upon the tip of the weft-carrier and this pressure aids in holding the weft-carrier in position and steadies it against accidental movement. At the same time, when a weft-carrier is brought 70 into position over the discharge opening b, above the guide-chute G, the tension of the corresponding spring U, starts the weft-carrier on its downward movement and insures its prompt descent to the transferring holder. 75 Each weft-carrier is further retained in position in the magazine by reason of the shape of the recess a. As shown in Fig. 2, this recess embraces more than one-half of the circumference of the weft-carrier butt, the 80 mouth of the recess being less than the diameter of the butt. In filling the magazine each weft-carrier is inserted butt end first into its recess a, and the retainer S, is lifted far enough, against the resistance of its 85 spring U, to enable the tip of the weft-carrier to pass downwardly beneath the engager W. Or, all of the retainers S, where the magazine is empty, can be lifted far enough to elevate their bends t, above the 90 sockets T, and the retainers can then be swung until their engagers W, are behind the recesses a, the retainers S, being maintained in this position by their bends t, resting on the tops of the sockets T. The weft- 95 carriers may then be put in place and on swinging the retainers S, forward they will be pulled back into their respective sockets by their respective springs U, thereby bringing their tip-engagers down upon the tips 100 of the weft-carriers.

It is necessary that the weft-ends of the several spare weft-carriers should be secured. To this end, there is a thread-holder consisting of a horizontal ring X, occupying 105 a plane just above the holder, as shown in Fig. 3. This thread-holder is supported from and rotates with the feeder F, being connected therewith by suitable arms w. This thread-holder has as many thread studs 110 as there are recesses a, in the feeder. As shown, each stud has a spring-pressed tension-disk Y, to grip the thread. When each weft-carrier is put in place in the magazine its thread is fastened at the appropriate 115 point on the thread-holder. As the feeder rotates step by step, the thread-holder likewise rotates, thereby maintaining the thread of each weft-carrier in proper relation thereto. The guide-chute G, has a length- 120 wise extending thread-slot Z (Figs. 1, 2 and 3), which is open top and bottom and widens out at the top, as shown in Fig. 1. Hence, when a weft-carrier drops through the guide-chute, its thread travels through this 125 thread-slot so that when the weft-carrier occupies the horizontal position in the transferring trough, as shown in Fig. 3, its thread

hangs in the position shown, extending in a proper direction from the weft-carrier to the thread-holder to enable the proper automatic threading of the self-threading shuttle to take place in the customary way of the Draper loom. The thread is prevented from sagging down into the way of the picker α , because the lower end of the thread-slot (see Fig. 6) is diverted inwardly at γ . When the weft-carrier is inserted into the shuttle N, and the lay moves backwardly, the thread drops down through this rearward divergence γ , of the thread-slot Z, and is then free between the inserted weft-carrier and the thread-holder, so that it draws off freely from the weft-carrier on the first flight of the replenished shuttle to the other side of the loom.

I claim—

1. A weft-replenishing loom having, in combination, a holder for the active spare weft-carrier; a transferrer which transfers said weft-carrier from the holder to the working shuttle; a magazine for spare weft-carriers located above the holder and holding the weft-carriers in vertical position butt end down; a guide-chute leading from the magazine to the holder; a horizontal rotary feeder which feeds the spare weft-carriers one by one from the magazine into the guide-chute; and means governed by the transferrer for advancing the feeder one step for each action of the transferrer.

2. A weft-replenishing loom having, in combination, a holder for the active spare weft-carrier; a transferrer which transfers said weft-carrier from the holder to the working shuttle; a magazine for spare weft-carriers located above the holder and holding the weft-carriers in vertical position; a guide-chute leading from the magazine to the holder; a feeder which feeds the spare weft-carriers one by one from the magazine into the guide-chute; and means governed by the transferrer for advancing the feeder one step for each action of the transferrer.

3. A weft-replenishing loom having, in combination, a holder for the active spare weft-carrier; a transferrer which transfers said weft-carrier from the holder to the working shuttle; a magazine for spare weft-carriers located above the holder and holding the weft-carriers in vertical position; a guide-chute leading from the magazine to the holder; a feeder which feeds the spare weft-carriers one by one from the magazine into the guide-chute; and means for advancing the feeder one step for each action of the transferrer.

4. A weft-replenishing loom having, in combination, a holder for the active spare weft-carrier; a transferrer which transfers said weft-carrier from the holder to the working shuttle; a magazine for spare weft-

carriers located above the holder; a guide-chute leading from the magazine to the holder; a feeder which feeds the spare weft-carriers one by one from the magazine into the guide-chute; and means for advancing the feeder one step for each action of the transferrer.

5. A magazine for a weft-replenishing loom having a flat stationary horizontal plate upon which stand the butts of vertically disposed weft-carriers, and having a discharge aperture, in combination with a horizontal step-by-step rotating feeder above the said plate having a series of recesses one for the butt of each spare weft-carrier, and a corresponding series of sockets; a corresponding series of bent weft-carrier retainers mounted to move up and down and turn in said sockets, each retainer having a tip-engager adapted to extend over and engage the tip of a weft-carrier; and a spring tending to depress each retainer.

6. A magazine for weft-replenishing loom having a flat stationary horizontal plate upon which stand vertically disposed weft-carriers, and having a discharge aperture, in combination with a horizontal step-by-step rotating feeder above the said plate having a series of recesses one for the butt of each spare weft-carrier, and a corresponding series of sockets; a corresponding series of weft-carrier retainers mounted to move up and down in said sockets, each retainer having a tip-engager adapted to extend over and engage the tip of a weft-carrier; and a spring tending to depress each retainer.

7. A magazine for a weft-replenishing loom having a plate upon which stand vertically disposed weft-carriers, in combination with a feeder which feeds the spare weft-carrier from said plate; and a tip-engager adapted to extend over and yieldingly engage the tip of a weft-carrier.

8. A weft-replenishing loom having, in combination, a transferrer; a holder beneath the active end of the transferrer to hold the active spare weft-carrier in a horizontal position; a stationary horizontal plate above the holder to support spare weft-carriers, a guide-chute leading from said plate to said holder; said chute having a lengthwise extending thread-slot open top and bottom, said slot having a rearward bend near its bottom; a rotary horizontal feeder adapted to feed from said plate to said chute spare weft-carriers one by one; a thread-holder consisting of a horizontal ring suspended from and moving with said feeder; and a plurality of thread studs carried by said holder.

9. A weft-replenishing loom having, in combination, a magazine which supports spare weft-carriers in a vertical position; a

rotary feeder adapted to feed spare weft-carriers from said magazine one by one; and a thread holder consisting of a horizontal ring moving with said feeder.

10. A weft-replenishing loom having, in combination, a magazine which supports spare weft-carriers in a vertical position; a feeder adapted to feed from said magazine spare weft-carriers one by one; and a thread-holder moving with said feeder.

11. A weft-replenishing loom having, in combination, a transferer; a holder beneath the active end of the transferer to hold the active spare weft-carrier in a horizontal position; a stationary horizontal plate above the holder to support spare weft-carriers; a guide-chute leading from said plate to said holder; said chute having a lengthwise extending thread-slot open top and bottom, said slot having a rearward bend near its bottom; and a feeder adapted to feed from said plate to said chute spare weft-carriers one by one.

12. A weft-replenishing loom having, in combination, a transferer; a holder to hold the active spare weft-carrier; a magazine above the holder to support spare weft-carriers; a guide-chute leading from said magazine to said holder, said chute having a lengthwise extending thread-slot open top and bottom; and a feeder adapted to feed from said magazine to said chute spare weft-carriers one by one.

13. A holder for a spare weft-carrier in a weft-replenishing loom having, in combination, a fixed abutment at one end for the butt of a weft-carrier, two separated parallel horizontal spring-lifted plates upon which the weft-carrier rests, the front one of said plates having a rearward lip extending beneath the tip of the weft-carrier, and a spring uplifted tip-guide beneath said lip.

14. A holder for a spare weft-carrier in a weft replenishing loom having, in combination, two separated parallel horizontal spring-lifted supports upon which the weft-carrier rests.

15. A weft-replenishing loom having, in combination, a yielding holder in which a spare weft-carrier is loosely held in horizontal position, and a spring-uplifted tip-guide, independent of said yielding holder, which normally lies in an inclined position beneath the tip of the weft-carrier, but has no normal action thereon, and which presses endwise upon the tip of the weft-carrier during its transfer into weaving position.

16. A holder for a spare weft-carrier in a weft-replenishing loom having, in combination, two separated spring-lifted supports upon which the weft-carrier rests, one of said plates having a lip extending beneath the tip of the weft-carrier.

17. A magazine for a weft-replenishing

loom which holds the spare weft-carriers in vertical position butt ends down, in combination with a horizontal rotary feeder which removes the weft-carriers one by one from the support of the magazine so that each weft-carrier in turn drops from the magazine butt end first.

18. A magazine for a weft-replenishing loom which holds the spare weft-carriers in vertical position, in combination with a feeder which removes the weft-carriers one by one from the support of the magazine, and a transferer which transfers such removed weft-carriers into weaving position in the loom.

19. A magazine for a weft-replenishing loom which holds the spare weft-carriers in vertical position butt ends down, in combination with a feeder which removes the weft-carriers one by one from the support of the magazine so that each weft-carrier in turn drops from the magazine butt end first.

20. A horizontally disposed magazine for a weft-replenishing loom which holds the spare weft-carriers in vertical position butt ends down, and having provisions for moving said weft-carriers horizontally.

21. A horizontally disposed magazine for a weft-replenishing loom which holds the spare weft-carriers in vertical position, and having provisions for moving said weft-carriers horizontally.

22. A transferer for a weft-replenishing loom having a pusher pivoted thereto above the active spare weft-carrier, said pusher being of a length greater than one-half the length of the weft-carrier, and a spring tending to lift the outer end of said pusher.

23. A transferer for a weft-replenishing loom having a pusher pivoted thereto above the active spare weft-carrier, and a spring tending to lift the outer end of said pusher.

24. A transferer for a weft-replenishing loom having a pusher pivoted thereto, and a spring tending to lift one end of said pusher.

25. A transferer for a weft-replenishing loom having a pusher pivoted thereto, said pusher extending lengthwise of the active spare weft-carrier and adapted to contact with the body of weft thereon.

26. In a weft-replenishing loom, a magazine having a discharge opening for a weft-carrier, and two corresponding pivotally mounted inclined retaining supports, one at each side of said opening, said supports adapted to move or rock correspondingly, to permit of the passage of the weft-carrier in a direct line when being transferred.

27. In a weft-replenishing loom, a transferer to transfer the weft-carriers into the active shuttle, a magazine for a plurality of weft-carriers having a discharge opening for the weft-carriers under said transferer,

and means, comprising two pivotally mounted spring-actuated supports, one at each side of said opening, to guide the weft-carriers into the shuttle in the same direction as the direction of movement of the transferrer.

28. In a weft-replenishing loom, a magazine for weft-carriers having a discharge opening for the transfer of a weft-carrier, and a pivotally mounted spring-actuated support for the weft-carrier at each side of

said opening, to contact with the weft on the weft-carrier, and guide the weft-carrier directly into the shuttle.

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

EDWARD S. STIMPSON.

Witnesses:

GEORGE E. CHANDLER,
EDWARD DANA OSGOOD.