A. SMITH.

LOOM FOR WEAVING.

APPLICATION FILED OCT. 27, 1915.

1,213,700.

Patented Jan. 23, 1917.

4 SHEETS—SHEET 1.

Fig. 1.

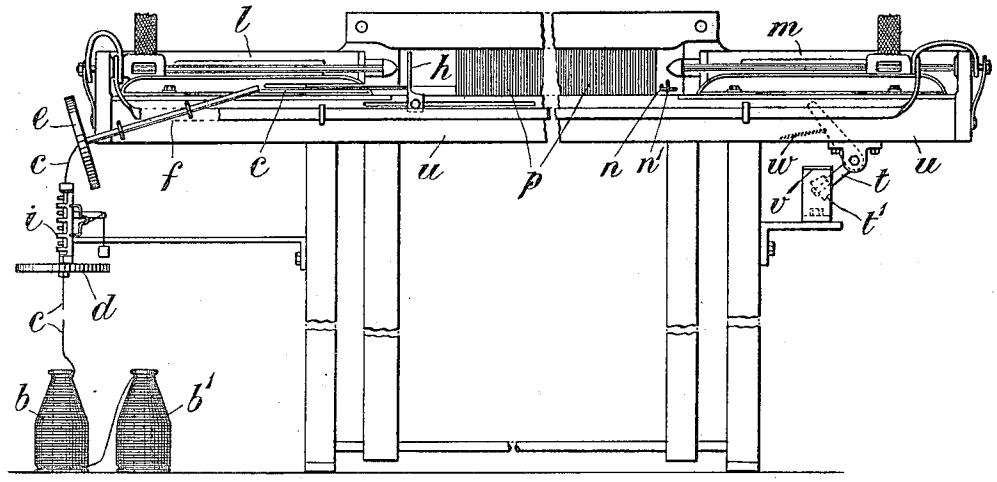


Fig. 2.

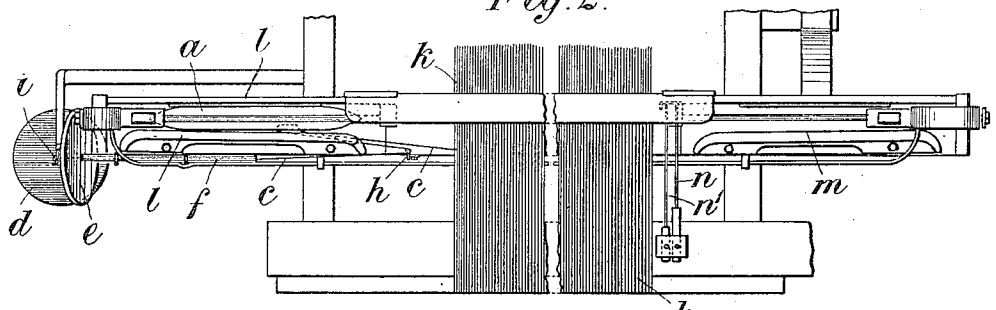
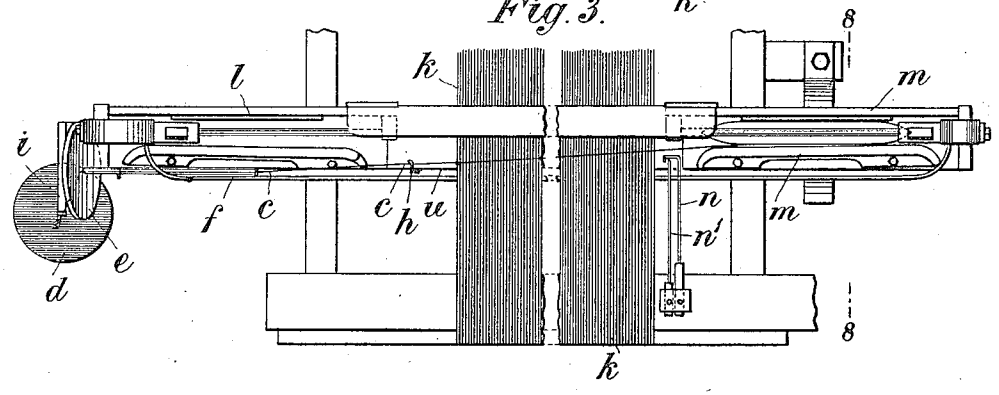


Fig. 3.



Witnesses;—

Arthur J. Powell

William J. Dowker

Inventor;—

Albert Smith

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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4 SHEETS—SHEET 2.

Fig. 4.

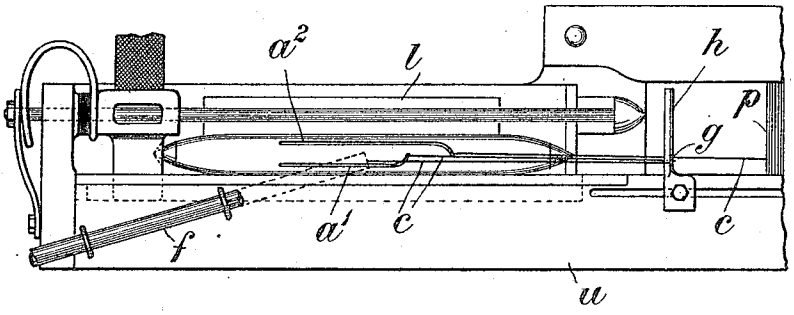


Fig. 6

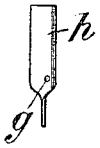


Fig. 5.

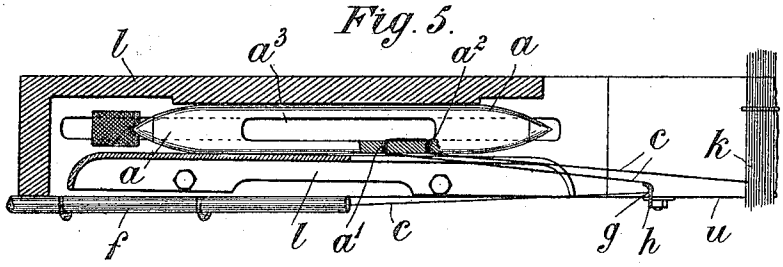
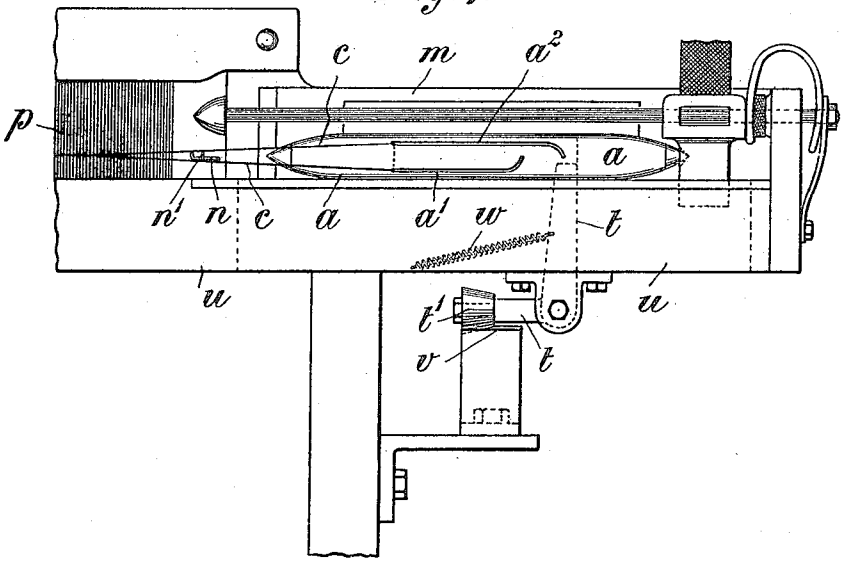


Fig. 7.



Witnesses;—

Arthur J. Powell

William J. Booker

Inventor;—

Albert Smith

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4 SHEETS—SHEET 3.

Fig. 8.

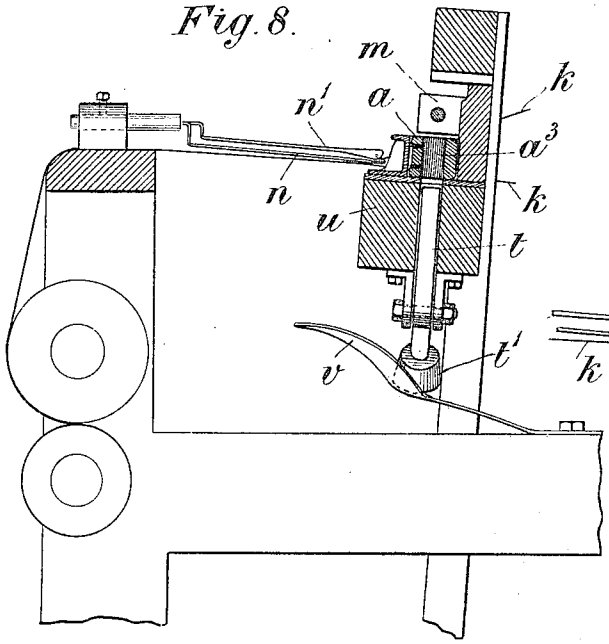


Fig. 12.

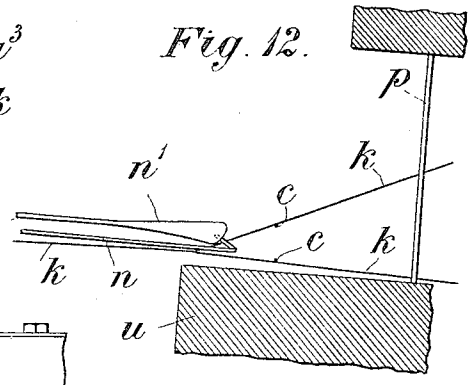


Fig. 13.

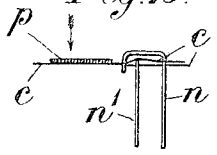


Fig. 14.

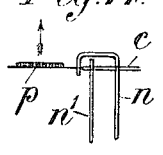


Fig. 9.

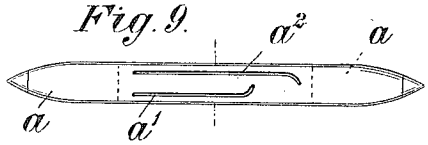


Fig. 11.



Fig. 15.

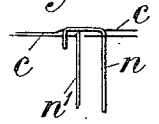


Fig. 16.

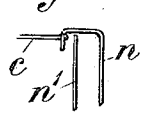
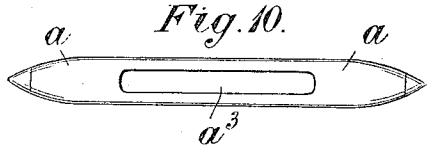


Fig. 10.



Witnesses;—

Arthur J. Powell

William J. Bowker

Inventor;—

Albert Smith

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4 SHEETS—SHEET 4.

Fig. 17.

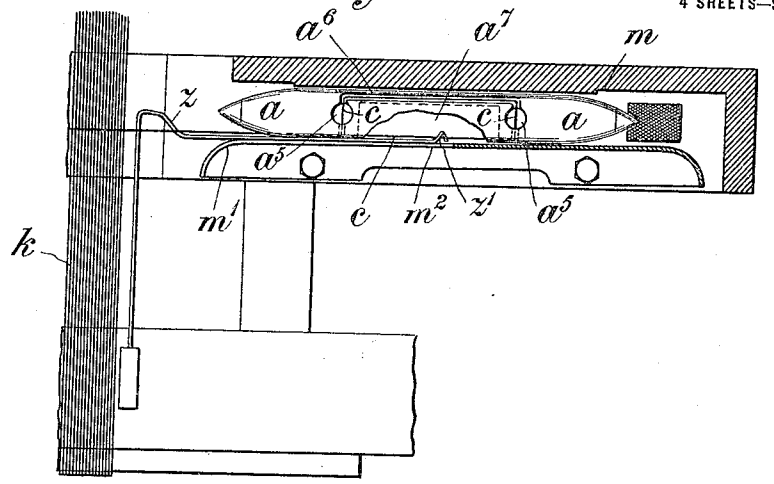


Fig. 18.

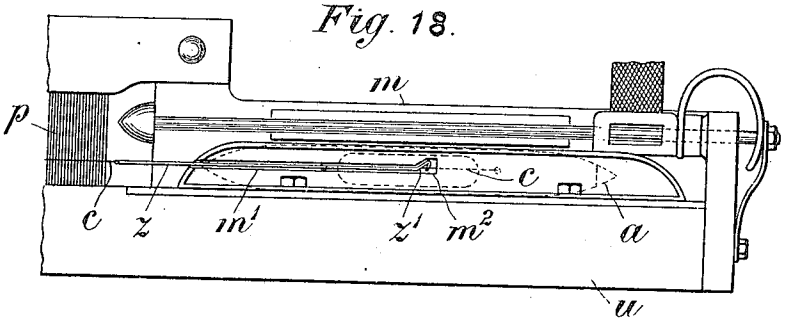


Fig. 19.

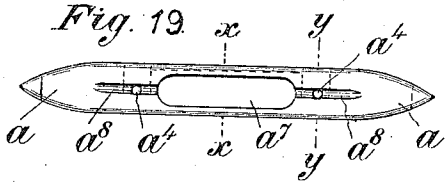


Fig. 21.

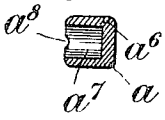


Fig. 22.

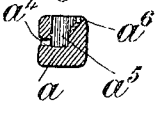
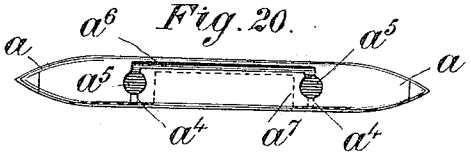


Fig. 20.



Witnesses;—

Arthur J. Powell

William J. Porter.

Inventor;—

Albert Smith

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALBERT SMITH, OF BIRMINGHAM, ENGLAND.

LOOM FOR WEAVING.

1,213,700. Specification of Letters Patent. Patented Jan. 23, 1917.

Application filed October 27, 1915. Serial No. 58,190.

To all whom it may concern:

Be it known that I, ALBERT SMITH, a subject of the King of Great Britain, residing at No. 717 Washwood Heath road, Ward End, Birmingham, England, have invented certain new and useful Improvements in Looms for Weaving, of which the following is a specification.

My invention relates to looms for weaving cloth in which the weft is supplied from bobbins or the like situated external to the shuttle, the said weft being carried through the open shed by the forward motion of the shuttle which inserts a double pick of weft, the shuttle returning after the first beat up of the slay on one of the strands or picks of weft, and my invention consists of the construction and arrangement or combination hereinafter described of the shuttle and other parts of the loom whereby the same is rendered very efficient.

According to my invention the shuttle is so constructed that the weft may enter and leave the shuttle on its front face. I provide a final weft guide from which the weft passes to the shuttle in advance of the shuttle box from which the shuttle is thrown to carry the double pick of weft through the open shed, the said final weft guide being preferably adjustable and having between it and the outside weft supply, which is preferably in the form of hosiery bobbins, cones or the like, a tensioning device, the weft being made practically endless by tying the finishing end of the thread on one bobbin or cone to the drawing off end of another bobbin or cone and so on where more than two cones are employed. The weft tensioning device between the final weft guide and the outside weft supply may be of any ordinary construction or convenient type.

I employ special devices hereinafter particularly described to retain the weft or form the loop at the selvage of the cloth opposite that adjacent the shuttle box from which the shuttle is first thrown.

The special forms of shuttle described are not specifically claimed herein, being made the subject matter of my divisional application for Letters Patent, Serial No. 127,465, filed October 24, 1916.

I will further describe my invention in connection with the accompanying drawings Figures 1 and 2 of which represent in front elevation and plan respectively so much of a loom as is necessary to the understanding of my invention. Fig. 3 is a similar view to Fig. 2 after the shuttle has been passed over to the right hand side of the loom. Fig. 4 represents a portion of Fig. 1 drawn to a larger scale than Figs. 1, 2 and 3. Fig. 5 is a part plan and part section of a portion of Fig. 1 and Fig. 6 is a side view of the weft guide seen at the right hand side of Figs. 4 and 5. Fig. 7 represents a portion of Fig. 3 drawn to the same scale as Figs. 4, 5 and 6. Fig. 8 is a cross section on the dotted line 8—8 Fig. 3 drawn to a larger scale than Fig. 3. Figs. 9, 10 and 11 represent in elevation, plan and cross section respectively the shuttle detached. Figs. 12 to 16 both inclusive are diagrams illustrating my improved method of retaining the weft and forming the loop at the right hand side of the fabric. Fig. 17 represents in sectional plan the right hand shuttle-box and adjacent parts with a modified form of shuttle in said shuttle-box; Fig. 18 is a front elevation of the same; Fig. 19 is a front elevation of said modified form of shuttle; Fig. 20 is a plan view of the same; Fig. 21 is a section on the line x—x of Fig. 19; and Fig. 22 is a section on the line y—y of Fig. 19.

The same letters of reference indicate the same parts in the several figures of the drawings.

a is the shuttle having longitudinal slots a^1, a^2 in its front face and a vertical longitudinal slot a^3 parallel or approximately parallel with the front face and extending from the upper to the underside of the shuttle as is best seen in Figs. 10 and 11.

The weft supply is taken from cones b, b^1

outside the loom (see Fig. 1) any number of cones being employed the finishing end of the cone b being attached to the drawing off end of the cone b^1 and so on where more than two cones are employed.

The weft thread c passes from the cone b through guides d, e, f to the hole or eye g in the adjustable upright or final guide h shown detached in Fig. 6, the said final guide being situated in advance of the shuttle box l at the left hand side of the loom. A tension device i of any known or preferred type is employed between the guides d and h. From the eye g the weft thread passes through the slot a^1 and then from the inner side of the slot a^3 back through the slot a^2, the end of the weft thread being secured by tying or twisting to the outside thread of the warp k as is illustrated in Figs. 2, 3 and 5, when weaving is first commenced.

The longitudinal slots a^1, a^2 in the shuttle a terminate one in advance of the other near one end of the shuttle, and are so shaped at the said end that the two strands or shots of weft are brought together, or side by side, when the shuttle is at one side of the loom.

On the shuttle being thrown from the shuttle box l through the open shed into the shuttle box m at the right hand side of the loom it takes the weft c therewith and a double pick of weft is thereby inserted in the cloth, the weft being drawn to the opposite ends of the slots a^1, a^2 as is illustrated in Fig. 7 and presenting an open triangle at the right hand side which on the beat up of the slay is brought over the weft retaining device n, n^1 and the engagement of the upper pick c seen in the diagram Fig. 12 with the hook of the weft retaining device n, n^1 is effected as follows:—The weft retaining device comprises two wires marked n, n^1 respectively, the wire n being hook shaped at its free end as is best seen in Figs. 12 to 16 both inclusive, and the wire n^1 being flattened at its free end and situated within the hook n. On the beat up of the slay, with the shuttle a in the shuttle box m, the upper pick of weft c is carried by the reed p over the hook n, the weft c being represented in the diagram Fig. 13 just before the completion of the beat up motion and in the diagram Fig. 14 immediately after the reed p has commenced its return motion. It will be noted by an examination of Fig. 13 that the upper pick of weft c is temporarily held or restrained by the wire n^1 and this insures the desired tension on the weft so that when the weft is carried past the hooked end of the wire n the upper pick becomes engaged therewith and is retained in the hook n as is indicated in the diagram Fig. 15. On the return of the shuttle a to the left hand shuttle box l it travels on one of the shots or picks of weft c and a loop is left on the hook n as is indicated in the diagram Fig. 16. On the next beat up prior to the shuttle entering a newly formed shed the loop on the hook n seen in Fig. 16 is carried off the hook and disengaged therefrom by the reed p.

In order to insure the shuttle occupying its proper position in the shuttle box m so as to insure the formation of the open weft triangle I pivot a bell crank lever t to the slay bottom or sole u (see Figs. 7 and 8) which on the beat up is caused, by the action of a roller t^1 carried by the lever t traveling up the inclined plate v to move into the vertical slot a^3 in the shuttle a and press the said shuttle back to its full extent as is represented in Fig. 7. The bell crank lever t is brought forward into the position represented in Fig. 1 on the back motion of the slay by a coiled spring w.

The left hand shuttle box l is so constructed that the weft lies evenly, that is without slack from the final guide h through the shuttle a and back to the warp k. Consequently the shuttle a can enter and emerge from the said shuttle box l without cutting the weft.

The construction of the shuttle may be modified as hereinafter described with reference to Figs. 17 to 22 both inclusive of the drawings. According to this modification the shuttle a has holes a^4, a^4 in the front face at a short distance from each end. The said holes a^4 may be upwardly inclined so as to open on the top side or face of the shuttle near the back edge of the same; or the said holes a^4 may be horizontal and open into vertical recesses a^5 in the top side or face of the shuttle as is illustrated in Figs. 20 and 22. In the top or upper side of the shuttle extending from one recess a^5 to the other is a longitudinal groove or channel a^6 and in the front face of the shuttle between the holes a^4, a^4 is a recess a^7. The front face of the shuttle also has in it shallow grooves a^8.

The weft from the supply bobbin is threaded through the eye g of the yarn guide h (Fig. 6) and is then passed through the hole a^4 in the front of the shuttle a near the left hand tip of the same and along the groove a^6 in the top of the shuttle and through the hole a^4 near the right hand tip, the weft thus entering and emerging on the front face of the shuttle a, thereby permitting the weft to be drawn through the shuttle continuously, the loose end of the weft being fastened to the left hand selvage as in the first described arrangement. The right hand shuttle box m has in its front a slot m^1 of a height which will correspond with the height of the deep channel or recess a^7 in the front face of the

shuttle a, the said slot m^1 having a greater width at the inner end m^2. The larger part m^2 of the slot m^1 in the shuttle box m occupies a position coinciding or nearly coinciding with the middle of the deep channel or recess a^7 in the front face of the shuttle a when the said shuttle is at rest in the shuttle box m.

In front of the aperture in the right hand shuttle box front I arrange the hook-shaped end z^1 of the wire z (see Figs. 17 and 18) which extends from that point to the fell of the cloth at the right hand selvage and from there to the breast beam of the loom where it is fixed.

The shuttle a after being threaded is placed in the loom on the left hand side and on the first pick passes along the slay to the opposite side of the loom, leaving two strands of weft between the divided warp threads, and the weft or yarn leaving the shuttle a extends from the outlet in the front face of the shuttle to the selvage of the cloth on the left hand side of the loom, crossing lengthwise the deep channel or recess a^7 in the front face of the shuttle. As the slay advances for the first beat up the hook-shaped end z^1 of the wire z which is presented to the enlarged end m^2, of the slot m^1 in the shuttle box m passes through the said slot and enters the said aperture a^7 in the shuttle and passes behind the weft that crosses the recess or channel a^7 in the front face of the shuttle a and thereby the said weft becomes engaged with the hook z^1. The slay then recedes leaving the weft around the wire z, and on the second pick the shuttle travels along the slay, causing the thread between the shuttle a and the yarn guide g to leave the fell of the cloth, the shuttle traveling on the weft to the left hand side, thus when the shuttle a has returned to the left hand shuttle box l there are two strands of weft extending from the selvage on the left hand side of the cloth to the wire z on the right hand selvage side, the tension on the weft consequent on the motion of the shuttle thereon on the second pick has drawn the weft down the wire and out of the aperture m^2 and slot m^1 in the right hand shuttle box m to the right hand selvage of the cloth, and on the second beat up the warp or longitudinal threads cross and form a fresh shed, and by a repetition of the aforesaid functions cloth is woven.

The wire is or may be provided with a knife to cut the loops of weft and liberate the selvage of the cloth.

In the claims I use the term "forward" as applied to the throws of the shuttle to describe throws of the shuttle in which the latter moves away from the yarn supply and toward the catch.

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

1. In a loom the combination of suitable shed-forming and picker mechanisms; means for supporting a supply of weft yarn at one side of the loom; a shuttle thrown by said picker mechanism and provided with rearwardly diverging longitudinal yarn guiding slot-like apertures in the face of said shuttle toward the fell of the woven cloth, through which apertures the weft yarn passes, whereby a looped double pick of yarn is laid in the shed at each throw of the shuttle forward or away from the weft yarn supply; and a catch located at that side of the loom remote from the weft yarn supply for coacting directly with the shuttle to catch the loop of said double pick while held open by the divergent yarn guiding apertures in the shuttle.

2. The combination of a loom including a suitable shed-forming mechanism, picker motion and slay; means for supporting a supply of weft yarn at one side of the loom; a shuttle thrown by said picker motion and provided with spaced apertures on the face toward the fell of the woven cloth, through which apertures the weft yarn passes, whereby a looped double pick of yarn is laid in the shed by each throw of the shuttle away from the weft supply; and a fixed catch located at that side of the loom remote from the yarn supply for coacting directly with the shuttle as the latter moves in the beating up motion of the slay to catch and retain the loop of said double weft.

3. The combination of a loom including a suitable shed forming mechanism, picker motion and slay; means for supporting a supply of weft yarn at one side of the loom; a shuttle thrown by said picker mechanism and provided with rearwardly diverging longitudinal yarn guiding slot-like apertures in the face of said shuttle toward the fell of the woven cloth, through which apertures the weft yarn passes, whereby a looped double pick of yarn is laid in the shed at each throw of the shuttle forward or away from the weft yarn supply; and a fixed catch located at that side of the loom remote from the weft yarn supply for coacting directly with the shuttle as the latter moves in the beating up motion of the slay to catch the loop of said double pick while held open by the divergent yarn guiding apertures in the shuttle.

4. In a loom for weaving fabric, a shuttle to which weft from a bobbin, cone or the like outside the shuttle is supplied so that a double pick of weft is inserted in the open shed on the motion of the shuttle in one direction, the shuttle running freely on one of the picks of weft when performing its motion in the reverse direction, the shuttle being constructed so that the weft passes into

and out of the shuttle through openings in the front face of the same, and means for giving to the shuttle its reciprocating motion working in combination with a weft retaining device at the side of the cloth opposite that at which the weft is first introduced into the open shed, the said weft retaining device comprising two parallel wires n, n^1, the wire n being hook shaped and the wire n^1 being flattened and situated within the hook of the wire n, the weft being engaged with the hook on the first beat up of the slay and being disengaged therefrom on the second beat up substantially as set forth and shown.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALBERT SMITH.

Witnesses:
ARTHUR J. POWELL,
WILLIAM J. BOWKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."