

No. 865,973.

PATENTED SEPT. 10, 1907.

J. L. POALK.  
LOOM.

APPLICATION FILED MAY 2, 1906. RENEWED JULY 30, 1907.

4 SHEETS—SHEET 1.

Fig: 1.

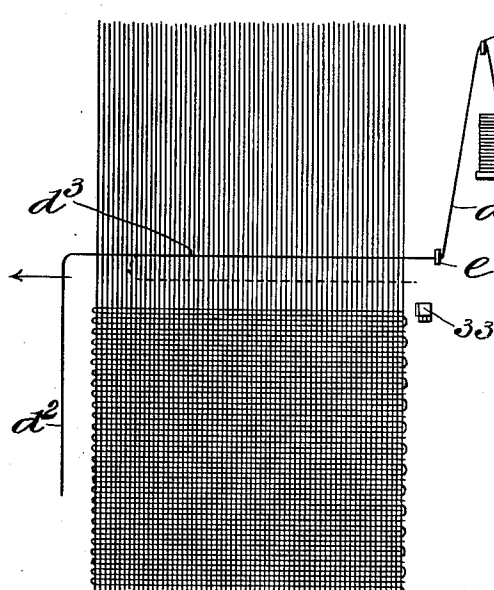


Fig: 2.

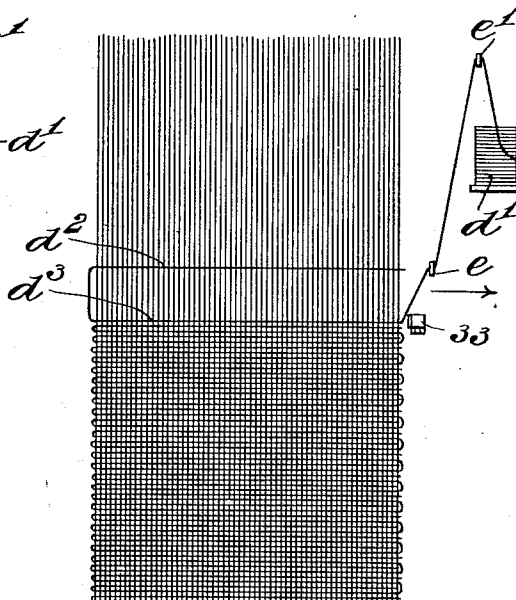


Fig: 3.

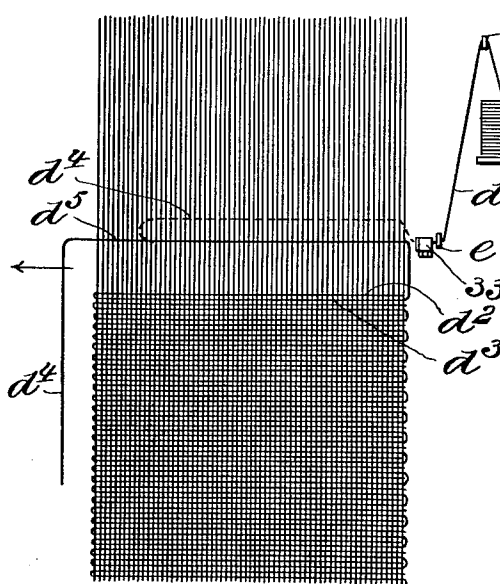
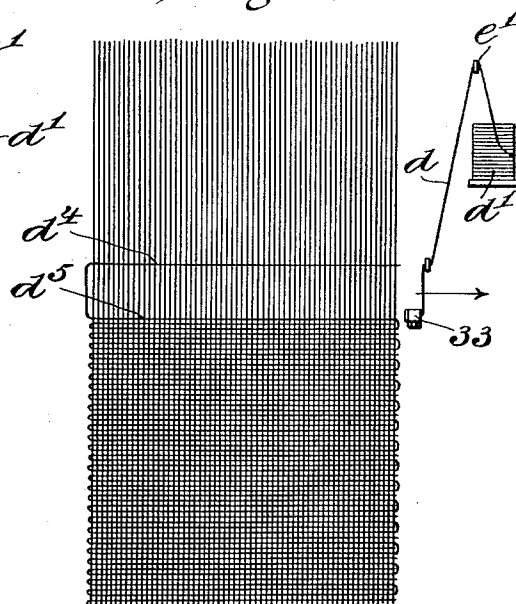


Fig: 4.



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4 SHEETS—SHEET 2.

Fig. 5.

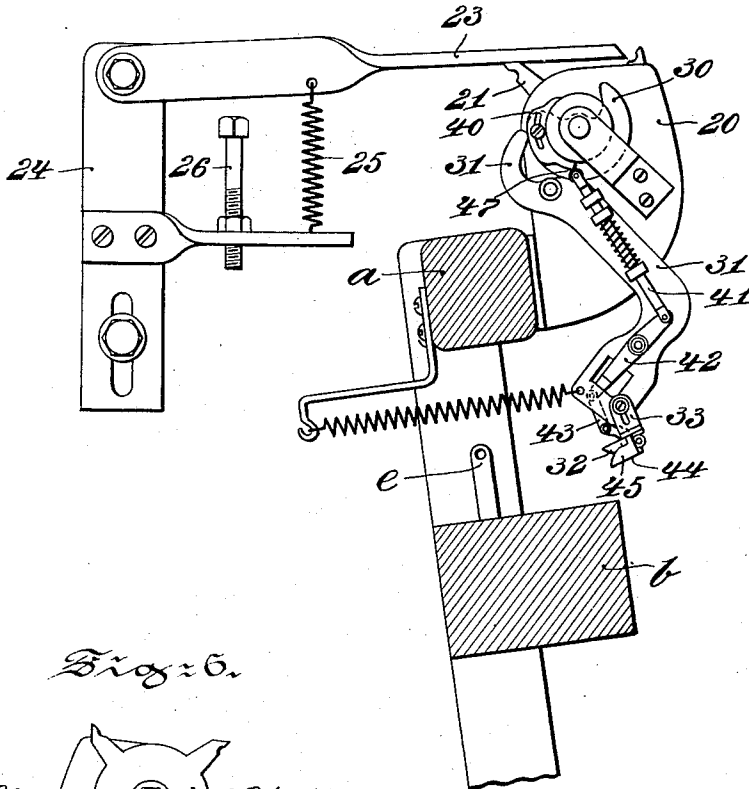


Fig. 6.

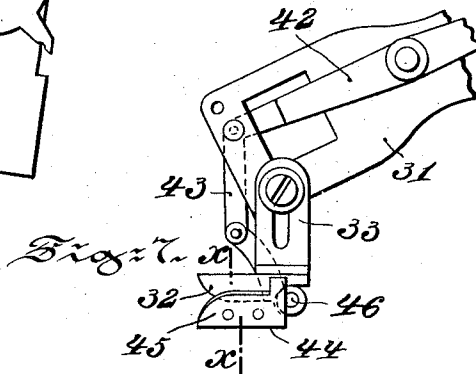
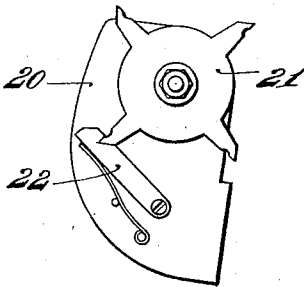


Fig. 8.

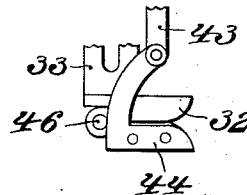
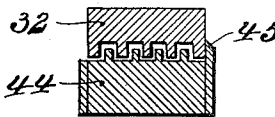


Fig. 9.



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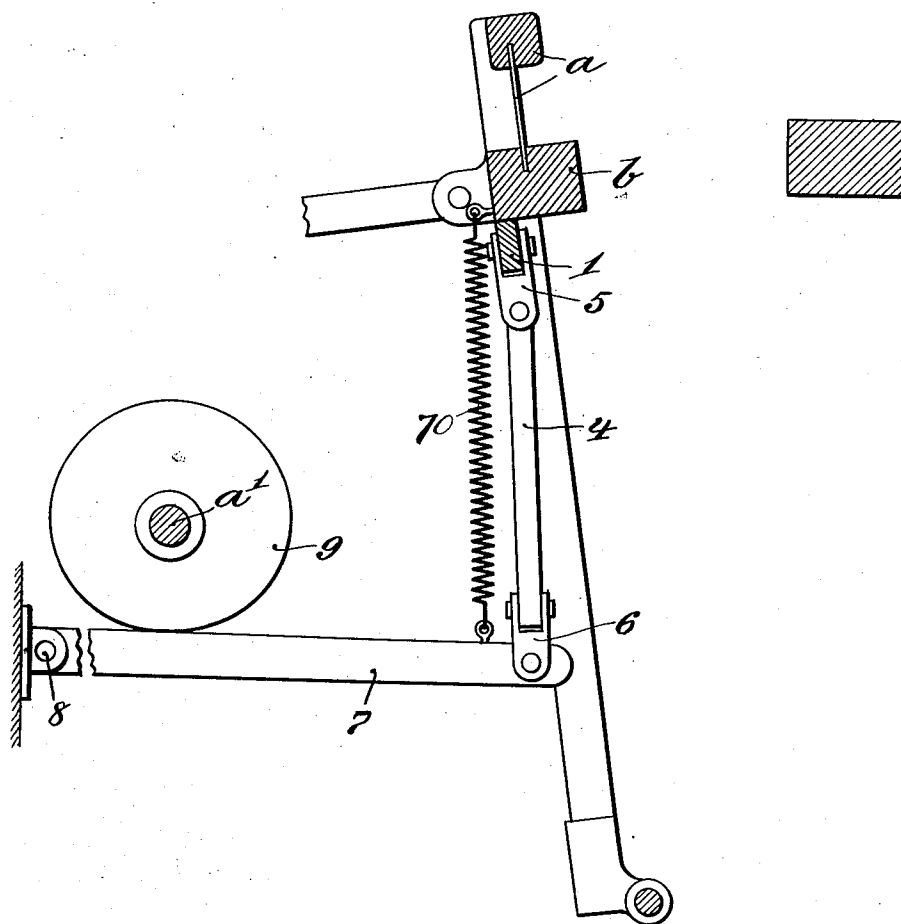
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4 SHEETS—SHEET 3.

*Fig. 10.*



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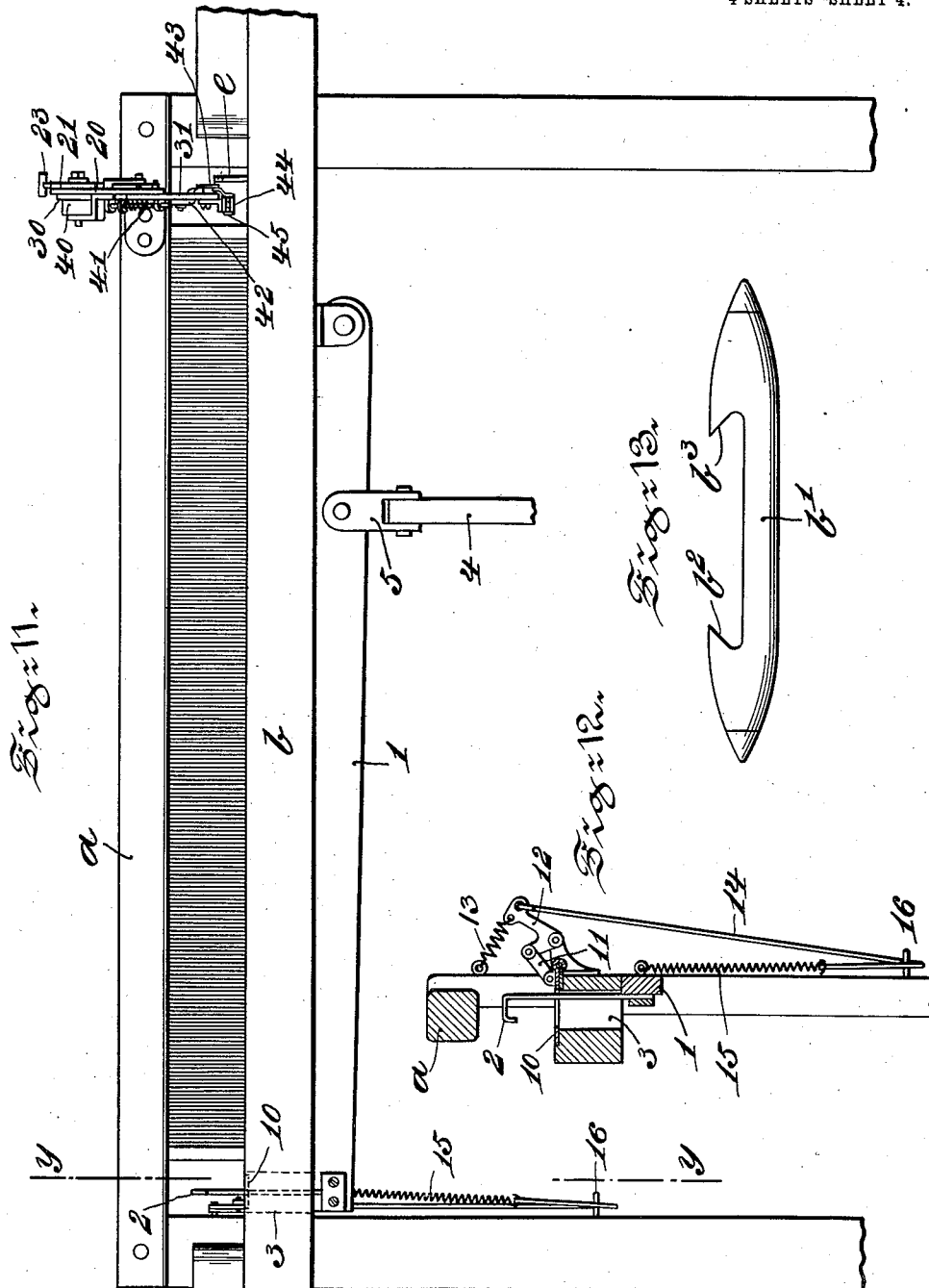
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

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## LOOM.

No. 865,973.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed May 2, 1906, Serial No. 314,755. Renewed July 30, 1907. Serial No. 386,244.

To all whom it may concern:

Be it known that I, JAMES LANE POALK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Looms, of which the following is a specification.

My invention has relation to that class of looms wherein a continuous weft thread is drawn from outside the loom by a shuttle which carries through the shed a doubled portion of said thread and in such connection it relates particularly to means whereby with a single shuttle drawing said double thread through the shed at each pick one portion of the doubled thread is beaten up in the fabric whereas the other portion is drawn out into position so that it may be carried by the shuttle and drawn through the next shed upon the reverse movement of the shuttle.

The nature and scope of my invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof in which:—

Figures 1 to 4 are diagrammatic views illustrating the successive steps in the formation of a fabric with my improved loom. Fig. 5 is a side elevational view of the means for holding one end of the doubled thread, the means for releasing said end and the means for severing said thread at certain intervals or picks of the shuttle. Fig. 6 is a detail view of the star wheel which controls the clamping means. Fig. 7, is an enlarged detail view of a portion of the clamping and severing means. Fig. 8, is a view similar to Fig. 7 but illustrating the lower portion of the clamping means on the side opposite to that shown in Fig. 7. Fig. 9, is a sectional view on the line X—X of Fig. 7. Fig. 10, is a vertical sectional view enlarged of the loom illustrating the reed or batten, and the operating mechanism for drawing a portion of the doubled thread out of the fabric. Fig. 11 is a front elevational view of a portion of the loom the parts being drawn to a smaller scale than shown in Figs. 5 to 10. Fig. 12, is a vertical sectional view on the line y—y of Fig. 11 and, Fig. 13, is an enlarged view of a form of shuttle employed in the loom.

In the drawings Figs. 5 to 13 only such parts of a loom are illustrated as are necessary to understand the present invention. The reed or batten *a* is operated in the usual manner from a power shaft not shown and upon the lay *b* the shuttle *b'* to be hereinafter more fully described, travels to carry a doubled portion of a weft thread *d* taken from a spool or reel *d'* located outside the movable parts of the loom.

Before describing in detail the various mechanisms used in my improved loom, a reference to the prior art and to Figs. 1 to 4 of the drawings will serve to more clearly set forth the nature and scope of my present invention. In the weaving of fabrics it has been proposed to throw in the weft from a continuous source of supply in at least two ways, namely in doubled threads which are beaten up together in a single shed and in doubled threads alternating with single cut off wefts, in which but one portion of each doubled weft is beaten up in a single shed. Thus, in Letters Patent #691,370 dated January 21st, 1902, for instance, a single shuttle throws into each shed a doubled warp which is beaten up double. A series of selvage shuttles ties in the doubled weft threads. Again in my Letters Patent #752,922 dated February 23d 1904 a shuttle throws in a doubled weft thread one portion only of which is beaten up in a shed, and a second shuttle throws in at alternate picks a short weft. In this instance the other portion of the doubled weft thread is held out of the path of the reed or batten when the first portion is beaten up and is brought back into position to be beaten up into the fabric at the proper time.

In the present invention as clearly shown in the diagrammatic Figs. 1 to 4, a single shuttle throws into the fabric at each pick a doubled thread but only one portion of each doubled thread is beaten up in each shed. In following the method of weaving in my improved loom, Fig. 1 illustrates the position of the doubled weft thread *d* at the end of the first pick, the shuttle traveling from right to left. In this instance the shuttle draws the thread doubled across the entire warps, the thread leading through a guide from the reel *d'*. At the end of the movement of the shuttle, a portion (the lowermost portion) of the doubled thread is drawn out of the shed of the fabric by a mechanism to be hereinafter described, and it extends out of the path of the shuttle as indicated by the portion *d*<sup>2</sup> of Fig. 1. The upper portion *d*<sup>3</sup> of the thread *d* is now beaten up into the fabric (see Fig. 2) and the shuttle is next returned from left to right carrying into the next shed the portion *d*<sup>2</sup> as clearly illustrated in Fig. 2, which is then beaten up. Upon the next pick, the shuttle travels from right to left (Fig. 3) with the continuation *d*<sup>5</sup> of the thread *d*<sup>3</sup> in the lower position and an upper portion *d*<sup>4</sup> follows with the shuttle. As the shuttle reaches its position at the left, a shearing device (to be more fully described hereinafter) located at the right of the fabric cuts the thread leaving the upper portion *d*<sup>4</sup> free to be drawn out of the shed to permit the portion *d*<sup>3</sup> to be

- beaten up. After being so beaten up the shuttle returns from left to right drawing into a shed the portion  $d^4$  of the thread  $d$ , (see Fig. 4) which may be beaten up (see Fig. 1) and the cycle of operations again begin.
- 5 From the foregoing description it will be understood that certain mechanisms are requisite to permit of the manipulations of the weft thread. The main mechanism is that which withdraws a portion of the doubled weft thread from the shed before the remaining portion
- 10 is beaten up in the fabric. This mechanism in its preferred form is illustrated in detail in Figs. 10, 11, and 12 and is as follows: To the lay  $b$  is pivoted one end of a long arm or lever 1, the free end of which carries a hook 2 traversing a slot 3 formed in the opposite end of the lay  $a$ . The necessary oscillation of the arm 1 is secured
- 15 by a link 4 connected at one end by a universal joint 5 with the arm 1 and at the other end by a similar universal joint 6 with the free end of a lever 7 pivoted as at 8 to a fixed part of the loom and extending underneath a cam 9 secured to the picker shaft  $a'$  of the loom. The lever 7 is held against the cam 9 by means of the spring
- 20 70. The cam 9 has its throw surface so arranged that at the proper intervals of time the hook 2 is lowered or raised, being lowered at the end of the first and third picks for instance and raised at the end of the other two picks. The hook 2 traverses a slotted plate 10 pivoted
- 25 to the upper portion of lay  $b$  at its slot 3 and this plate 10 is normally held down upon the lay  $b$  in closed position by means of the link 11, bell crank lever 12 and spring 13, when the hook 2 projects above the plate 10 as illustrated in Fig. 12. The lever 12 is connected
- 30 by cord 14 and spring 15 with the arm 1 carrying the hook 2, the cord passing through the eye 16. When the hook 2 is lowered and its arm 1 passes below eye 16 to the lowermost position, the cord 14 is tightened and pulls the lever 12 to raise the plate 10. The plate 10
- 35 serves when lifted to elevate that portion of the weft thread drawn out of the shed by the hook so that upon the reverse pick of the shuttle it may be caught by the shuttle and drawn through the next shed. The plate 10 is useful only when the hook 2 draws the inoperative portion of the weft thread not only out of the shed but
- 40 also out of the shuttle. If the thread remains in the shuttle after being drawn out of the shed as at the beginning of the fourth pick (see Fig. 3) the plate 10 performs no useful function. The next mechanisms which are preferably used in the improved loom are those which hold and sever the weft thread at the point
- 45 between the spool  $d'$  and the entrance into the shed. To simplify the construction of the loom the gripping and severing mechanisms for the weft thread are combined as illustrated in detail in Figs. 3 to 9 of the drawings and are constructed and arranged preferably as follows:
- 50 The thread  $d$  as it leaves the spool  $d'$  passes through one or more fixed guides  $e e'$  and adjacent to one of these guides 2 is arranged the gripper, which oscillates with the reed  $a'$ . Secured to the top of the reed  $a'$  is a plate 20 forming substantially a journal within which turns a star wheel 21 the shaft of which has its bearing in the plate 20. The star wheel 21 is prevented from rotation
- 55 in one direction by the spring pawl or stop 22 (see Fig. 6) and it is moved with a step by step motion in the opposite direction by means of the finger 23 pivoted at one end in a fixed part 24 of the loom and projecting with its free end in alinement with the arms of the star wheel 21. A spring 25 normally holds the finger 23 down into alinement with the arms of the star wheel 21 and yet permits the finger 23 to be raised during the oscillation of the reed  $a'$  in one direction (from left to right in Fig. 70
- 60 5) to allow the arms of the star wheel to come successively into alinement with the end of the finger 23. An adjustable pin or screw 26 serves as a stop to limit the downward movement of the finger 23 under the influence of its spring 25. Each oscillation of the reed  $a'$  from right to left causes an arm of the star wheel 21 to abut against the finger 23 and the star wheel is thus rotated step by step. The shaft of the star wheel 21 carries the cams 30 and 40 of suitable contour or shape. The cam 30 as it travels with the star wheel 21 rocks a lever arm 31 to the lower end of which a gripping jaw 32 is adjustably secured by a slotted arm 33. The rocking of the lever arm 31 thus serves to operate the gripping jaw 32 at certain intervals of time namely at the beginning and ending of the fourth pick (see Figs. 3 and 4). The other cam 40 controls through the spring controlled arm 41, lever 42, and link 43, the movement of the lower jaw 44 which carries a cutting blade 45, so that at certain periods of time the jaw 44 is swinging on its pivoted connection 46 with the jaw 32 to approach or recede from the jaw 32 and thus to close or open said jaws. The cam 40 has upon its cam surface an abrupt termination 47 of which the spring controlled arm 41 passes at certain intervals and through the intermediate connections serves to operate the jaw 44 to release the end  $d'$  of the weft  $d$  at the proper time.
- The shuttle  $b'$  used in the loom is operated by the usual picker sticks and picker stick mechanism not shown. It has intermediate of its ends the oppositely inclined hook like indentations  $b^2 b^3$  which serve alternately to catch the weft and draw it through the shed.
- Having thus described the nature and object of my invention what I claim as new and desire to secure by Letters Patent is:—
1. In a loom, a shuttle to draw a doubled weft thread through the shed at each pick, means for drawing one portion of said doubled thread out of the shed, means for beating up the other portion of said thread into the fabric and means for holding the drawn out portion in position to be carried by the shuttle through the next shed upon the reverse movement of said shuttle.
  2. In a loom, a shuttle to draw a doubled weft thread through the shed at each pick, a spool located outside the movable parts of the loom and from which spool said thread is drawn by said shuttle, a hook mechanism to draw out one portion of the doubled thread from the shed, a means for beating up the portion of the thread remaining in the shed, and a means for presenting the drawn out portion of the thread to the shuttle upon the reverse pick.
  3. In a loom, a shuttle to draw a doubled weft thread through the shed at each pick, a hook mechanism to draw out one portion of the doubled thread at the end of each first and third pick, a means for beating up the portion of the doubled thread remaining in the shed at the end of each pick, and a means for presenting the drawn out portion of the thread to the shuttle upon the beginning of the second and fourth picks to draw said drawn out portion through a shed.
  4. In a loom, a shuttle to draw a doubled weft thread through a shed at each pick, means for drawing one por-

tion of said thread out of the shed, means for beating  
up the other portion of said thread into the fabric, a  
spool located outside the movable parts of the loom, from  
which spool said thread is drawn by the shuttle, a severing  
5 device for the thread and a means for operating said  
severing device upon certain picks of the shuttle.

5. In a loom, a lay, a shuttle to draw a doubled thread  
through a shed, a gripping means for the thread ar-  
ranged on and carried by the lay, a severing device com-

bined with the gripping means, a hook mechanism car- 10  
ried by and traversing the lay and means for operating  
said hook mechanism at certain picks of the shuttle to  
draw out from a shed one portion of the doubled thread  
carried by the shuttle after the thread has been severed.

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