

No. 628,206.

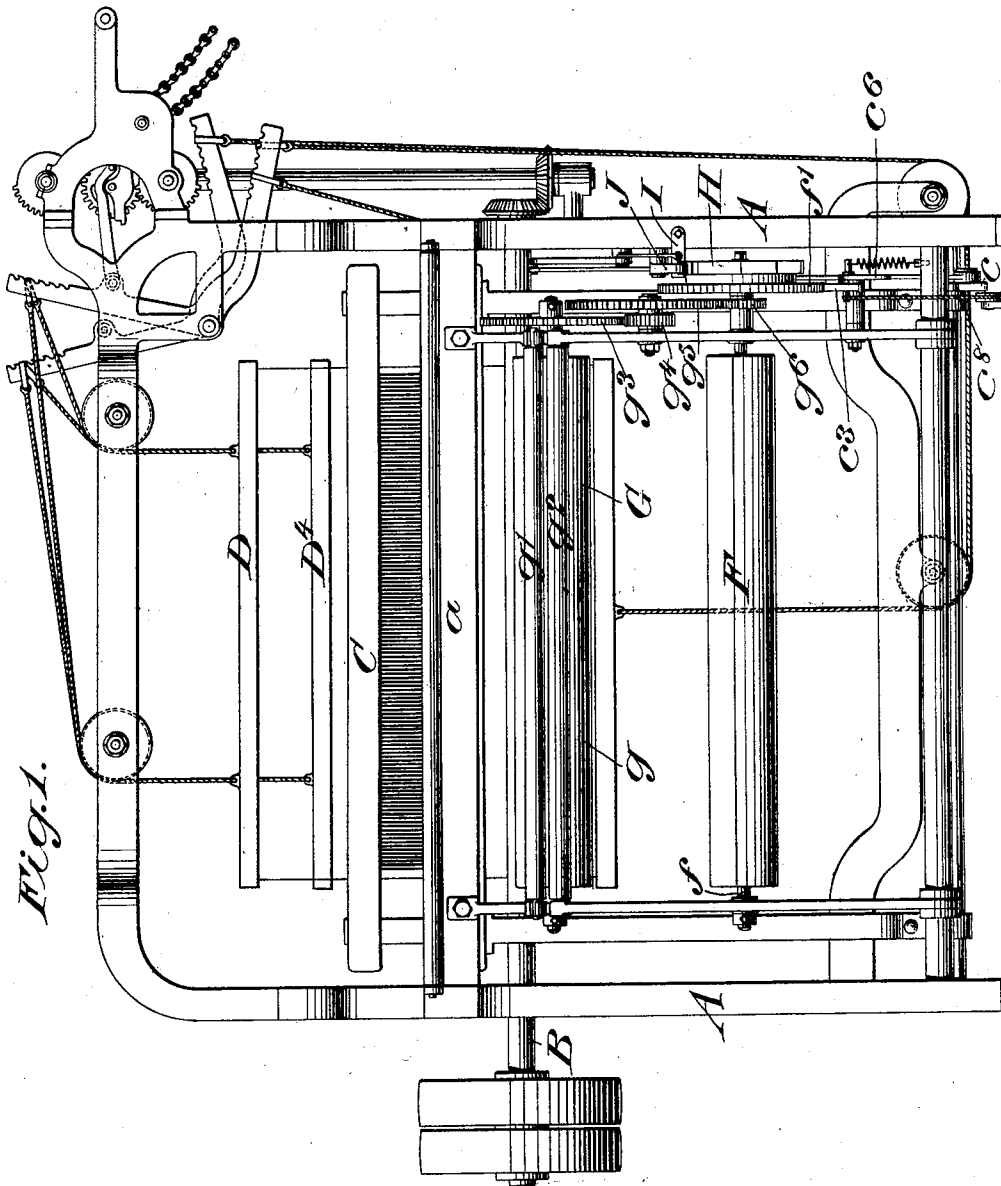
Patented July 4, 1899.

W. J. LUTTON.
LOOM.

(Application filed Sept. 23, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:-
M. E. Fletcher.
J. H. Haynes

Inventor:
W. J. Lutton
by attorneys.
M. E. Fletcher

No. 628,206.

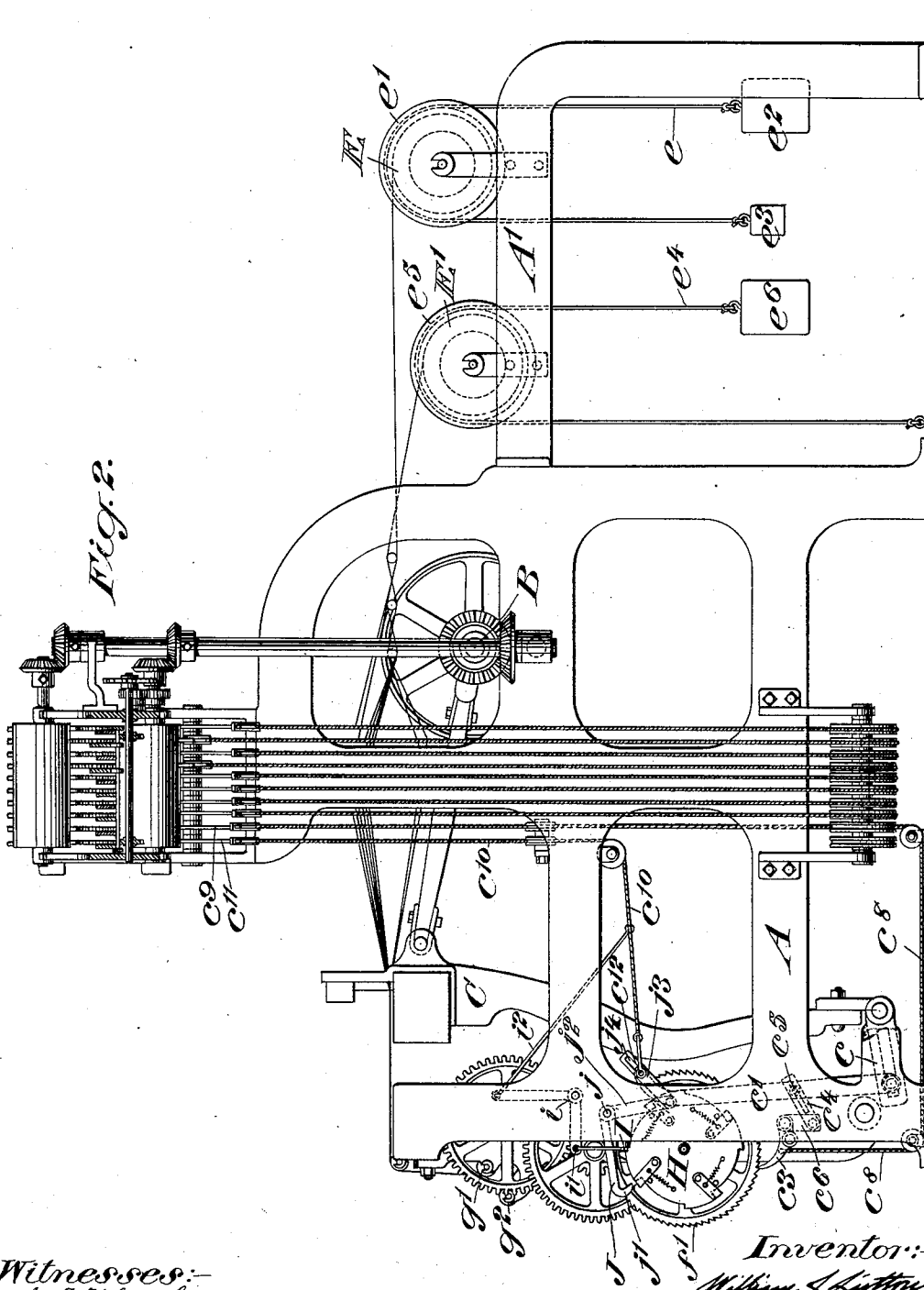
W. J. LUTTON.
LOOM.

Patented July 4, 1899.

(Application filed Sept. 23, 1898.)

(No Model.)

3 Sheets—Sheet 2.



No. 628,206.

Patented July 4, 1899.

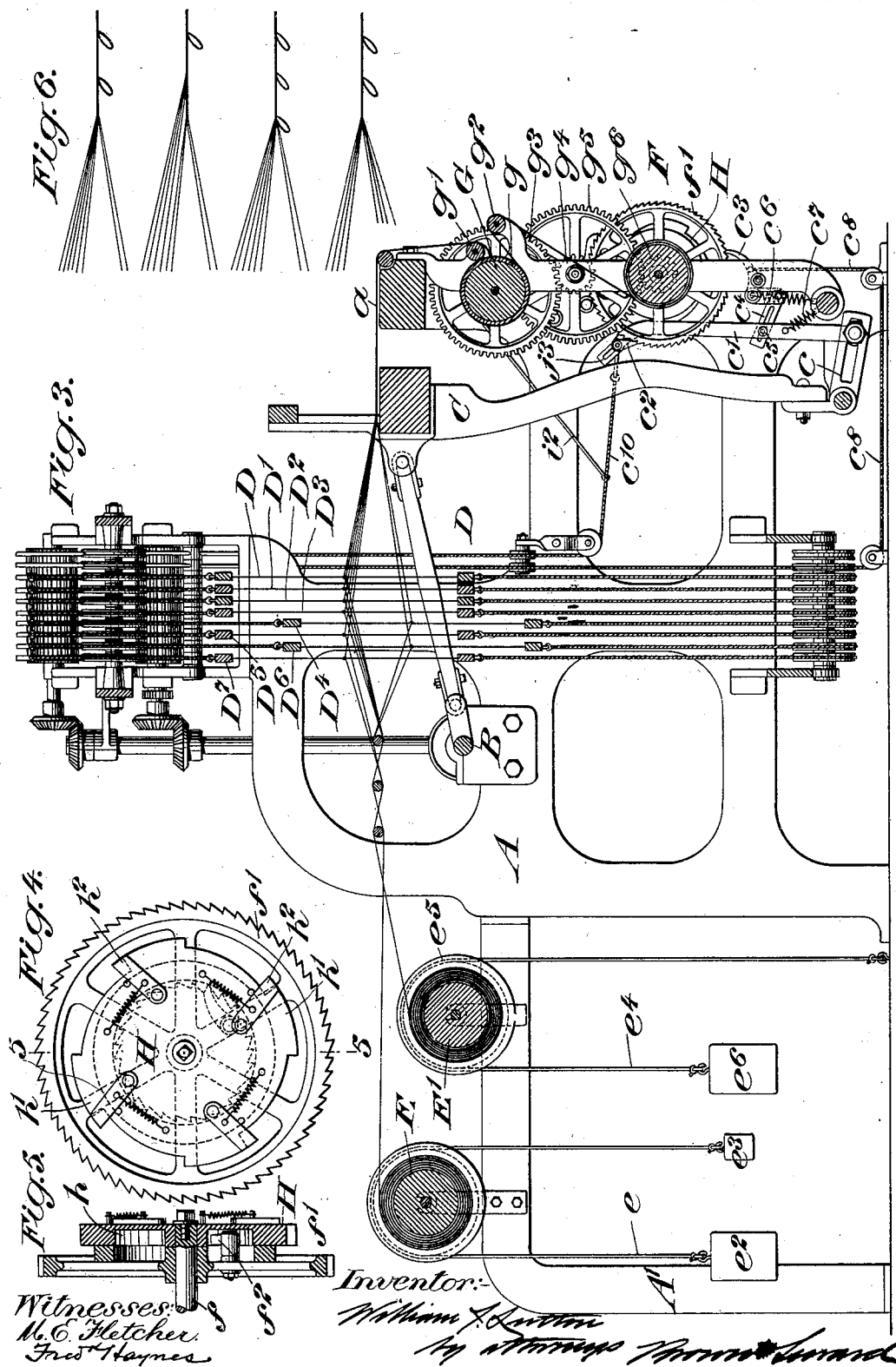
W. J. LUTTON.

LOOM.

(Application filed Sept. 23, 1898.)

3 Sheets—Sheet 3.

(No Model.)



UNITED STATES PATENT OFFICE.

WILLIAM J. LUTTON, OF PATERSON, NEW JERSEY.

LOOM.

SPECIFICATION forming part of Letters Patent No. 628,206, dated July 4, 1899.

Application filed September 23, 1898. Serial No. 691,673. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. LUTTON, a citizen of the United States, and a resident of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Looms, of which the following is a specification.

My invention consists in an improvement in looms whereby plaits of any desired width may be woven at the required distances apart into a fabric during the continuous weaving thereof.

My invention further consists in providing mechanisms for producing the above results which will be very simple and effective and which will not interfere in the regular action of the heddles and lay-beam of the loom.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents a front view of the loom with my improvements embodied therein. Fig. 2 is a side view of the loom. Fig. 3 is a vertical section from front to rear. Fig. 4 is a side view of the winding ratchet-wheel and its releasing-cam. Fig. 5 is a vertical central section through the same in the plane of the line 5 5 of Fig. 4. Fig. 6 represents in detail four views of the fabric, showing the several stages during the weaving of the plaits therein.

The main frame A of the loom is constructed in the usual manner, and it is provided with a drive-shaft B, which drive-shaft is connected to and operates the lay-beam C.

To illustrate the operation of my invention, I have shown eight heddles mounted in the loom, the upward and downward movements of the heddles being controlled by pattern-chains and intermediate mechanism, as is usual. These heddles I have designated by D D' D² D³ D⁴ D⁵ D⁶ D⁷. All of the heddles are utilized for the weaving of the body of the fabric, and the heddles D⁴ to D⁷, inclusive, are used for weaving the loops which are to form the plaits, while the heddles D to D³, inclusive, are lying idle.

An auxiliary frame A' is attached to the rear of the frame A, and in said frame are mounted two warp-beams E E'. The warp-beam E is utilized for supplying the warp-threads to the heddles D to D³, inclusive,

and the warp-beam E' is utilized for supplying warp-threads to the heddles D⁴ to D⁷, inclusive. The warp-beam E is provided with a weighted frictional device, which consists of a strap or cord e, passing over a pulley e' on the warp-beam and provided at its dependent ends with a larger weight e² and the smaller weight e³. The tendency of the larger weight e² is to wind the warp-threads onto the beam E, thereby tending to pull the threads leading to the heddles D to D³, inclusive, rearwardly. A frictional device is engaged with the warp-beam E' for holding the threads leading to the heddles D⁴ to D⁷, inclusive, at all times taut, which frictional device comprises a strap or cord e⁴, passing over a pulley e⁵ on the warp-beam E', one end of the cord or strap being attached to the floor or other suitable support and the other end being provided with a weight e⁶.

The winding-beam upon which the completed fabric is wound is denoted by F, and it is mounted at the front of the loom some distance beneath the breast-beam a. An intermediate winding-roll G is mounted at the front of the loom between the winding-beam F and the breast-beam a, which intermediate winding-roll is preferably provided with a friction-surface g for engaging the fabric and preventing it from slipping thereon as the fabric is wound and unwound. Idler-rollers g' g² are mounted in proximity to the roll G, so as to cause the fabric to engage a considerable portion of the periphery of the said roll. The roll G is connected with the winding-beam F by a train of gearing, which consists in the present instance of a spur-gear g³ and pinion g⁴ intermeshing therewith and a spur-gear g⁵ and a pinion g⁶ intermeshing therewith.

The means which I have shown for imparting a rotary movement to the winding-beam F, and thereby to the winding-roll G, in a direction to wind the completed fabric is as follows: A ratchet-wheel f' is mounted on the shaft f of the winding-beam F. The lay-beam C is provided with a slotted arm c, projecting forwardly from its hinged connection with the frame. An upwardly-extended bar c' is adjustably secured at its lower end to the arm c, and at its upper or free end it is provided with a gravity-pawl c², which is adapted to

normally rest in engagement with the teeth of the ratchet-wheel f' . A second spring-actuated pawl c^3 is mounted on the loom-frame and is normally held in engagement with the teeth of the ratchet-wheel f' , which pawl is provided with a rearwardly-extended slotted arm c^4 , which engages a pin c^5 on the upwardly-extended bar c' . To insure the proper movement of the pawl c^3 , the rearwardly-extended arm c^4 is connected with the pawl c^3 by means of a link c^6 . A retracting-spring c^7 leads from the bar c' to a support on the loom-frame, tending to hold the bar at the limit of its forward movement with its pawl c^3 in engagement with the ratchet-wheel f' . The rocking movement of the lay-beam C will thus impart a regular winding movement to the winding-beam F. The pawl c^3 is withdrawn from engagement with the ratchet-wheel f' , when it is desired to do so, by means of a flexible connection c^8 , leading from said pawl around suitable idler-pulleys up to the usual lever c^9 , controlled by one of the pattern-chains. The upwardly-extended bar c' is swung rearwardly and the pawl c^2 thereby withdrawn from its engagement with the teeth of the ratchet-wheel f' , when it is desired, by means of a flexible connection c^{10} , leading from the free end of the said bar c' around suitable idler-pulleys up to the usual lever c^{11} under control of one of the pattern-chains.

The arrangement of the pattern-chains is such that all of the heddles and their warp-threads are used for weaving the body of the fabric between the plaits and only certain of the heddles—in the present instance, the heddles D^4 to D^7 , inclusive—and their warp-threads are used for weaving the strip which is to form the plait, while the other heddles—viz., D to D^3 , inclusive—are held motionless.

The means which I employ for permitting the fabric to be drawn rearwardly at the proper intervals for allowing the lay-beam to beat up the portion of the fabric which has been woven to form the loop or plait is as follows: A cam H is mounted loosely on the shaft f of the winding-beam F in proximity to the ratchet-wheel f' . The cam H has a pawl-and-ratchet connection with the ratchet-wheel f' , which is so arranged that as the ratchet-wheel f' is rotated, tending to wind the fabric upon the winding-beam F, the cam H is not rotated by said ratchet-wheel, while if the ratchet-wheel f' is rotated in the opposite direction, tending to unwind the fabric from the winding-beam, the said cam will be also rotated. This is accomplished in the present instance by providing the cam H with an interior ratchet-face h , which is engaged by a pawl f^2 , carried by the ratchet-wheel f' . The periphery of the cam H is provided with a series of teeth h' , (in the present instance four are shown,) which teeth have abrupt faces, as shown. The cam is held against a rearward movement by means of a swinging latch I, hinged to the main frame A of the

loom in position to permit its nose to rest upon the periphery of the cam H in engagement with the rear face of one of the teeth h' . A locking and releasing pawl J is pivoted at j to the main frame A directly above the cam H, with its nose j' arranged to drop into position to engage the front face of one of the teeth h' when permitted to do so. This pawl J is provided with a downwardly-extended arm j^2 , to the lower end of which is secured a rearwardly and upwardly extended slotted arm j^3 . The slot j^4 in the arm j^3 embraces the pin c^{12} in the end of the bar c' , upon which the pawl c^2 is hinged. The connection of the pawl J with this pin c^{12} is such that when the flexible connection c^{10} is drawn rearwardly to release the pawl c^2 from engagement with the ratchet-wheel f' the pawl J is permitted to fall by gravity into the position to engage one of the teeth h' of the cam. The latch I is withdrawn simultaneously with the withdrawal of the pawl c^2 by means of a rocking lever i on the loom-frame, having one arm connected with the latch by a suitable connection i' and its other arm connected with the flexible connection c^{10} by a suitable connection i^2 .

For preventing the nose j' of the pawl J from accidentally dropping into engagement with the front face of the tooth h' directly beneath it I provide a series of spring-actuated hinged guards h^2 , which are arranged in position to swing forwardly a slight distance beyond the front faces of the teeth h' the moment that the nose j' is released from any one of the said teeth.

The operation of my invention is as follows: All of the heddles D to D^7 , inclusive, are operated alternately to form the body of the fabric being woven, and as the loom is operated the completed fabric is wound onto the winding-beam F in the manner hereinbefore set forth. After the required amount of the body of the fabric has been woven the warp-threads which lead from the beam E are held stationary while the warp-threads which lead from the beam E' are being utilized to weave the portion of the fabric which is to form the plait or loop. When the desired amount of fabric to form the plait has been woven, the winding mechanism is released, and the fabric will be drawn rearwardly until the last shot of weft of the plait is forced by the movement of the lay-beam into proximity to the first shot of weft of the said plait, thereby forming a loop. While this beating-up process is going on all of the heddles have been set in motion, and the weaving of the body of the fabric is again begun. As the plait portion of the fabric is being set up to form the plait or loop the regular shots of weft are introduced into the fabric, so that when the plait is finally set up there will be a sufficient number of shots of weft woven into the fabric to securely lock the plait. The amount of fabric to be woven between each of the plaits is controlled by the spools upon certain of the pat-

tern-chains, and the size of the plaits is controlled by the spools upon a special pattern-chain which controls the levers $c^9 c^{11}$, which levers are connected with the winding mechanism, as has heretofore been set forth. The cam H is arranged so that its partial rotation from one tooth to the next will permit the withdrawal of the fabric a sufficient distance to beat up the narrowest plait which it is desired to make in the loom, and the spools on the pattern-chain may be so arranged that the cam H may successively release any number of teeth, so as to permit the backward movement of the fabric a distance sufficient to correspond to the widest plait which it is desired to weave. While I have shown the cam H as provided with four teeth in the accompanying drawings, it is evident that cams with a greater or lesser number of teeth may be employed, if so desired.

By the structure hereinbefore set forth I am enabled to weave plaits of varying widths into the fabric during the continuous operation of the loom, and I can weave these plaits at varying distances apart to suit different requirements. This structure is intended more especially for use in weaving plaited silk goods.

I have not shown nor described herein the mechanism for inserting the weft into the fabric, as I believe that it would tend to unduly complicate the structure. Any suitable weft-introducing means may be employed, as the structure which I have described for weaving the plaits into the fabric does not interfere at all with the weft-introducing mechanism.

What I claim is—

1. A loom for weaving a plaited fabric comprising means for alternately weaving the body and plait portions of the fabric, means for moving the fabric forwardly, means for releasing the fabric, means for moving the fabric rearwardly when it is released and means for beating up the plait portions during the rearward movements of the fabric to form the plaits, substantially as set forth.

2. A loom for weaving a plaited fabric comprising means for weaving the body of the fabric, means for weaving plait portions into the fabric, means for moving the fabric forwardly while the plait portion is being woven, means for releasing the fabric, means for moving it rearwardly after the completion of the plait portion and means for beating up the plait portion to form a plait as the fabric is moved rearwardly, substantially as set forth.

3. In a loom for weaving a plaited fabric, the combination with the heddles, the lay-beam and means for operating it, of a warp-beam for supplying threads for the body of the fabric, another warp-beam for supplying threads for the plait portion and the body of the fabric and means for alternately operating all of the heddles to form the body of the fabric and then only the heddles through which the warp-threads from the second-named warp-beam pass to form the plait

portions of the fabric and means for drawing the warp-threads, leading from the first-named warp-beam, rearwardly at intervals for causing the lay-beam to beat up the plait portions into plaits substantially as set forth.

4. In a loom for weaving a plaited fabric, the combination with the heddles, the lay-beam and means for operating it, means for operating the heddles to alternately weave the body and plait portions of the fabric, means for positively moving the fabric forward and releasing it at intervals and means for moving the fabric rearwardly when released, substantially as set forth.

5. A loom for weaving a plaited fabric comprising a lay-beam, means for operating it, heddles, means for operating the heddles for alternately weaving the body and plait portions of the fabric, a winding-beam engaging the fabric, means under the control of the movement of the lay-beam for operating the winding-beam, means for disconnecting the winding-beam from the lay-beam at predetermined intervals and means for moving the fabric rearwardly when released whereby the lay-beam is caused to beat up the plait portions of the fabric into plaits, substantially as set forth.

6. A loom for weaving a plaited fabric comprising a lay-beam, means for operating it, means for alternately weaving the body and the plait portions of the fabric, a winding-beam engaging the fabric, an intermediate winding-roll engaging the fabric and geared with the winding-beam, means under the control of the lay-beam for rotating the winding-beam means for disconnecting the winding-beam from the lay-beam at intervals and means for moving the fabric rearwardly whereby the lay-beam is caused to beat up the plait portions into plaits, substantially as set forth.

7. In a loom, the combination with the winding-beam means for rotating it in one direction and means tending to rotate it in the opposite direction when released, of a cam for controlling the reverse movement of the winding-beam, substantially as set forth.

8. In a loom, the combination with the winding-beam, its operating-wheel means for rotating it in one direction and means for rotating it in the opposite direction when released, of a controlling-cam connected with the said operating-wheel and means for releasing the cam to permit it and thereby the operating-wheel to rotate a predetermined distance in a direction to unwind the winding-beam, substantially as set forth.

9. In a loom, the combination with the winding-beam, its operating-wheel means for rotating it in one direction and means for rotating it in the opposite direction when released, of a controlling-cam having a slip-clutch connection with the said wheel and provided with a plurality of teeth, a pawl arranged to prevent a rotary movement of the cam in one direction, a second pawl arranged

to limit the rotary movement of the cam in the other direction and means for operating the pawls to permit the cam and thereby the operating-wheel to rotate a predetermined distance in a direction to unwind the winding-beam, substantially as set forth.

10. In a loom, the combination with the winding-beam means for rotating it in one direction and means tending to rotate it in the opposite direction when released, of a cam for controlling the reverse movement of the winding-beam, the said cam having a plurality of teeth, a pawl arranged to engage and disengage the said teeth and a plurality

of spring-actuated hinged guards carried by the cam in position to swing forwardly a slight distance beyond the front faces of the teeth when the pawl is disengaged therefrom, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 18th day of August, 1898.

WILLIAM J. LUTTON.

Witnesses:

FREDK. HAYNES,
M. E. FLETCHER.