

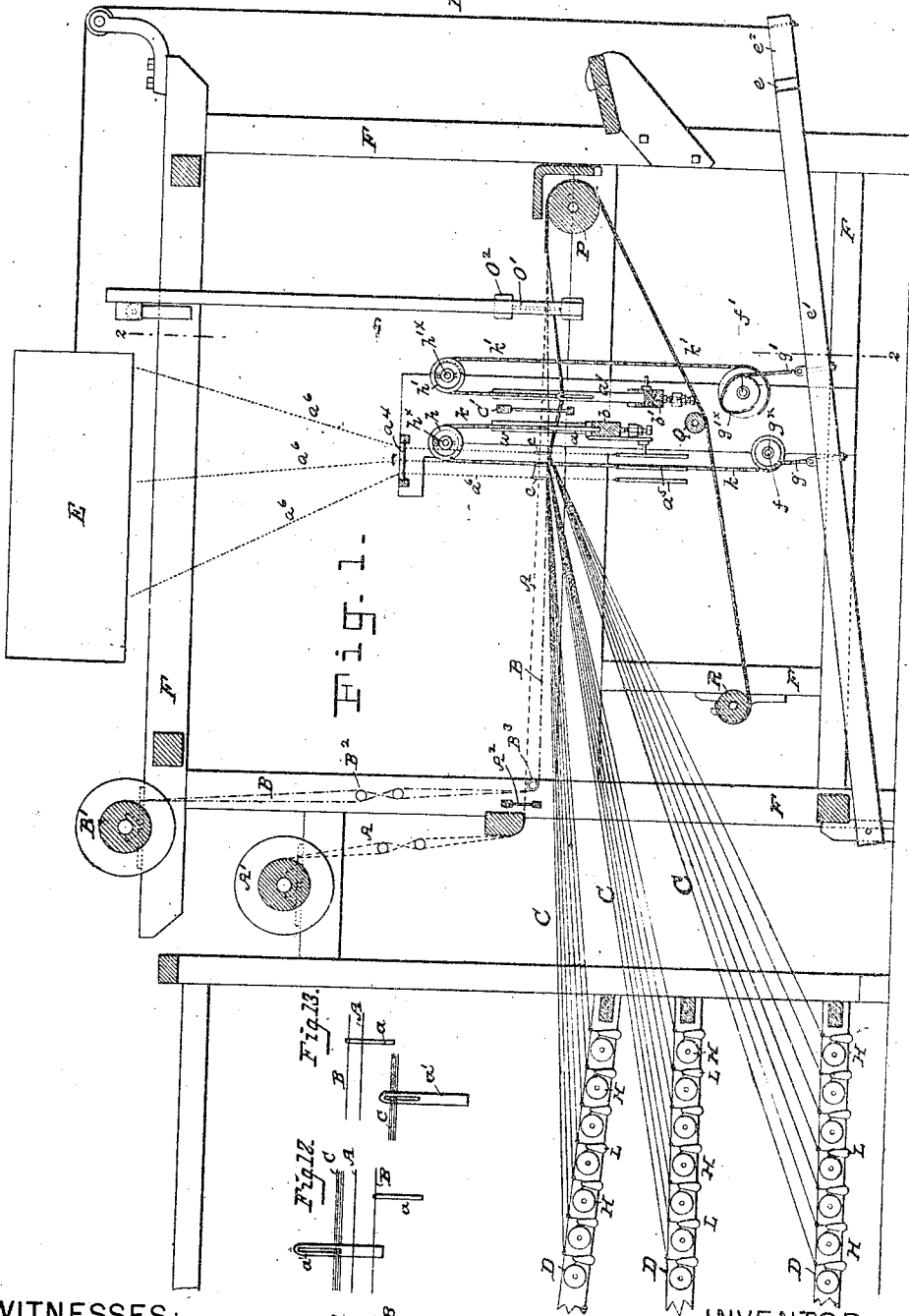
(No Model.)

3 Sheets—Sheet 1.

A. DUQUESNE.
LOOM.

No. 366,940.

Patented July 19, 1887.



WITNESSES:

E. B. Colton
Frank Moulton

INVENTOR:

Adrien Dagueane
By his Attorneys,

Burke, Isaac House

(No Model.)

3 Sheets—Sheet 2.

A. DUQUESNE.
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Fig. 2.

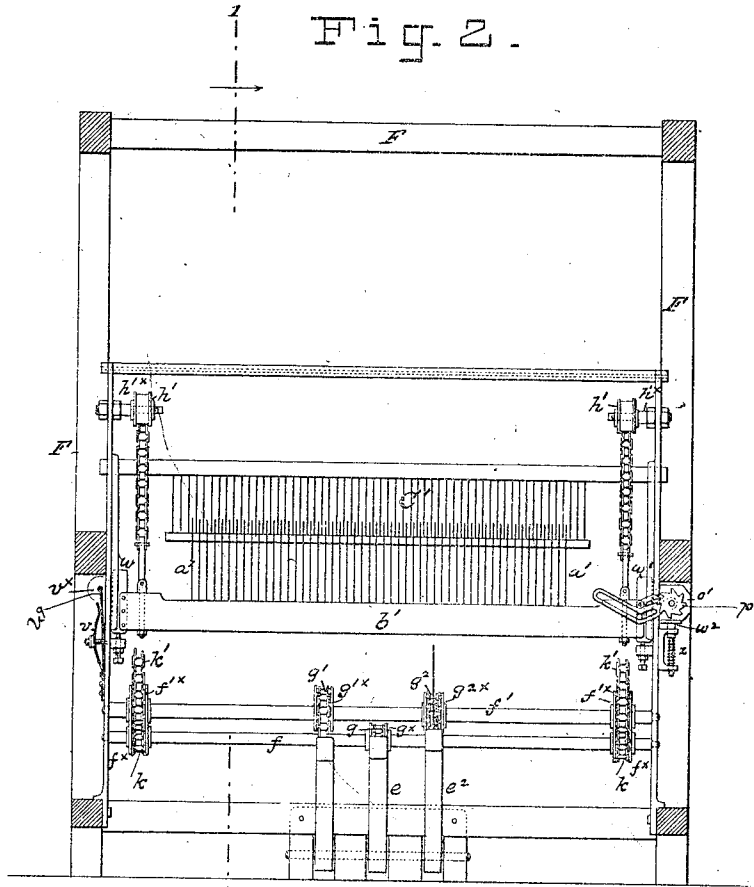


Fig. 3.

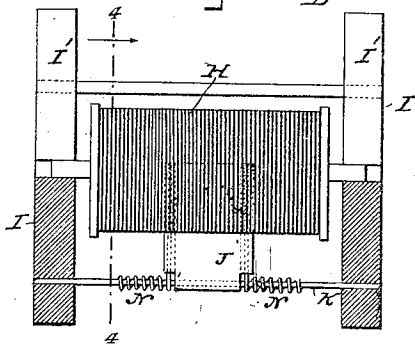
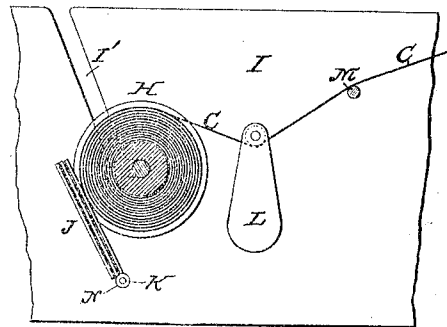


Fig. 4.



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3 Sheets—Sheet 3.

LOOM.

No. 366,940.

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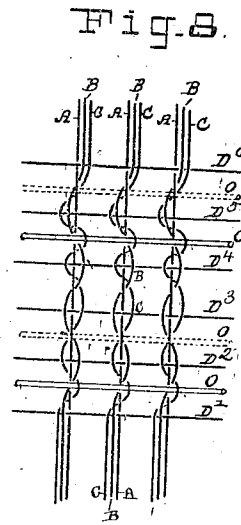
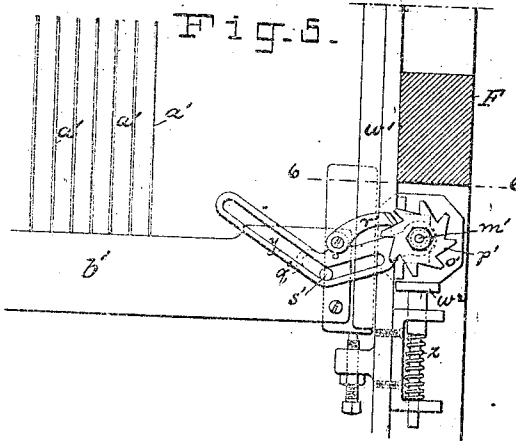


Fig. 7.

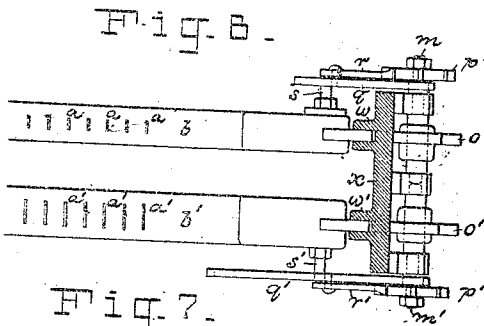
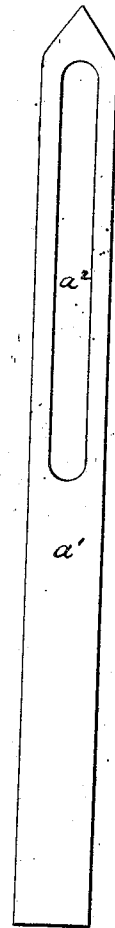
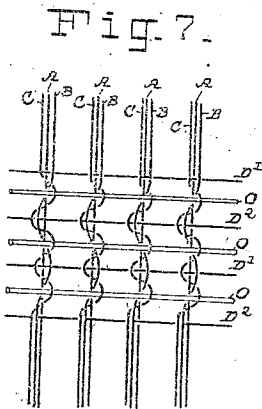
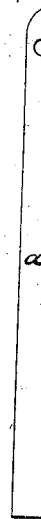


Fig. 9.



WITNESSES.

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UNITED STATES PATENT OFFICE.

ADRIEN DUQUESNE, OF PARIS, FRANCE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 356,940, dated July 19, 1887.

Application filed July 21, 1885. Serial No. 172,513. (No model.) Patented in France March 1, 1883, No. 154,627; in England March 8, 1883, No. 1,259, and January 29, 1885, No. 1,285; in Belgium March 9, 1883, No. 69,690, and in Germany March 18, 1883, No. 21,471.

To all whom it may concern:

Be it known that I, ADRIEN DUQUESNE, a citizen of the French Republic, and a resident of Paris, France, have invented certain improvements in Looms, (for which invention I have been granted patents in France, No. 154,627, dated March 1, 1883; in England, No. 1,259, dated March 8, 1883, and No. 1,285, dated January 29, 1885; in Belgium, No. 69,690, dated March 9, 1883, and in Germany, No. 21,471, dated March 18, 1883,) of which the following is a specification.

My invention relates to that class of looms wherein needles are employed in lieu of heddles for carrying the warps and forming the shed.

My loom is designed for weaving velvet carpets and other analogous fabrics, and forms what is called the "buckle" or "knot" stitch. When a fabric is woven with this stitch, it may be cut without danger of its raveling at the cut or raw edges.

My loom is adapted for weaving single or double faced fabrics, or plain fabrics with two different faces.

I employ two kinds of needles for carrying the warps, one kind having simple round eyes and the other kind having elongated or slot-like eyes. In weaving plain fabrics—that is, fabrics without pattern or design—the first-mentioned kind of needles are employed for both the binding warp and face or pile warp, and in these needles the warp threads have no vertical play in the needle eyes; but in weaving figured fabrics the threads of the face or pile warp pass through and play in the elongated eyes of the last-mentioned class of needles. Each set of needles is mounted in a bar extending across the loom, with the points of all the needles directed upward, and these bars are given the necessary up-and-down movement required for forming the shed, and a right-and-left or "shogging" movement to produce the buckle or knot stitch.

In weaving figured fabrics on my loom several threads of the woolen warp, of different colors arranged in proper order, pass through the elongated eye of a needle, and these form the face and back of the fabric, being thrown

up according to the positions they are to occupy in the design. Each thread of the face or pile warp is thrown up in its proper order through the medium of an ordinary Jacquard mechanism, the rings or "perles" of which carry the several threads of the warp in a manner well understood by weavers. By reason of the elongated character of the eyes of the needles which carry the face or pile warp the upward and downward movements of these needles must be increased proportionately.

In weaving plain or unfigured fabrics the face or pile warp is supplied from a single warp beam; but in weaving figured fabrics the threads of the face or pile warp are supplied from bobbins, each of which carries a warp thread. The face or pile warp alone being visible on the face of the fabric, the threads of this warp are the only ones that need be of wool or other fine material. The other threads of the warp may be of hemp, linen, cotton, or other cheap fiber of sufficient strength.

In order that my invention may be the better understood, I will describe it with reference to the accompanying drawings, wherein it is shown embodied in a loom for weaving figured velvet carpets.

Figure 1 is a longitudinal vertical section or sectional elevation taken on line 1 1 in Fig. 2; and Fig. 2 is a vertical transverse section or sectional elevation, the plane of the section being substantially indicated by line 2 2 in Fig. 1. In this view the frame of the loom is in section and the treadles in elevation, as seen from the front end of the loom. Figs. 3 and 4 illustrate on a large scale a bobbin for one of the pile-warp threads, showing the mode of mounting the same in the rack and the tension-regulating devices. Fig. 3 shows the bobbin in elevation and the rack in section. Fig. 4 is a section, substantially on line 4 4 in Fig. 2, showing the tension devices in elevation. Figs. 5 and 6 are respectively a sectional elevation and a sectional plan on a large scale, illustrating the mechanism for imparting the lateral movements to the needle-bars. Fig. 5 shows the operative mechanism and part of one needle-bar, with its needles in elevation; and Fig. 6 shows the same parts in plan, the

plane of the section in Fig. 6 being taken substantially on line 6 6 in Fig. 5. Figs. 7 and 8 are diagrams illustrating the interlocking of the threads in fabrics woven on my loom. These will be referred to hereinafter. Fig. 9 illustrates on a large scale one of the needles employed in my loom, provided with an elongated eye for the passage of the pile warp; and Fig. 10 is a similar view of another of the needles, which has a simple round or non-elongated eye. Figs. 11, 12, and 13 are explanatory diagrams illustrating the action of the Jacquard mechanism on the warp in connection with the needles having elongated eyes.

Referring particularly to Figs. 1 and 2, I will explain first the construction of my loom.

In Fig. 1 I have shown three warps, A, B, and C, properly set in the loom. A is the plain warp, usually of hemp or cotton, the threads of which are led off from a warp-beam, A', through a reed, A'', mounted in the loom-frame, thence through a reed, C', and thence through a reed, O', carried by the lay O''. The warp B is the binding-warp, which is usually of hemp, cotton, or other cheap fiber. This warp is led from a warp-beam, B', over tension-regulating and guide bars B'' and B'', through the eyes of one set of needles *a a*, mounted in a needle-bar, *b*, and thence through the reed C' and the reed O' on the lay O''. The face or pile warp C C, usually of wool or other costly fiber, is led each thread from a separate bobbin, H, which bobbins are mounted in racks D D. The details of construction of the bobbins and racks will be hereinafter explained. The threads of the warp C are led through the suspended rings or perles *c*, connected with the ordinary Jacquard mechanism, E, arranged over the loom. This mechanism being of the usual well-known kind and quite complex, I have not deemed it necessary to illustrate it here. From thence the threads of the warp C pass each through reed C', and thence through the elongated eye (*a'* in Fig. 10) of one of the series of needles *a'*, fixed in the needle-bar *b'*. Thence the warp passes through the reed O' on the lay O''. F represents in general the frame of the loom; P, a roller or beam, over which the woven fabric passes; Q, a cross-rod or roller, over which the fabric is drawn to smooth it; and R, the take-up or winding beam, on which the completed fabric is wound.

I will now describe the preferred mode of mounting the bobbins H H, which carry the threads of the face or pile warp C, referring to Figs. 3 and 4.

I I are the side plates of the rack D, and in these are formed inclined slots I', in which rest the axes of the bobbins, as seen in Fig. 4. This construction allows the bobbin to be lifted out readily and conveniently. M is a rod extending across from I to I, over which the warp-thread from the bobbin passes, and L is a weight hooked on to the thread between the bobbin and rod M to produce the necessary

yielding tension on the thread. In addition to this, and in order to keep the bobbin from rotating too easily, a plate or flap, J, is hinged on a cross-rod, K, and is kept pressed elastically up against the bobbin at its back by a spring or springs, N.

I will now describe, by reference to Figs. 1, 2, 5, and 6, the mechanism for imparting the up-and-down and right-and-left (or shogging) movement to the needle-bars *b* and *b'*, bearing, respectively, the two ranges or sets of needles *a* and *a'*. At the lower part of the loom is mounted a treadle, *e*, connected by a chain, *g*, to a sheave, *g'*, mounted fixedly on a suitable horizontal axis, *f*, bearing at its ends, near the loom-frame, two sheaves, *f'x f'x*, to which are fixed chains *h h*, which pass over sheaves *h h*, rotatively mounted on studs *h'x h'x* at the opposite sides of the loom. The ends of chains *h* extend down and are attached to the ends of the needle-bar *b*, bearing needles *a*. Downward pressure on treadle *e* is thus caused to raise needle-bar *b* to a predetermined height. When the pressure is removed, the needle-bar again descends. The ends of the needle-bar *b* play in guides *w'*, and the mechanism for imparting the shogging or endwise movement to said bar simultaneously with its up-and-down movement is illustrated in Figs. 2, 5, and 6. Fig. 5 illustrates the mechanism for actuating the needle-bar *b'*; but as both bars are actuated by like mechanisms this view will serve to explain both.

In the loom-frame is mounted a rotating shaft, *m*, on which are fixed an eight-toothed ratchet-wheel, *p*, and an eight-sided cam, *o*, the sides of which are unequal. This cam projects through a slot in a plate, *x*, (here shown as formed integrally with the guide *w*), and bears against the end of the bar *b*. Mounted loosely on shaft *m* is a slotted arm, *q*, the slot in which is engaged by a stud, *s*, on bar *b*. In the arm *q* this slot is limited, as indicated by the dotted lines in Fig. 5; but in the corresponding arm connected with needle-bar *b'* the slot has an extension, *y*, the purpose of which will be explained hereinafter. On this arm *q* is mounted a spring-pawl, *r*, which, when bar *b* is raised, engages the teeth of the ratchet-wheel *p*, and thus rotates it and cam *o*. This cam is held against any accidental movement by a brake, *w'*, held up to the flat face of the cam by a spring, *z*. The cam *o* and the similar cam, *o'*, hereinafter described, are each provided with similar brakes; but I have deemed it sufficient to show only that for cam *o'*, seen in Fig. 5. When the bar *b* is raised, the cam *o* is rotated, and, acting on the end of the bar, either moves the latter to the left, as seen from the point of view of Figs. 2 and 5, by direct pressure, or permits it to move to the right. This is effected by giving the cam unequal faces, which stand at different radial distances from the cam-axis. Thus a narrow side or face of the cam is farther from the axis than a wider one. If a narrow side of the cam is made to act on the bar *b* in the ascent

of the latter, the bar will be moved to the left. The descent of the bar is vertical, as the cam is not rotated by the descending movement. At the next upward movement of the bar *b* the adjacent broader side of the cam comes into play, and the bar moves upward and to the right in an oblique path, being kept pressed elastically up to cam *o* by a spring, *v*, acting on a flexible arm, *v'*, which carries a roller, *r*, which roller bears against the end of the needle-bar. This roller and spring are seen at the left in Fig. 2. In this view the spring *r* and roller *r'* seen are those which act on bar *b'*; but they are counterparts of those which act on bar *b*, which in this figure stand directly behind them. The same illustration will serve for both. The roller *r* plays through a slot in the guide or keeper *w* for that end of the bar. It will be observed that this mechanism will impart to the needles *a*, first, an oblique movement upward and to the left; second, downward; third, upward to the right; fourth, downward, and so on as often as the treadle *c* is operated.

The needles *a* have a uniform vertical movement or travel; but the needles *a'*, which carry the threads of the face or pile warp, and which have slot-like eyes about ten centimeters in length, are operated by two treadles, *c'* and *c''*, so coupled or connected to the needle-bars as to impart to the latter different degrees of movement. On a shaft, *f'*, are fixed two sheaves, *g''* and *g'''*, which are attached, respectively, to treadles *c'* and *c''* by chains *g'* and *g''*. On the ends of the shaft *f'* are fixed sheaves *f''* and *f'''*, to which are secured the lower ends of chains *k'k'*, which pass over sheaves *h'h'* rotatively mounted on studs *h''h'''*. The chains *k'k'* extend down and are attached to the ends of the needle-bar *b'*. Thus the treadles *c'* and *c''* will either of them by their descent raise the needles *a'* in bar *b'*; but treadle *c'* will raise them twice as high as the treadle *c''*, for the reason that the sheave *g''*, over which chain *g'* passes, (see Fig. 1,) is cam-shaped and larger than the sheave *g'''*, over which the chain from treadle *c''* passes.

The mechanism for moving the bar *b'* endwise laterally as it is raised will require but a brief description, as the ratchet *p'*, cam *o'*, arm *q'*, stud *s'*, and pawl *r'* are precisely like the corresponding parts, *p*, *o*, *q*, *r*, and *s*, heretofore described, except that as the lateral movement of the needles *a'* is the same as that of the needles *a*, and the vertical movement is twice as great when effected by lever *c'*, I provide an extension, *y*, of the slot *q'*, in order that the stud *s'* may not affect the rotation of the cam *o'* after one-half of the upward movement is completed, the slot in the arm *q'* being straight and short, and the slot in arm *q'* being angular and long. It will be readily understood by those skilled in the art that bar *b'* in its ascent will have rotated cam *o'* one-eighth of a revolution when it shall have made one-half of its upward movement, and that the stud *s'* will play along slot *y* and not affect the

cam during the remaining half. The needles *a* have, for example, an upward movement equal to ten centimeters, and the needles *a'*, when actuated by treadle *c'*, an upward movement of twenty centimeters. When actuated by treadle *c''*, the needles *a'* have a movement equal to ten centimeters. The Jacquard mechanism *B* is actuated by a cord or chain, *F'*, which is connected at its lower end to the treadle *c''*. The rings or perles *e* of the Jacquard mechanism are on cords *a''*, which pass down through perforations in a plate, *a'*, and are provided with weights *a''*.

Figs. 7 and 8 are diagrams illustrating the "weave" of two plain fabrics of this kind woven on my loom.

Following are given the operations or movements necessary for weaving a plain pile fabric having a rep back with the buckle or knot stitch, as indicated in the diagram Fig. 7. The treadle *c'* at the right hand is now supposed to be disconnected from the jacquard, and the needles *a'* (with elongated eyes) to be replaced by needles like *a*. *c* is the left-hand treadle, operating needles *a* and warp *B*, and *c'* is the right-hand treadle, operating needles of the same kind in bar *b'*, carrying the pile warp *C*.

First movement: Depress both treadles, raising warps *B* and *C*, leaving warp *A* below. Make a shot with weft *D'*, let fall the warps *B* and *C*, and beat up the weft.

Second movement: Depress the right-hand treadle, which raises the pile warp *C*, crossing the warps *A* and *B* from left to right, pass the pile-wire *O*, let fall the warp *C*, and beat up.

Third movement: Depress both the treadles, raising warps *B* and *C*. Warp *B* crosses with warp *C* from right to left. Make a weft shot, *D'*, and let the warps fall, both warps to the left.

Fourth movement: Depress treadle *c'*, raising warp *C* on the right of warp *A*, pass the pile wire *O*, let fall the warp *C*, and beat up. The pile can be cut on the wire as usual.

Repeat these movements.

By employing two treadles a double-faced velvet fabric with a buckle stitch may be made. This is done, as in the first case, with three warps—a plain or straight warp, *A*, a binding-warp, *B*, and a pile warp, *C*. Such a fabric is indicated in the diagram Fig. 8. This is a plain fabric, and the same arrangement of the treadles and levers is employed as described with reference to Fig. 7.

Following are the movements required:

First movement: Depress both treadles to raise warps *B* and *C*, which cross to the left of warp *A*, leaving the latter below. Make a weft-shot, *D'*, let fall the warps *B* and *C* to the left, and beat up.

Second movement: Depress the right-hand treadle to raise warp *C*, which crosses from the left to right below the warps *A* and *B*. Pass the pile wire *O* above warps *A* and *B* and let fall the warp *C* at the right.

Third movement: Depress both treadles,

raising warps B and C, the warp B crossing warp A from left to right and the warp C from right to left. Make the west-shot D², let fall the warps B C, and beat up.

5 Fourth movement: Depress the two treadles to raise the warps B and C, warp B crossing below warp A from right to left and warp C from left to right, passing below and crossing the binding-warp, a pile-wire, O, and warp
10 A. Make a west-shot, D³, beat up, and let the warps fall, B to the left and C to the right.

Fifth movement: Depress the two treadles, raising the warps B and C, the warp B crossing from left to right and the warp C from
15 right to left, the latter at the same time crossing both warps A and B. Make a west-shot, D⁴, and let fall warp B at the right and warp C at the left.

Sixth movement: Depress the right hand
20 treadle, raising warp C, which crosses to the right below the warps A and B, pass a pile-wire, O, and let the warp C fall at the right.

Seventh movement: Depress the two treadles, raising warps B and C, which both move from
25 right to left, make a west-shot, D⁵, let fall the warps B and C at the left, and pass a pile-wire, O, below.

Eighth movement: Depress the two treadles, raising the warps B and C, the former cross-
30 ing from left to right and below warp A and the latter from left to right below and crossing warp B and the pile-wire. Make a west-shot, D⁶, and let fall warps B and C, the latter at the right of the former. Continue the move-
35 ments substantially as indicated, making due allowance for the fact that after west-shot D⁶ the warps B C are on the side of warp A opposite that on which they are placed in beginning the various movements described.

40 I have referred to the operations of the loom as if they were performed by hand; but it will be understood that they may be performed mechanically, as in power-loom of the usual construction.

45 I am aware that needles have been before employed in looms to carry the warp-threads, and this I do not broadly claim. In my loom the needles are all arranged with their points upward. The two sets of needles are oper-
50 ated independently. In weaving figured fabrics all the needles of one set which carry the face warp have elongated eyes, and this set of needles is operated by either of two mech-
55 anisms, one of which raises the needles higher than the other. The Jacquard mechanism is operated by the treadle, (or other mechanism,) which raises the face warp to the least or minimum height, and the shogging mechanism is so constructed that the lateral move-
60 ment of the needle-bar is the same, whether it is raised to its minimum or maximum height. These features in my loom I believe to be new.

Having thus described my invention, I claim—

65 1. A loom having two sets of warp carrying needles, one for the face warp and one for the binding-warp, each set of needles mounted in

a needle-bar with the points of the needles up-
ward, the eyes of all the needles of the set carry-
ing the face warp being elongated, and said
loom provided with a Jacquard mechanism
70 connected with the threads of the face warp, and with means, substantially as described, for imparting the proper movements to the needle-bars, as set forth.

2. The combination, in a loom, of a set of
needles, *a'*, all having elongated eyes *a''*, to re-
ceive and carry several threads of the face
warp, the bar *b'*, which carries said needles,
means for imparting to said bar a shogging
80 movement, and mechanism for imparting to said needle-bar an up-and-down movement, substantially as set forth.

3. The combination, in a loom, of the needles *a* for the binding-warp, arranged with
35 their points upward, and their carrying-bar *b*, means for imparting an up-and-down and a shogging movement to said bar and needles, the needles *a'* for the face warp, provided with
90 elongated eyes and arranged with their points upward, and their carrying-bar *b'*, means for imparting a shogging movement to said bar *b'*, and for imparting up-and-down movements to said bar, and a Jacquard mechanism connected with the face warp, substantially as
95 set forth.

4. The combination, with the needle-bar *b'*, and the needles *a'*, mounted therein, of the
guide *w'*, shaft *m'*, unequal-sided polygon *o'*,
fixed on shaft *m'*, ratchet *p'*, fixed on shaft *m'*,
arm *q'*, hung on shaft *m'*, and having an angu-
100 lar slot, as described, the pawl *r'*, carried by arm *q'* and engaging ratchet *p'*, the stud *s'* on the needle-bar, engaging the slot in arm *q'*,
105 and a spring mechanism to keep the needle-bar up to the face of cam *o'*, substantially as set forth.

5. The combination, with the needle-bar *b'*, and the needles *a'* for carrying the face warp,
110 mounted therein, said needles having all elongated eyes, of the two mechanisms, substantially as herein described, for imparting up-and-down movements to said needles, said
115 movements differing in extent, for the purpose set forth.

6. The combination, in a loom, of the needles *a* for the binding-warp, and their carry-
ing-bar *b*, the treadle *e*, mechanism connect-
ing said treadle with needle-bar *b*, the needles
120 *a'* for the face-warp, provided with elongated eyes, their carrying-bar *b'*, the treadle *e'*, mechanism connecting said treadle with needle-bar
125 *b'*, the treadle *e''*, mechanism connecting this treadle with needle-bar *b'*, the Jacquard mechanism, and means for connecting said Jacquard mechanism with treadle *e''*, substantially as set forth.

7. A loom having two sets of warp carrying
needles—one for the face warp and one for the
binding-warp—each set of needles mounted in
130 a needle-bar and arranged with the points of the needles upward, in combination with rollers *h h'*, mounted above said needle-bars, shafts *f f'*, mounted beneath said needle-bars, sheaves

$g^x g'^x$ upon said shafts, chains fastened at one end to said sheaves, passing over the rollers h and connected at the opposite ends to the needle-bars, operating-treadles, and the mechanism, substantially as described, connecting said treadles to said shafts ff' , to rotate the same, substantially as set forth, whereby the needle-bars are moved up and down and are supported by flexible supports, and mechan-

ism for imparting to each of said needle-bars to independently a shogging movement.

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

ADRIEN DUQUESNE.

Witnesses:

ROBT. M. HOOPER,
AMAND RITTER.