

(No Model.)

4 Sheets—Sheet 1.

A. GIROUX.
LOOM.*

No. 586,233.

Patented July 13, 1897.

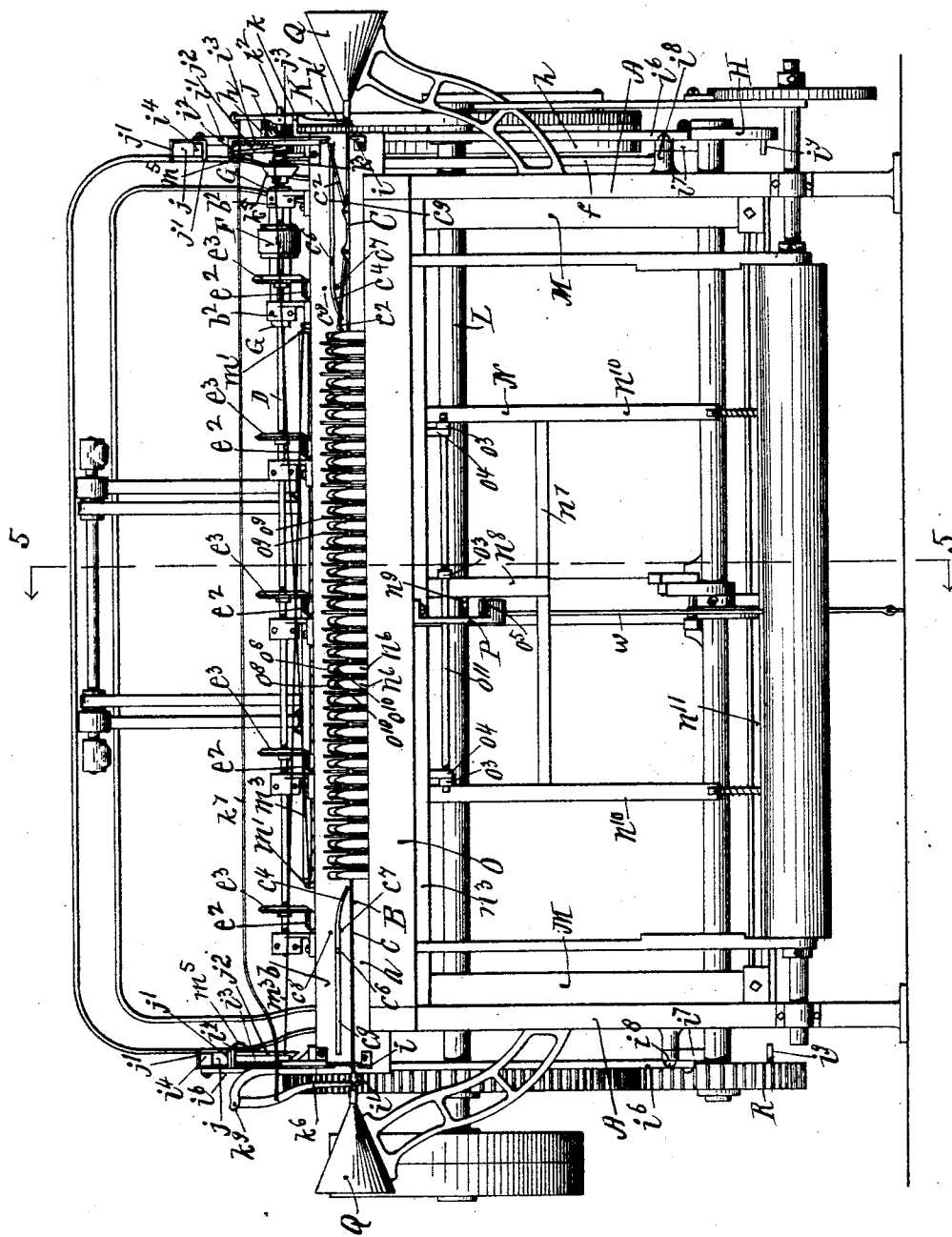


Fig. 1.

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INVENTOR:

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By S. Schofield
ATTY.

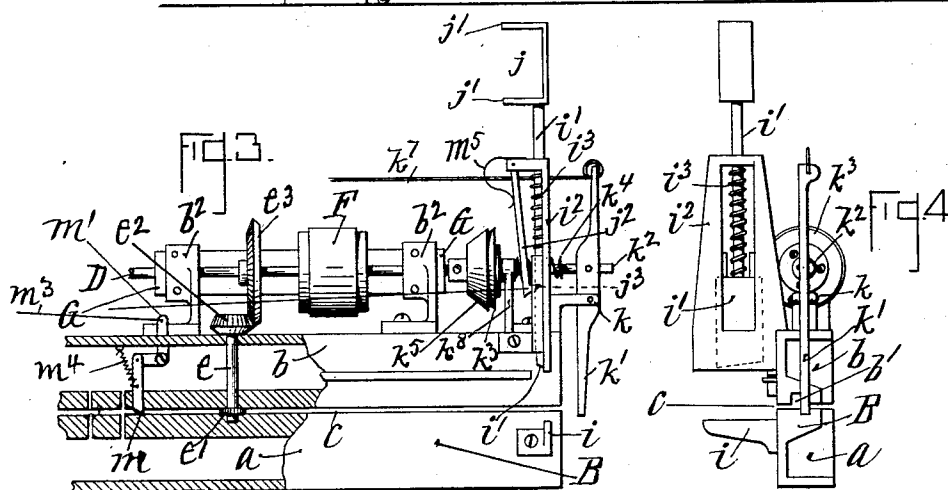
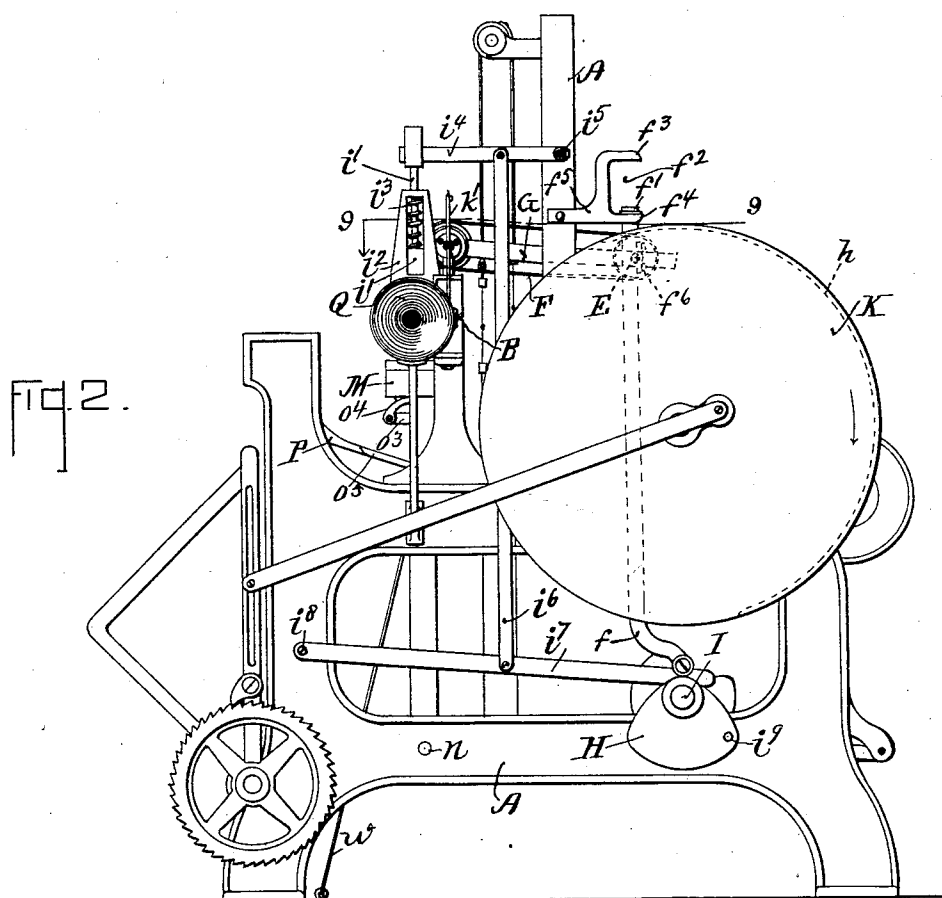
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4 Sheets—Sheet 2.

A. GIROUX.
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Patented July 13, 1897.



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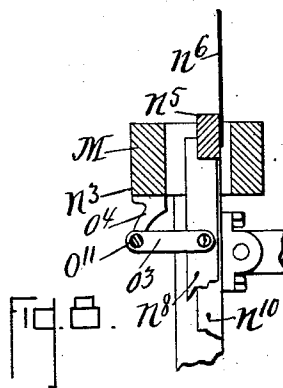
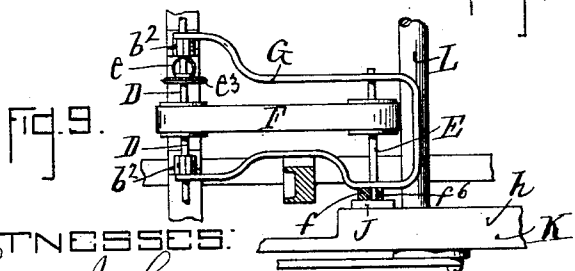
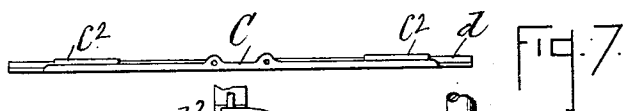
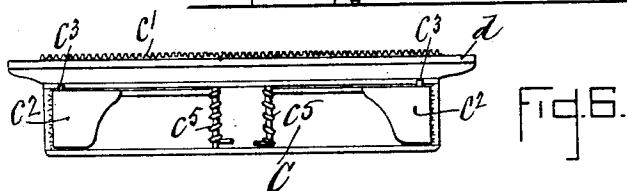
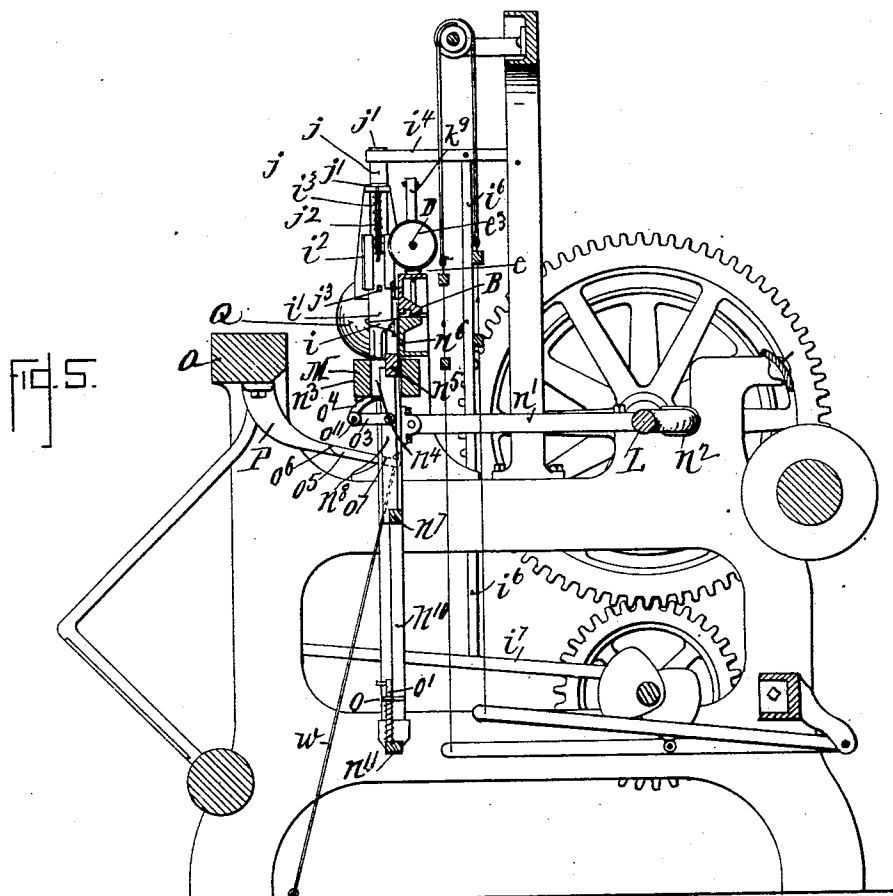
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4 Sheets—Sheet 3.

No. 586,233.

Patented July 13, 1897.



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4 Sheets—Sheet 4.

A. GIROUX.
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Patented July 13, 1897.

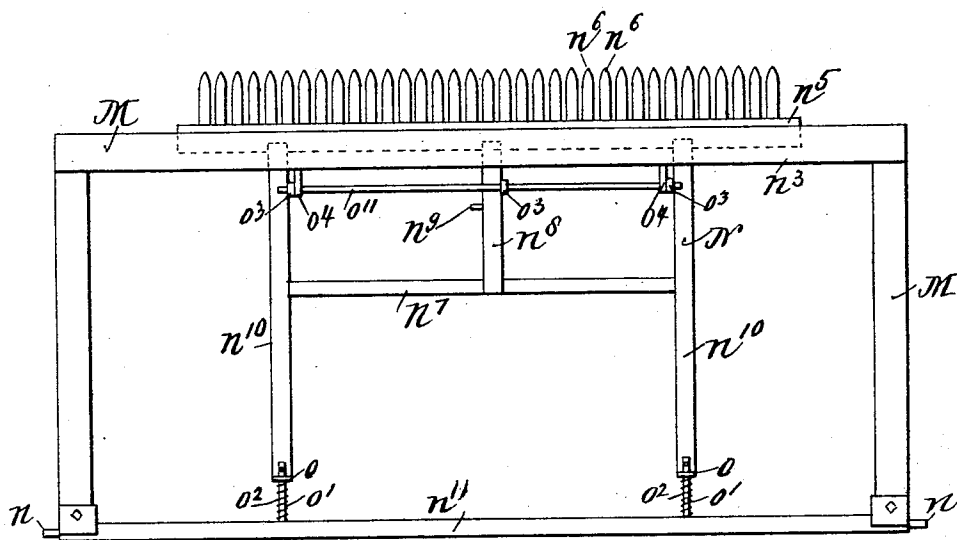


Fig. 10.

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UNITED STATES PATENT OFFICE.

ALFRED GIROUX, OF EAST PROVIDENCE, RHODE ISLAND, ASSIGNOR TO
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LOOM.

SPECIFICATION forming part of Letters Patent No. 586,233, dated July 13, 1897.

Application filed September 3, 1895. Serial No. 561,325. (No model.)

To all whom it may concern:

Be it known that I, ALFRED GIROUX, a subject of the Queen of Great Britain, residing at East Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Looms, of which the following is a specification.

My invention relates to an improved loom especially adapted to weave a fabric for carpet-lining; and it consists in the combination of a stationary shuttle-race provided with transverse slots adapted to receive the warp-threads, and a positively-driven shuttle with a series of fingers adapted to beat up the weft from the face of the shuttle-race.

It also consists in improved means for operating the shuttle and in means for cutting off the weft while it is being drawn into the shed.

In the accompanying drawings, Figure 1 represents the front view of a loom provided with my improvement. Fig. 2 represents an end view of the same. Fig. 3 represents an enlarged detail side view showing the knife for cutting the weft and the friction device for checking the momentum of the shuttle-driving mechanism. Fig. 4 represents an enlarged detail end view of the same. Fig. 5 represents a vertical section taken in the line 5 5 of Fig. 1. Fig. 6 represents a top view of the shuttle. Fig. 7 represents an edge view of the same. Fig. 8 represents an enlarged detail section taken in the line 5 5 of Fig. 1, showing the fingers for beating up the weft. Fig. 9 represents a detail section taken in the line 9 9 of Fig. 2, showing the flanged wheel and friction-roller for actuating the shuttle. Fig. 10 represents a front view of the frame which carries the fingers for beating up the weft.

In the drawings, A represents the frame of the loom, and B the vertically-arranged stationary shuttle-race, which is formed by means of the bars *a* and *b*, having the slot-opening *c* between them, an end view of the said bars being shown in Fig. 4. The upper portion *b* of the shuttle-race B is provided with the groove *b'*, located within the slot-opening *c*, the said groove being adapted to receive the retaining-flange *d* of the shuttle C. At suitable distances along the bar *b*, which forms the upper portion of the shuttle-race, are placed the upright shafts *e e*, (shown in Fig. 3,) provided at their lower ends with the spur-

gears *e'*, which serve to drive the shuttle, and at their upper ends with the bevel-gears *e''*, by means of which the said shafts are driven. In the bearings *b'' b''* above the shuttle-race B is placed the shaft D, upon which are secured the bevel-gears *e''*, which engage with the gears *e''*, the said shaft being driven from the shaft E by means of the belt F. The shaft E is held in a frame G, which is pivoted upon the bearings *b'' b''* and is operated to rise and fall by means of the cam H, secured to the end of the cam-shaft I and operatively connected with the frame G by means of the rod *f*, the upper end *f'* of which is bent outwardly and held in the space *f''* between the ears *f'''* of the bracket *f''*, the said ears serving to form suitable stops for the upward-and-downward movement of the shaft E, to which the rod *f* is loosely secured by means of the cap *f''*.

Upon the end of the shaft E is secured the friction-roller J, which is adapted to engage first with the inner side and then with the outer side of the friction-flange *h* at the inner side of the wheel K, which wheel is secured to the end of the driving-shaft L, whereby upon the rotation of the wheel K the said roller will be first driven in one direction and then in the opposite direction by frictional contact with the flange.

The shuttle C is provided with the rack *c'*, which engages with the teeth of the gears *e'*, by means of which the shuttle is driven back and forth along the shuttle-race, and the shuttle is also provided with the spring-actuated gripping-jaws *c'' c''*, which operate to seize the end of the weft and draw it through the shed, the said jaws being provided with the inwardly-projecting pins *c'''*, which are adapted to engage with the latch-cams *c'' c''* at the ends of the shuttle-race B, which cams serve to cause the opening movement of the jaws against the resilient action of the springs *c'' c''*, which serve to close the same upon the weft, the said latch-cams being pivoted to the point *c''* and limited in their movement by the stop-pins *c'' c''*, attached to the side of the bar *b* of the shuttle-race.

At the opposite ends of the shuttle-race B, and at the side of the lower bar *a* of the same, are secured the stationary cutters *i i*, which upon the downward movement of the knife *i'*, held to slide in the guide *i''*, attached to the upper bar *b* of the shuttle-race, serve to sever

the proper length of filling from the filling-strip which is being drawn through the trumpet Q, and by means of said trumpet a comparatively wide flat strip of paper drawn from a roll will be properly crumpled for presentation to the jaws of the shuttle.

The knife i' is actuated in its downward movement by means of the spring i^3 , and is raised to its highest elevation by means of the lever i^4 , pivoted at the point i^5 to the frame A of the loom, and connected by means of the rod i^6 to the lever i^7 , pivoted to the frame at the point i^8 , and actuated in its upward movement by means of the inwardly-projecting pin i^9 , which is secured to the cam H upon the shaft I at one end of the loom, the corresponding knife i' at the opposite end of the loom being actuated by means of the pin i^9 , attached to the gear R, secured to the shaft I, sufficient play being allowed between the outer end of the lever i^4 and the knife by means of the opening j between the ears j' j' at the upper end of the knife. The knife i' is retained in its elevated position while the lever i^4 passes by gravity to its lower position between the ears j' j' by means of the spring-actuated catch j^2 , which engages with a notch j^3 made in the side of the knife, and is so held until released by the shuttle, as hereinafter described.

To the bracket k , at one end of the upper bar b of the shuttle-race B, is pivoted the lever k' , which extends downward to a position in line with the slot-opening c of the shuttle-race, and to the lever k' is pivoted the sliding rod k^2 , to the inner end of which is secured the friction-cone k^3 , which does not revolve, the said friction-cone and sliding rod k^2 being supported by the bearing-standard k^4 and forced outward by means of the spring k^5 . To the end of the shaft D is secured the conical friction-cup k^6 , adapted to fit the friction-cone k^3 and serve to check the momentum of the shaft D upon the engagement of the forward end of the shuttle with the lower end of the lever k' .

To the curved bracket k^9 , at the opposite end of the shuttle-race, is pivoted the pendent lever k^6 , which also extends downward to a position in line with the slot-opening c of the shuttle-race, and the lever k^6 is connected with the lever k' at the opposite end of the loom by means of the wire k^7 , so that the outward movement of the lower end of either one of the levers will cause the engagement of the non-revoluble friction-cone k^3 with the rotating conical friction-cup k^6 to check the momentum of the shaft D.

The catches j^2 are caused to be withdrawn from engagement with the holding-notch j^3 of the knife i' by the engagement of the shuttle with the beveled lower end of the engaging piece m , (shown enlarged in Fig. 3,) the said engaging piece being jointed at its upper end to the bell-crank lever m' , the upper end of which lever is connected with the catch j^2 by means of the connecting-wire m^3 , and a weak

spring m^4 is employed for holding the engaging piece m in an elevated position to prevent the engagement of the shuttle therewith upon the return movement of the said shuttle, the resilience of the spring m^5 , which actuates the catch j^2 , being made greater than that of spring m^4 .

The lay-frame M for imparting a forward-and-backward movement to the fingers employed for beating up the weft is pivoted to the end frames A of the loom, at the points n n , by means of the pivot-rod n^9 and is caused to vibrate back and forth by means of the connecting-rods n' , which are jointed to the opposite ends of the frame M and connected with the cranks n^2 of the crank-shaft L of the loom. The upper longitudinal bar n^3 of the vibrating frame M is provided with a slot-opening n^4 , adapted to receive the frame N, which is arranged to vibrate back and forth with the frame M and to have an up-and-down movement thereon, and to the forward side of the bar n^5 of the frame N are attached the projecting fingers n^6 n^6 , which serve to beat up the weft, the said frame N being provided with the horizontal bar n^7 , the centrally-arranged bar n^8 , provided with the engaging pin n^9 , and the downwardly-extending end bars n^{10} , to the lower ends of which are attached the projecting perforated plates o , adapted to move loosely upon the upwardly-projecting pins o' o' , which are secured to the pivot-rods n^{11} of the frame M, and upon the studs o' o' , between the plates o o and the pivot-rod n^9 , are placed the spiral springs o^2 , which serve to carry the frame N and the attached fingers n^6 to their highest elevation. The upper portion of the frame N is also held for up-and-down movement by means of the links o^3 o^3 o^3 , which are jointed to the side of the bar n^8 and to the inner sides of the end bars n^{10} of the frame N and rigidly secured to the rod o^{11} , loosely held in the brackets o^4 o^4 , attached to the lower side of the upper bar n^5 of the frame M, as shown in Figs. 5 and 8.

To the under side of the breast-beam O of the loom is attached the cam-bracket P, provided at one side with the fixed cam o^5 , which is adapted for engagement with the pin n^9 at the side of the bar n^8 of the finger-carrying frame N. The said pin n^9 , when the fingers are brought forward to beat up the weft, will swing into engagement with the end o^6 of the cam o^5 , causing the frame N to be slightly raised, so that when the pin n^9 passes beyond the end o^6 of the cam o^5 the frame N will drop, so that on the return movement of the frame M the pin n^9 of the frame N will pass to the under side of the cam o^5 , thus causing the frame N and the fingers n^6 to be pressed downward against the resilience of the springs o^2 until the said pin arrives at the end o^7 of the cam o^5 , allowing the fingers to rise again with the shed back of the weft which has in the meantime been deposited in the shed by the shuttle, the face of the shuttle-race B being

provided with shallow grooves o^8 between the vertical slots o^9 , made in the shuttle-race to provide for the shed of the warp-threads, the said shallow grooves being adapted to receive the points o^{10} of the fingers n^6 and thus prevent the accidental engagement of the said fingers with the weft when springing upward into the shed at the face of the shuttle-race. The cam-arm P is held against upward movement at its outer end by means of the rod w , secured to the floor.

The shuttle C is shown in Fig. 1 as in the act of dropping the weft, the rear gripping-jaw c^3 having been just raised to release the weft by means of the latch-cam c^4 , the forward gripping-jaw c^2 being held in its opened position by means of the fixed guide c^9 , which extends outward from the pivoting-point c^6 of the latch-cam c^4 , and upon the continued forward movement of the shuttle the inwardly-projecting pin c^3 of the forward gripping-jaw will pass off of the fixed guide c^9 and will then seize the previously-cut end of the weft. The acquired momentum of the shuttle and its actuating mechanism, if sufficient to carry the shuttle to contact with the lower end of the lever k' , will actuate the friction-cone k^3 into engagement with the friction-cup k^5 to check the momentum of the shuttle-actuating mechanism.

When the shuttle in its passage through the shed arrives at the beveled lower end of the engaging piece m , (shown in the section, Fig. 3,) it causes the upward movement of the said engaging piece and the corresponding movement of the bell-crank lever m' , which is connected by means of the wire m^3 with the catch j^2 , which holds the knife i' in its elevated position, causing the withdrawal of the said catch from its holding-notch j^3 , thus releasing the knife to cut off the weft, the catch j^2 being held in an outward position against the vertical side of the knife when the knife is at its lower position. The connecting-wire m^3 will thus be slackened by the outward movement of the catch j^2 from its notch, so that the spring m^4 , which is weaker than the spring m^5 , will serve to hold the engaging piece m in its elevated position after the shuttle has passed beyond the said engaging piece, thus preventing the engagement of the shuttle therewith upon its return movement, and the said engaging piece m will be held in its elevated position until the knife is again raised either by the action of the pin i^9 of the cam H or the pin i^9 of the gear R, as the case may be. The resulting passage of the catch j^2 into its notch j^3 will cause the tightening of the wire m^3 and the downward movement of the engaging piece m preparatory to the succeeding engagement of the shuttle.

The reverse traveling movement of the shuttle through the shed is effected by the engagement of the friction-roller J first with one side and then the other of the friction-flange h of the wheel K, as the said wheel is being

rotated, but other means for producing the required reverse movement may be employed.

The weft, which may consist of a comparatively wide strip of paper, is to be drawn through the trumpet Q and cut off at the length required while being drawn into the shed, thus producing a fabric having a crumpled-paper filling which is adapted for a carpet-lining, but when a twisted weft is employed the trumpet is not required, suitable means being provided for supporting the filling in position for the engagement of the shuttle.

By arranging the stationary shuttle-race in a vertical instead of a horizontal position and providing the shuttle-race with the transverse openings for the shed of the warp-threads I am enabled to employ the upper side of the shuttle-race for the attachment of the special shuttle-driving means without interfering with the warp-threads.

I claim as my invention—

1. The combination of the vertical shuttle-race, provided with the transverse openings for the shed of the warp-threads, and with the grooves to receive the fingers for beating up the weft, the shuttle, and means for operating the same, with the projecting fingers for beating up the weft, and means for actuating the said fingers downward from the warp-threads, backward to the grooves at the vertical face of the shuttle-race, thence upward in said grooves and between the warp-threads at the rear of the weft, and forward between the warp-threads, to beat up the weft, substantially as described.

2. The combination of the vertical shuttle-race, and the shuttle provided with the rack, with the gears engaging with the rack, means for alternately reversing the movement of the gears to cause the back-and-forth movement of the shuttle through the shed, and the rotary friction device, actuated into engagement by the shuttle, and operating to check the momentum of the shuttle-driving means, substantially as described.

3. The combination of the vertical shuttle-race, the shuttle and means for causing the back-and-forth movement of the shuttle through the shed, with the stationary knife, and means adapted to be engaged by the shuttle, to cause the knife to sever the weft, substantially as described.

4. The combination of the vertical shuttle-race, and the shuttle provided with the spring-actuated gripping-jaws, the latch-cams for opening the jaws of the shuttle, the spring-actuated knife for cutting off the weft, means for raising the knife, the catch for holding the knife in its raised position, and means adapted to be engaged by the shuttle, for withdrawing the catch, substantially as described.

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