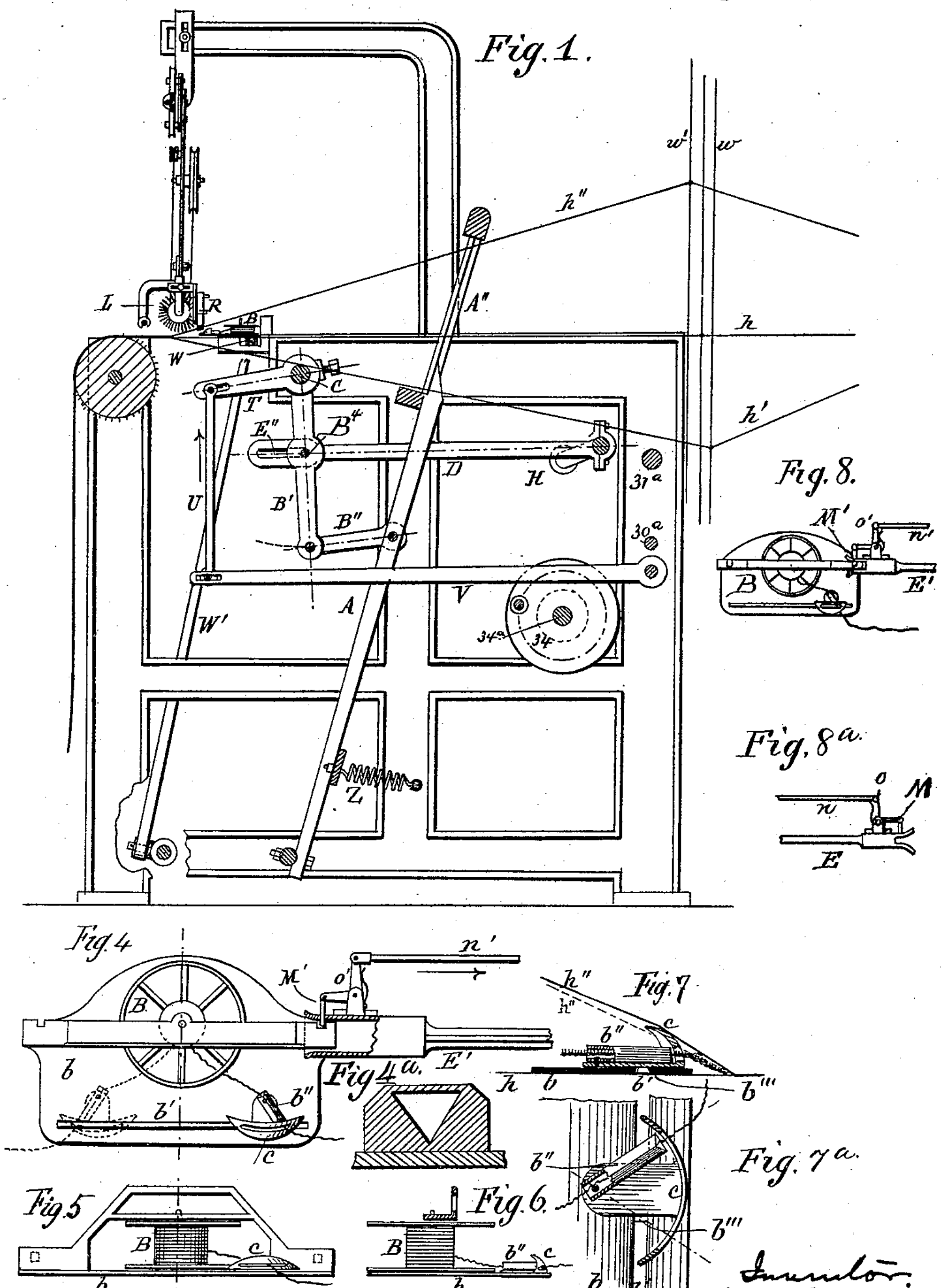
(No Model.)

3 Sheets—Sheet 1.

L. LETALLE.

LOOM FOR WEAVING CHENILLE CARPETS.

No. 473,261. Patented Apr. 19, 1892.



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(No Model.)

3 Sheets—Sheet 2.

L. LETALLE.

LOOM FOR WEAVING CHENILLE CARPETS.

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Fig. 2.

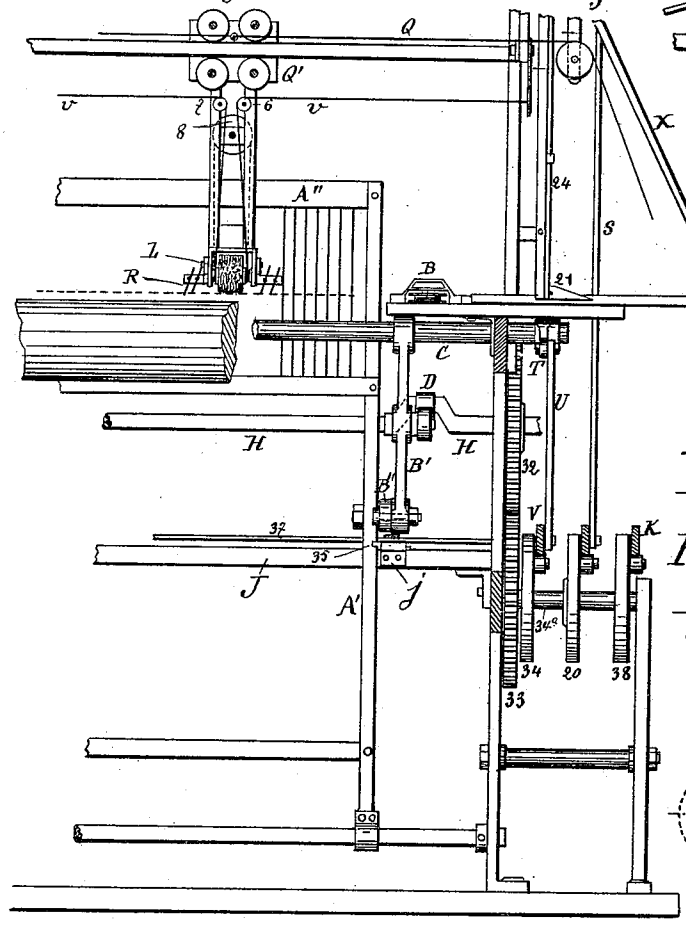

Fig. 2a.

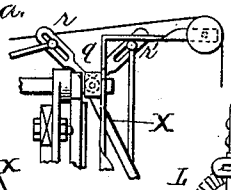

Fig. 9.

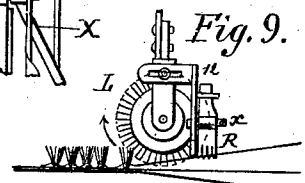

Fig. 10.

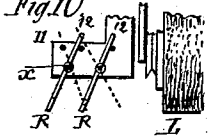

Fig. 11.

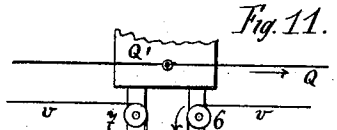

Fig. 11a.

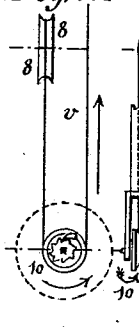

Fig. 11b.

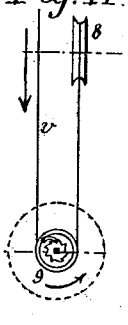

Fig. 3.

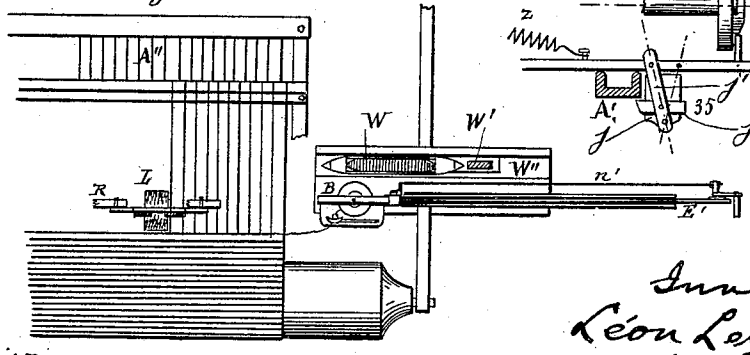

Fig. 20.

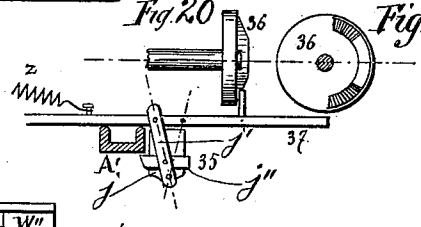

Fig. 20a.

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LOOM FOR WEAVING CHENILLE CARPETS.

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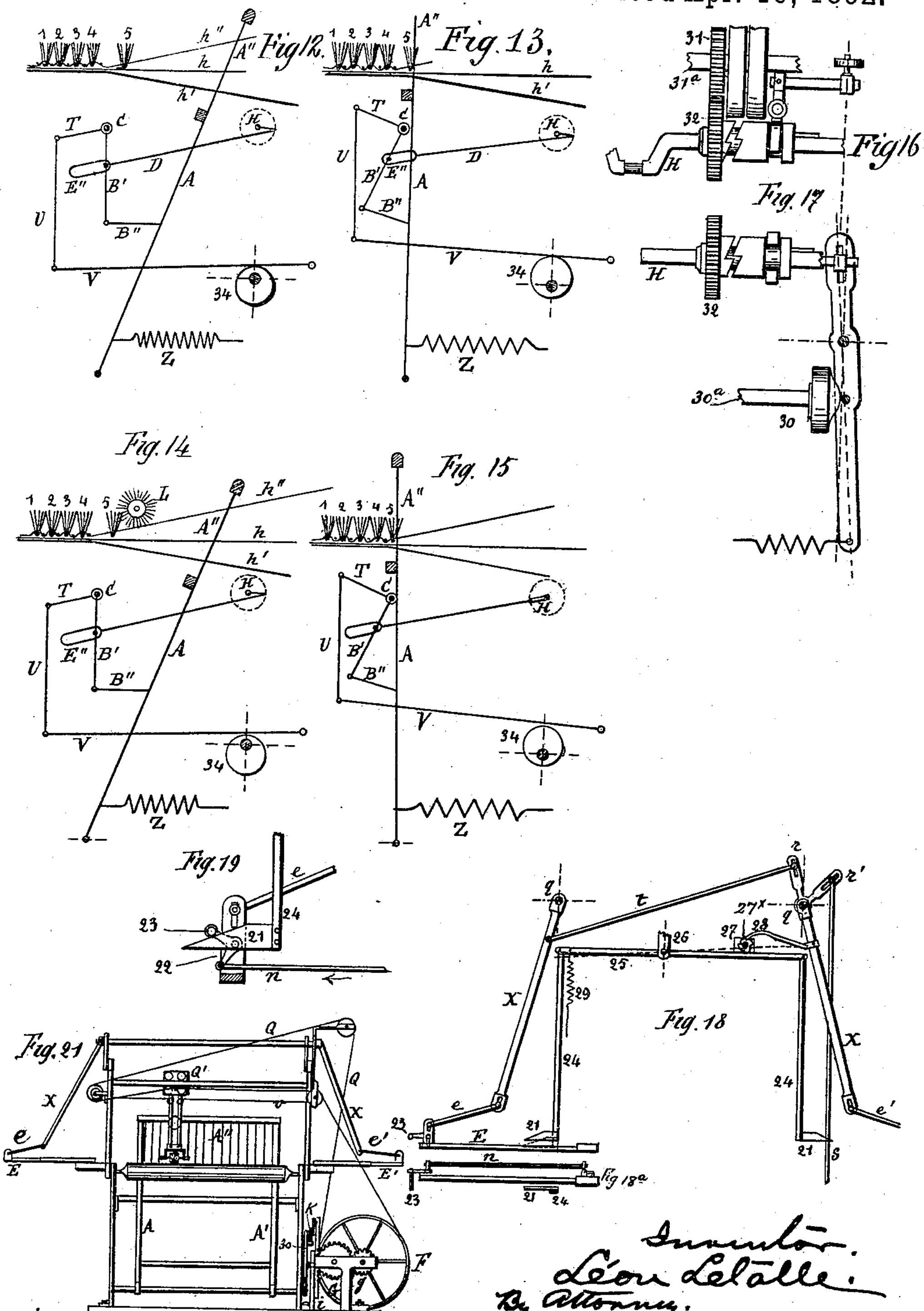

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UNITED STATES PATENT OFFICE.

LEON LETALLE, OF BEAUVAIS, FRANCE.

LOOM FOR WEAVING CHENILLE CARPETS.

SPECIFICATION forming part of Letters Patent No. 473,261, dated April 19, 1892.

Application filed March 20, 1891. Serial No. 385,934. (No model.) Patented in France January 13, 1890, No. 203,116; in England January 20, 1891, No. 1,005; in Austria-Hungary February 7, 1891, No. 7,591 and No. 22,317, and in Germany February 25, 1891, No. 59,821.

To all whom it may concern:

Be it known that I, LEON LETALLE, a citizen of the French Republic, residing at Beauvais, in the Department of the Oise and Republic of France, have invented Improvements in Looms for Weaving Chenille Carpets, (patented in France January 13, 1890, No. 203,116; in England January 20, 1891, No. 1,005; in Austria-Hungary February 7, 1891, No. 7,591 and No. 22,317, and in Germany February 25, 1891, No. 59,821,) of which the following is a specification.

This invention relates to improvements in carpet-weaving looms, and particularly those used in making long-pile carpets.

In the manufacture of long-pile carpets the chenille is prepared beforehand. This chenille, which constitutes the velvety surface of the carpet, is composed of a warp of flax or cotton threads serving as ligatures to each of the small tufts of wool, the color of which varies according to the pattern to be executed. This chenille and the varying arrangement of the colors is prepared beforehand for one or several carpets. It is by placing side by side and in parallel rows a series of chenille-wefts that the pattern is produced. Each of the small tufts of wool (which in carpet weaving are called "points") having its proper color produces by their combination the pattern settled beforehand. It is therefore necessary in order to obtain a perfect pattern that each row of chenille in placing itself at the side of the preceding should occupy exactly its proper place. Otherwise one point or all the points of a same row which might be carried to the right or to the left would naturally break the uniformity or exactness of the pattern. The difficulty of mechanically laying these rows resides, therefore, first in the obligation of properly placing them. It also resides in the necessity of having the nap or pile side of the chenille always upward. The reverse would produce blanks in the velvety pile of the carpet. Therefore the unwinding of the chenille and its laying between the warp-threads must be produced without twist up to the moment when it is definitely fixed, and finally none of the bits of wool which form this chenille should be compressed or pushed away by the warp-threads which fix it to the canvas or backing fabric. In hand-work, which is much slower, the workman places, arranges, and modifies whatever has been irregularly produced. He pulls to the right or to the left the chenille weft which he has unwound by throwing his shuttle. He straightens the tufts of pile which may have been laid down. He drives in the warp-threads which are to hold the chenille into its nap, so that these threads disappear and that they do not drive back the nap. The loom operating mechanically must meet these requirements in its working, which must be at once exact, for the rapidity with which it must work does not permit the workman to modify, as in hand-work, excepting in case of accident.

The main points of the working of this loom to obtain a perfect velvety surface are therefore, first, very regular laying of each weft of chenille; second, unwinding of the chenille without twist in order that the pile or nap side may be always upward; third, straightening and regulation of the nap and disappearance of the warp-threads fixing the chenille, so that they are sunk in the nap or pile. This work is effected by the aid of the following main parts: First, arrangement and isolation of the batten from the shuttles to permit these latter to preserve an invariable line as close as possible to the fabric, insuring the unwinding of the chenille without excess and proportionally to the laying. The separation of the shuttle carrying the backing-weft, without being so indispensable, gives greater lightness to the batten and limits the width of the loom. Second, functions and differential working of the batten, which first tightens the canvas or backing wefts and then in two irregular beats the chenille wefts. Third, arrangement of a brush and of combs acting on the chenille and the laying-threads to raise and equalize the pile or nap of the chenille and cause the warp-threads which fix the chenille to the canvas or backing to enter into the nap of the chenille to be there concealed.

Figure 1 of the drawings represents a section in side view of a loom embodying my invention. Fig. 2 shows the right side of the loom in front view, and Fig. 2ª is the top thereof

shown detached. Fig. 3 is a plan of a part of the loom in the line of the shuttles. Figs. 4, 4^a, 5, 6, 7, 7^a, 8, and 8^a show the chenille shuttle with circular disk. Figs. 9, 10, 11, 11^a, and 11^b show the brush and the combs and means for operating same. Figs. 12, 13, 14, and 15 are diagrams showing the travel of the batten. Figs. 16, 17, 18, 18^a, 19, 20, and 20^a are detail views of parts to be described. Fig. 21 is a front view of the loom in its entirety.

The body or backing of the carpet is of canvas made of strong flaxen threads. The warp of this canvas is indicated by the threads h and h', Fig. 1. The weft of this canvas or backing is carried by the shuttle W, Fig. 3. The making of this canvas takes place, as in ordinary looms, by the aid of the healds w, Fig. 1, which produce the crossing of the threads $h\,h'$. The shuttle W is thrown by the picker-stick W', Figs. 1 and 3. The picker-stick W' is shown in Fig. 1 as being broken away before its entrance into the shuttle-box, in which is shown an end view of the shuttle W. In Fig. 3 the end of the picker is seen in its slot in the bottom of the shuttle-box and immediately at the rear of the shuttle. The picker is pivoted at its lower end and may be connected to the actuating parts of the loom in any suitable manner. No detail device is herein shown or claimed for operating the picker, as many devices have been used in this connection, and I make no claim to this feature. The boxes which receive this shuttle, of which the right-hand one W'' is shown, Fig. 3, are fixed to the frame and absolutely independent of the batten, contrary to the generality of looms in which the shuttle-boxes come and go with it. This arrangement lightens the batten and renders the placing of the parts for weaving the chenille more easy.

The weaving of the carpet is effected as follows: First, a few shoots of canvas are woven, and then the laying of the chenille takes place by weaving alternately a shoot of canvas and a row of chenille. The chenille is fixed to the canvas by warp-threads h'', Fig. 1. This warp is called the "laying-warp." It is also worked by a heald w', in order that the canvas-shuttle W may cross its thread with it in order to fix it. The chenille-shuttle therefore passes between the canvas or backing warps and the threads h'', the chenille being wound in a determined order on the disk B. In order that the chenille in unwinding from the disk may always present itself with the nap or pile upward and preserve this position, it is necessary that the tying-warp which unites the tufts of wool undergoes a slight friction and a slight tension, and to avoid any twist that the guide which directs it lays it as near as possible to the last row.

In order that no more of the chenille-weft be unwound than is necessary when the shuttle leaves the warp at either side of the fabric, the shuttle passes only far enough beyond the selvage to permit the batten to pass. Four or five centimeters is sufficient for this purpose. The arrangement of the shuttle is therefore as follows: The disk B, which receives the chenille-weft, is set on a vertical axle fixed to the plate b. It turns freely on this axle. The plate b has a groove or slot b', in which is fitted a sliding piece b''', Figs. 7 and 7^a, fitted to the guide c. This slide-piece b''' is dovetailed into the groove or slot b', and, while permitting the guide c to reciprocate freely therein at each change of direction of the shuttle, effectually prevents any uncertain movement or displacement thereof. Behind the mouth of this guide is pivoted a small V-shaped hollow slider b''. (See Fig. 4^a.) The chenille in passing through the V-shaped groove of the slider b'' is folded upon itself, being under tension, and the warp-threads naturally having a tendency to be drawn down into the narrower part of the V of the groove, it therefore issues from the mouth of the slide and guide c folded upon itself, with its tufts upward, as they have been folded into and passed through the wider part of the V-shaped groove. The guide c, which has a convex form, like an olive, in passing under the laying-threads h'', which it slightly uplifts, prepares the place for the chenille. Then directly it has passed these threads in lowering press lightly on the chenille, so as to keep it in place at about one centimeter from the last row. The shuttle in its shifting movement from right to left unwinds the chenille. Then it moves away to give passage to the batten. At each change in the working the guide c, which only moves a few centimeters from the selvage, slides in the groove b' and goes to the other end, while the shuttle advances through the fabric to begin the laying of a new row. Thus no superfluous unwinding occurs. As the guide under the pressure of the warp-threads slides in the groove and does not pass under such threads until after the arrival of the guide at the end of the groove, the unwinding of the weft does not recommence until after the shuttle has completely entered the shed in the warps. The slider b'' obeys in the same way, going to the right or to the left, according to the direction of the laying of the weft. The shuttle is carried and guided through the fabric by the two slide bars or rods E E', one of which is shown in Figs. 4 and 8, which move to meet each other at the center of the shed. When one of them has carried the shuttle half its journey, it leaves it to be taken by the other and retires backward. This movement is operated by the arms or levers X, Figs. 2 and 18. These two arms are pivoted at the points q to the upper part of the loom. On the right-hand stud or shaft, to which the right-hand lever X, is fixed, is fixed a square or angle-piece formed of two arms r r'. The arm r' is connected to a rod s, which receives a to-and-fro motion from the eccentric 20 on shaft 34^a, Fig. 2. The arm r is connected to the left-hand lever X by a rod t. The angle-piece in pivoting carries with it first the right lever and then by the aid of the rod

t the lever on the left. To each of these lever-arms are fixed the slide-bars E E′ by the aid of the coupling-levers *e e′*. The shuttle must be abandoned by one of the slide-bars at half its journey and then taken by the other, which completes it. This action is produced by the bolts or catches M M′, Figs. 4 and 8, set on the squares or angle-pieces *o o′*, pivoted in a bracket on the end of the slide-bars E E′. The said pieces *o o′* are actuated by the rods *n n′*, which in the shifting movement which they make with the slide-bars E E′ are themselves actuated by the stop-pieces or inclined planes 21, Figs. 2, 18, and 19. Each of the rods *n n′* is jointed to an angle-piece 22, having a finger or projection 23. This finger meeting the inclined plane 21 rises upon it, causes the angle-piece 22 to pivot, and produces traction upon one of the rods *n n′*, which thus cause the bolts or catches M M′ to open. As the opening of the bolts is to be produced only for that which releases the shuttle, it is necessary that the stop 21, which corresponds to the taking-rod, should keep away. Otherwise the bolt, not closing, would not seize the shuttle, which would remain in the fabric. The disappearance of the inclined plane takes place by the lowering of one of the rods 24, Fig. 18, which are actuated by the pivoting movement of the lever 25, pivoting at 26. This pivoting movement is produced by the rectangular tumbler 27, having a ratchet-wheel $27^{\times}$ and operated by the catch or pawl 28, carried by the right-hand lever X. The unequal shape of this tumbler 27, joined to the action of the retaining-spring 29, therefore produces alternately to the right and to the left the lowering of that one of the inclined planes which is to bring about the seizure by the bolt or catch.

The batten or lay is the part intended to beat up the woven wefts the one against the other. In my loom it has several functions: It serves, first, to beat up the shoots of the canvas or backing wefts. Then it beats up the rows of chenille-wefts as they are laid. Its travel is therefore variable in the two cases. For beating up the canvas weft it gives its full beat, actuated by the crank-shaft H and the connecting-rods D, Figs. 1 and 2. For beating up the chenille it does not act in the same way. It makes, first, a limited beat, which regulates the row of chenille laid without closing it up, leaving it at one-half centimeter from the preceding row. This first movement of approach permits the brush to raise the naps of chenille which may not be in a suitable position. It also permits the combs in pressing on the warp-threads *h″* to cause them to penetrate into the pile, all of which would be impossible if the chenille was tightened up against the preceding row at the first beat. The batten is composed of two swords A A′, Figs. 1 and 2, which support the reed or slay A″. It is actuated at one time by the crank-shaft H, at another by an eccentric 34 on shaft 34^{a}. The connecting-rod D has a slot E″, in which moves a carrier B^{4}, mounted on the arm B′, which causes this arm B′ to pivot with the rock-shaft C. By this movement the connecting-rod B″, which is jointed to the arm B′ and to the batten A, carries this latter forward. A spring Z recalls it backward. When the full beat which drives the canvas or backing-weft into position is given and the batten has returned to its place, the crank-shaft H is thrown out of gear by the aid of a cam 30, Fig. 17, located upon a shaft 30^{a}, the end of which is seen in section in Fig. 1, and a system of toothed clutches. (Represented in Figs. 16 and 17.) The working of the loom is continued by the gears 31 on driving-shaft 31^{a} and 32 and 33, Figs. 2 and 16, the gear 32 being loose on its shaft. The limited movement of the batten intended to produce the approach or nearing of the chenille to the preceding row without tightening up is produced by the eccentric 34, Figs. 1 and 2, acting on the lever V, which, uplifting the rod U, causes the arm T, the rock-shaft C, and the connecting-rods B′ and B″ to pivot, carrying with them the batten. The shaft 34^{a}, on which is mounted the cam 34, is driven from shaft 31^{a} by gears 31 32 33. The rod D remains stationary during this movement, the slot E″ permitting the play of the carrier B^{4} of the connecting-rod B′. Figs. 12, 13, 14, and 15 show this operation diagrammatically. Fig. 12 shows the position of the batten at the moment that the row of chenille 5 has been laid near the four preceding rows, the batten being stationary. Fig. 13 shows the nearing movement produced by the first beat of the batten movement produced by the action of the eccentric 34, the lever U, the arm T, rock-shaft C, and the connecting-rods B′ and B″. Fig. 14 shows the batten brought back under the action of the spring Z at the moment of the passage of the brush. After the passage of the brush the crank-shaft H is thrown into gear. A full stroke of the batten then takes place, a beat which finally closes up the row 5 against the preceding. Fig. 15 shows this action. The final closing up of the chenille and that of the canvas or backing wefts is effected by the crank-shaft.

In order that the abruptness of the recoil movement of the batten may not cause it to rebound forward, I use an arrangement of bolts or catches, as illustrated in Figs. 2, 20, and 20^{a}. To the cross-piece J of the loom-frame is attached a plate or support *j*. A short connecting-bar *j′* is pivoted at one end to this plate and at its other to a rod 37, which is located just above and parallel to the cross-piece J. A bolt or catch *j″* is carried by the bar *j′* and projects into the path of the part A′ of the batten. The rod 37 is loosely carried by the bar *j′* and a similar one on the opposite side of the loom, which is not shown, and is free to reciprocate longitudinally. A finger is attached to the rod 37 and is engaged by a cam 36, which may be operated manually or be automatically operated in any

suitable manner by attachment to the moving parts of the loom itself. The rotation of the cam 36 will move the rod 37 and bar j', and the latch will release the batten. A further movement of the cam will release the rod 37, and the spring Z will return it to its former position.

The brush L, Figs. 1, 2, 9, 10, and 11, which serves to raise the nap of the chenille, as well as the combs R, which accompany it, are worked as follows: The brush has an alternate shifting movement throughout the whole breadth of the machine and a rotary movement in one direction. The shifting movement is produced by the wheel F, Fig. 21, actuated by the pinions G and g, which are actuated by the rack i. This rack receives an alternate movement from the lever K and cam or eccentric 38, Fig. 2, which causes the wheel F to execute an alternate circular movement. The endless cord Q, carried by the wheel F, causes the advance of the carriage Q' of the brush, which thus executes its to-and-fro motion. This same shifting movement produces at the same time the rotation of the brush by the aid of the fixed cord v. This cord passes successively over the pulley 6, Fig. 11, then on the pulley with ratchet-wheel and catch 9 of the brush to rise again and pass over a return-pulley 8, coming back to a second pulley with pawl and ratchet 10, then onto the pulley 7. The two ratchets of the pulleys 9 and 10 carry these only in a desired direction—that is to say, that the movement of the brush from left to right across the loom produces by the friction of the cord v the rotation of the pulley 9; but in this case the pawl lifts over the teeth of the ratchet without moving it. In consequence of the pulley 8 the cord v passes behind the pulley 10 and causes it to pivot. Its pawl, being in gear, actutates the brush. When the brush executes the movement from right to left, it is, on the contrary, the pulley 10 which becomes free, and it is the pulley 9 which is in gear. The brush turns, therefore, always in the same direction from back to front, whatever may be its lateral shifting. The combs R are fixed on each side of the brush and move with it. They are set to pivot upon an axle x, Fig. 9 and 10, their pivoting being limited by the pins 11, against which strikes the upper part 12 of each comb. The result is that they take of themselves the necessary position, according to the direction of the shifting which they undergo, to press upon the warp-threads h'', produce then vibration, and by this combined action compel them to penetrate into the nap of the chenille without pressing down its threads.

I do not in this application claim generally the shuttle *per se* which is shown and described, since that feature is included in and broadly claimed in a separate application filed by me March 25, 1892, Serial No. 426,408.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a loom for weaving chenille carpets, a rotary brush reciprocating across the warp-threads and raising the nap of the chenille-weft threads and means for operating the brush.

2. In a loom for weaving chenille carpets, a rotary brush reciprocating across the warp-threads and raising the nap of the chenille-weft threads, a suitable support sustaining the brush above the shed, and means for operating the brush.

3. In a loom for weaving chenille carpets, a way located above the shed transverse thereto, a carriage traveling upon said way, a brush supported by said carriage, and means for rotating said brush and reciprocating it across the warp-threads.

4. In a loom for weaving chenille carpets, a way located above the shed, a carriage upon said way, a frame depending from said carriage, a rotating brush supported by the frame, and means for rotating said brush and reciprocating it across the warp-threads.

5. The combination, in a loom for weaving chenille carpets, of a weft-carrying shuttle reciprocating through the shed, a brush suitably mounted upon a way above the shed and following the shuttle in its reciprocations, and means for rotating and reciprocating said brush.

6. The combination, in a loom for weaving long-pile carpets, of two arms operated from opposite sides of the said loom and passing the chenille-weft shuttle from one to the other, and a rotating brush operating to brush the nap of the chenille-weft into position between the warp-threads and following the shuttle in its reciprocating movement, and means for operating said brush.

7. The combination, in a loom for weaving chenille carpets, of a weft-carrying shuttle reciprocating through the shed, a brush suitably mounted upon a way above the shed and following the shuttle in its reciprocations, means for rotating and reciprocating said brush, and combs carried upon the frame of the brush and whipping the warp-threads.

8. The combination, in a loom for weaving chenille carpets, of a brush traveling to and fro across the warp-threads upon a suitable way transverse thereto, means for operating said brush, and a comb or combs carried thereby and in contact with said threads.

9. The combination, in a loom for weaving chenille carpets, of two arms operated from opposite sides of the loom-frame, a chenille-carrying shuttle reciprocated across the warp-threads by said arms, a way above the shed transverse thereto, a carriage upon said way, a frame depending from said carriage, a brush supported by said frame, and means for rotating the brush and reciprocating the brush-carriage and brush across the warp-threads, following the reciprocations of the shuttle.

10. The combination, in a loom for weaving chenille carpets, of a shuttle having a convex-faced delivery-tube for raising the warp-threads simultaneously with the delivery of the chenille-weft threads, two arms operated from opposite sides of the loom-frame and reciprocating the said shuttle through the shed, a brush following the reciprocations of the shuttle and brushing the chenille points into position between the warp-threads, and means for rotating and reciprocating said brush.

11. The combination, in a loom for weaving chenille carpets, of a weft-carrying shuttle, means for reciprocating said shuttle across the warp-threads, and a rotating and reciprocating brush, and means, substantially as described, for controlling the movements of said brush, so that it will follow the reciprocations of the shuttle, and a batten alternating in movement with the reciprocations of the brush and shuttle to drive the chenille firmly into place between the warp-threads.

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