No. 775,970. PATENTED NOV. 29, 1904.

W. G. HARTLEY.

LOOM FOR WEAVING PILE FABRIC.

APPLICATION FILED FEB. 4, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

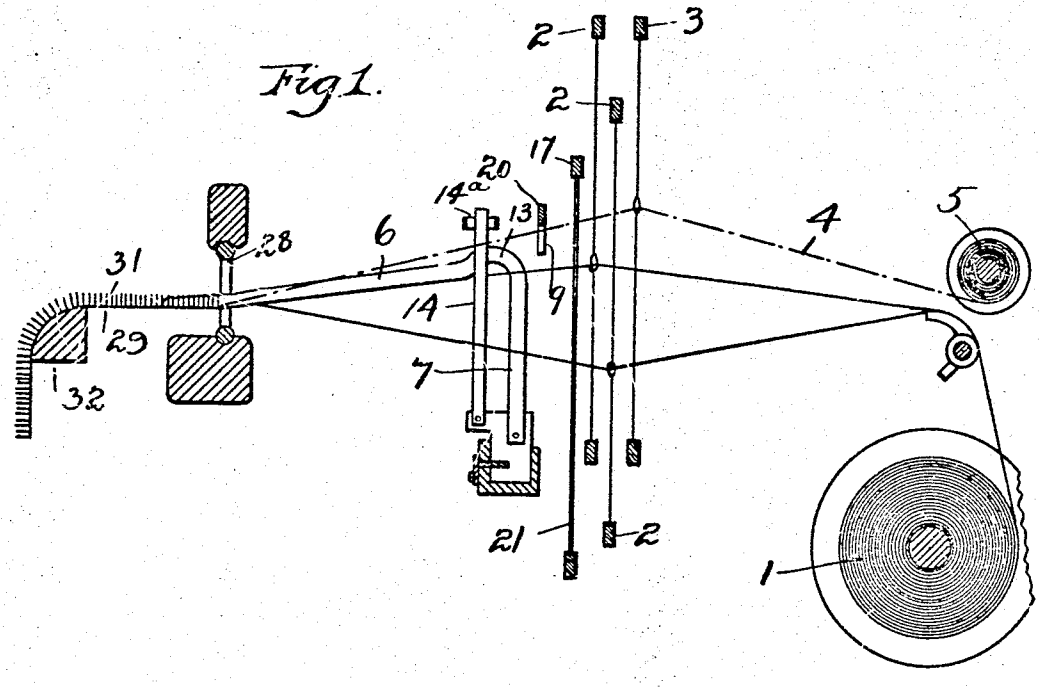


Fig. 3.

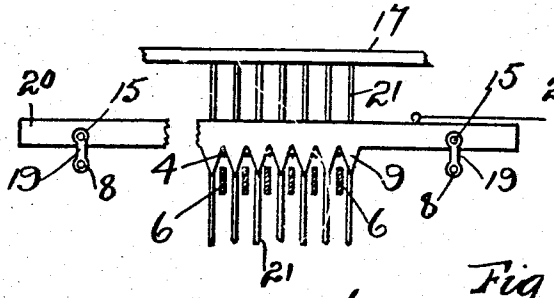


Fig. 4.

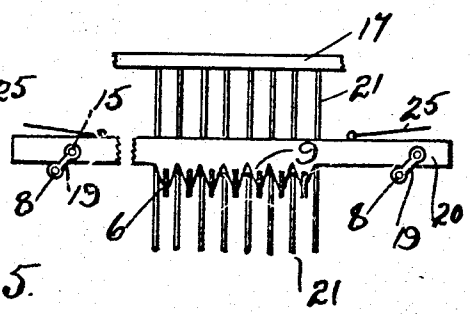


Fig. 5.



Witnesses

Frank A. Foster

E. J. Ogden

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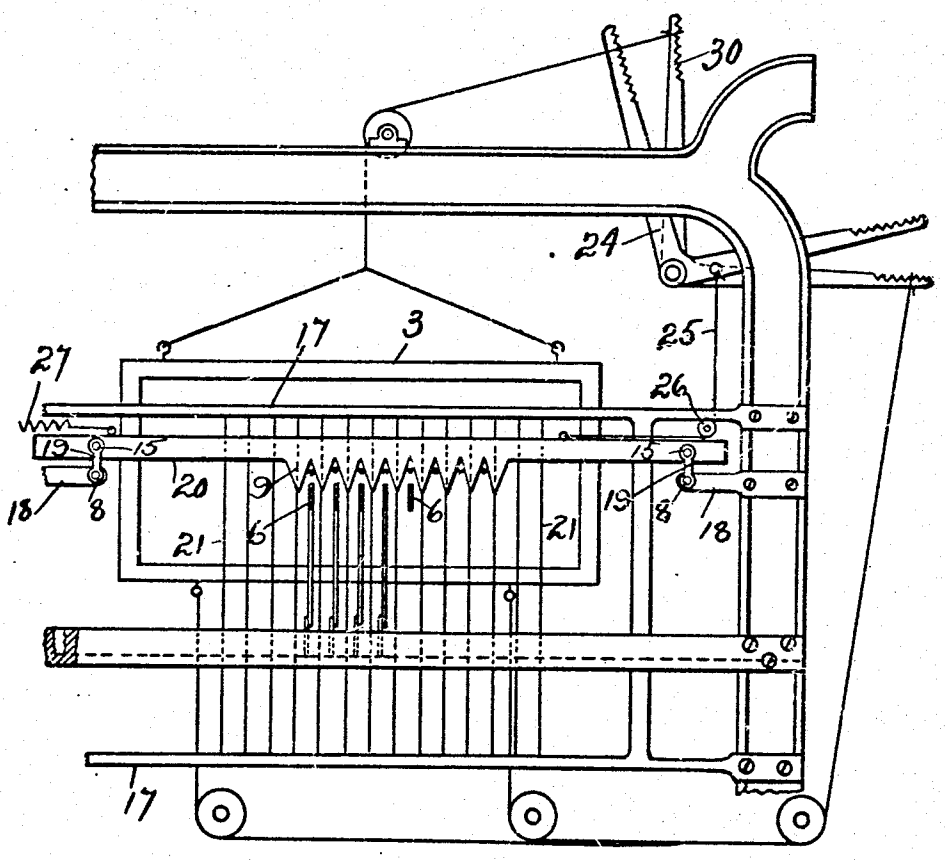
W. G. HARTLEY.

LOOM FOR WEAVING PILE FABRIC.

APPLICATION FILED FEB. 4, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

Fig 2.



Witnesses

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No. 775,970. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM G. HARTLEY, OF AMESBURY, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HARTLEY LOOP WEAVE COMPANY, OF AMESBURY, MASSACHUSETTS.

LOOM FOR WEAVING PILE FABRIC.

SPECIFICATION forming part of Letters Patent No. 775,970, dated November 29, 1904.

Application filed February 4, 1904. Serial No. 191,966. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. HARTLEY, a resident of Amesbury, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Looms for Weaving Pile Fabric; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to improvements in looms for weaving pile fabric, and has for its object an improved construction of mechanism for forming loops over pile-wires, which mechanism may be used for weaving any pile fabric, but is adapted more particularly for use in weaving carpeting.

A further object of the invention is to provide means, including a serrated bar, having a set of downwardly-projecting tapering teeth or fingers, each tooth projecting down between the series of pile-threads, the whole being capable of being moved transversely or in the direction of the width of the fabric and at the same time moving downwardly, carrying the pile-threads over the pile-wires.

A further object of the invention is to provide means for the purpose of guiding the vertically-reciprocating pile-threads so that after they have been carried down and out from between the said teeth through the ground-warp threads they will be sure to find their way back (when carried up by the ascending harnesses) into the space between the teeth where they came from.

The invention consists of other novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the appended claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 illustrates the pile-thread as being operated by the heddles, the view being a diagram in section showing parts of the loom and the relative position of the new device to the usual parts looking in the direction of one end of the loom. Fig. 2 is a front view showing a portion of the frame with my improved device attached thereto, showing the laterally-reciprocating serrated bar for operating the guide-wires. Fig. 3 shows the serrated guide-bar hung on its swinging arms, said bar being in its up or central position. Fig. 4 shows the toothed guide-bar thrown over to one side on its pivoted arms, which carries it downward at the same time. Fig. 5 is a top plan view showing the position of the threads as the toothed guide-bar is drawn to one side.

Referring to the drawings, 1 in Fig. 1 is the usual yarn-beam that carries the warp-threads from which the ground fabric is woven. On this ground fabric is formed the pile-loops, which when cut produce the velvet or plush effect such as form the face of carpeting or other pile fabric.

At 2 2 are the heddles or harnesses that control the ground warp-threads, and 3 is the heddle that controls the vertically-reciprocating movement of the pile-threads 4, these latter threads being led from the spools 5 on the rear of the loom. When it is desired to weave plain carpeting, this heddle 3 may be used, and it may be operated by the ordinary jack-levers in a dobby-head; but when it is desired to weave a figured carpeting or the like the jacquard mechanism (not shown) may be used in the manner well known to those skilled in the art of weaving.

At 6 is the pile-wire, one end of which lies on the woven fabric, such end being drawn down to the size of the loops desired to be formed over it. The main arm of this pile-wire may be set on an angle a little less than that of the upper shed of the ground warp-threads when open, said arm having a hump or protuberance 13 at the bend or where the wire turns down. This hump or rounded raised portion on the pile-wire catches the pile-thread first in its descent and prevents the thread from slipping back on the wrong side of the wire as it is being carried down by

the heddles to form a loop over said wire. The main arm of the pile-wire is supported below the warp-threads.

At 14 is the guide-bar, which is also pivoted below the warp-threads. This bar sets upright a short distance forward of the depending leg 7 and extends up past the pile-wire, resting loosely against the same. This guide-bar is for the purpose of guiding the pile-thread and preventing it from being carried too far to one side and over the adjacent pile-wire. It lies loosely against the pile-wire, so the pile-thread may readily pass down between it and said pile-wire. By placing these guide-bars either forward or back of the depending legs of the pile-wires more room is given for both the pile and warp threads to pass between said pile-wire legs without binding. The position of this guide-bar is quite an essential feature in the weaving of carpeting, as the threads are necessarily large and the space between said depending legs is very limited and where a number of different colored pile-threads are used the space is somewhat crowded. The upper portions of each of these guide-bars 14 are held loosely in a supporting-bar 14^a, which latter bar resembles a reed in construction, the ends of said guide-bars resting loosely between its dents; but any suitable means may be employed for supporting the upper ends of these guide-bars.

To carry the pile-warps 4 over the pile-wires 6 first to one side and then the other in the formation of loops over said wire, I preferably use a serrated bar having long tapering teeth 9 resembling the teeth of a saw, leaving correspondingly-tapering spaces between said teeth. The object in forming tapering spaces between the teeth is that each pile-thread 4 used in weaving carpeting is often made up of a plurality of loose and separate strands, and it is found in practice very desirable and often necessary in order to obtain good results in weaving this class of goods that these strands should be gathered together and held closely while they are being carried from side to side over the pile-wire in order to keep them from splitting or separating and part going on one side and part on the other of said pile-wire 6 as it is being carried down to form a loop over the same.

By the use of this construction the threads are carried by the harnesses 3 up to the apex of the angle between the teeth 9, thereby being held closely together, and by moving this toothed bar sidewise and downward at the same time these strands are retained in their proper position and held together until they have been carried safely over the hump or top of the pile-wires and down on the other side. In order to obtain this side motion and downward motion at the same time, I preferably employ the simple mechanism, (best illustrated in Figs. 3 and 4,) which is that of hanging the guide-bar 20 at each end on arms or connections 19 19, which connections are pivoted at 8 at their lower ends to fixed pieces 18 18 on the loom-frame, their upper ends being pivoted at 15 to the toothed guide-bar 20. By thus supporting this toothed bar on pivoted connections I am able to operate it in two directions at once by simply moving it endwise.

In order to insure a safe and sure return of each pile-thread back into the space between the same teeth where it was before it was carried down by the harnesses, I preferably employ a frame 17, supported from the loom-frame, which has bars 21 in it resembling in construction a wide reed. said bars or dents being long enough to extend down through and below the ground-warps when the shed is open. Each pile-thread passes through the space between the dents and is thereby safely guided back on its upward stroke into its proper position between the teeth 9 of the laterally-movable bar 20. Both this laterally-movable serrated bar 20 and the guiding-reed 17 are placed back of the pile-wires 6 and between them and the harnesses for the purpose of giving more room for a freer movement of the pile and warp threads.

The operation of my device is further explained as follows: When it is desired to weave a plain pile fabric, the pile-threads are led from the spools 5 in the rear of the loom through the harness 3, thence through the reed 28 to the ground fabric 29, to which latter it is secured. This harness 3 is actuated by a harness-lever 30 in the dobby-head to raise the pile-threads 4 at the required time above the pile-wires 6. The harness-lever 24 is then called into action in the usual manner and draws the toothed bar 20 endwise, the movement of which bar draws the teeth of the transversely-movable bar 20 over against the pile-threads 4, causing them to be carried down on the opposite side of the pile-wires 6 and form a loop when the harness descends. On the next stroke up of the pile-thread-actuating harness 3 the toothed bar 20 is released and allowed to be carried back by the tension of the spring 27 to its inward position, causing its teeth to engage the opposite side of each adjacent pile-thread and press or guide them over the next pile-wire so they may be drawn down on the opposite side of said pile-wires, again forming a loop. By a slight movement of these teeth, which extend down between adjacent pile-threads, said threads are guided to be carried down alternately first on one side and then on the other of the pile-wire 6 and bound down in the usual way by the passing of the shuttle over them. This thread is thus securely woven into the body of the fabric, the loops being formed over the wire, said loops being carried down by the beating up of the reciprocating reed 28 to the small end of the wire, where they are drawn to the proper size. This sequence of motions is repeatedly made, and a

series of loops 31 of the pile-threads are formed over each wire 6, which loops are drawn off of the front end of the wires as the cloth is drawn forward over the breast-beam 32 by the take-up motion. (Not shown.) Any number of flattened wires 6 and corresponding pile-threads 4 may be used, and any number of harnesses or shuttles may be employed, according to the style of goods desired. Only enough of the loom is shown to illustrate the operation of my invention.

I have shown the pile-threads 4 as being operated by the harness-levers in a dobby-head; but I do not wish to confine myself to any particular method of operating these pile-threads, as they may be actuated by cams or any of the various methods known to those skilled in the art of weaving.

This construction is extremely simple and practical, and by the arrangement of the mechanism the parts are made very accessible. This device is not confined to weaving of carpets alone, but may be used in weaving any plain or figured velvet of other pile fabric.

The mechanism for operating the different parts is not shown nor described, as they are all well known, and no particular way is claimed.

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

1. In a loom of the character described, pile-wires, a laterally-movable bar, said bar being provided with angular openings into which the pile-threads are gathered as they are carried laterally over the pile-wires and means for moving said bar laterally.

2. In a loom of the character described, pile-wires, a laterally-movable bar, said bar being provided with angular openings, said openings having an apex into which the threads are gathered as they are carried over the pile-wires, and means for moving said bar laterally.

3. In a loom of the character described, pile-wires, a laterally-movable bar, said bar being provided with angular openings, said openings having an apex into which the threads are gathered as they are carried laterally over the pile-wires, means for moving said bar laterally and means for guiding the pile-threads vertically.

4. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, guiding means for imparting a combined lateral and downward movement to said pile-threads, and independent means for guiding the pile-threads vertically.

5. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, guiding means for imparting a combined lateral and downward movement to said pile-threads, and independent fixed means for guiding the pile-threads vertically.

6. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, guiding means for imparting a combined lateral and downward movement to said pile-threads, and vertically-disposed bars or wires set between the pile-threads and adapted to guide the latter in their vertical movement.

7. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, a serrated bar adapted to engage said pile-threads, means for imparting a combined lateral and downward movement to said serrated bar, and means for guiding the pile-threads vertically.

8. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, guide teeth or fingers adapted to engage the pile-threads, means for imparting a combined lateral and downward movement to said teeth or fingers, and fixed independent means for guiding the pile-threads vertically.

9. In a loom for weaving pile fabrics, pile-wires over which loops are made by the pile-threads, a laterally-moving serrated bar, means whereby said bar may be moved endwise and downward at the same time, the teeth of which bar engage the pile-threads to guide or press them laterally and downwardly from side to side so that when said threads are carried down they will form loops over said pile-wires, means for moving said bar and means independent of the heddles for guiding said pile-threads vertically.

10. In a loom for weaving pile fabrics, pile-wires over which loops are made by the pile-threads, a laterally-moving serrated bar, means whereby said bar may be moved endwise and downward at the same time, the teeth of which bar engage the pile-threads to guide or press them laterally and downwardly from side to side so that when said threads are carried down they will form loops over said pile-wires, means for moving said bar, and vertically-disposed bars or wires set in between the pile-threads for guiding said threads vertically.

11. In a device of the character described, pile-wires over which loops are formed by the pile-threads, a serrated bar adapted to engage said pile-threads, and means for imparting a combined lateral and downward movement to said bar.

12. In a loom of the character described, pile-wires over which loops are formed by the pile-threads, a serrated bar adapted to move said pile-threads laterally and downwardly, and means for guiding said pile-threads vertically.

13. In a loom of the class described, pile-wires, upright flexible guide-bars located by the side of said pile-wires, and means located back of said guide-bars for moving the pile-threads, said guide-bars extending above said pile-wires for the purpose of preventing an excess lateral movement of the pile-threads.

14. In a loom of the class described, pile-wires, supported at one end by a depending leg, upright guide-bars located by the side of said pile-wires and forward of said leg, and

extending above said pile-wires for the purpose of preventing an excess lateral movement of the pile-threads.

15. In a loom of the class described, pile-wires, means for carrying the thread laterally across said pile-wires and upright flexible bars located by the side of said pile-wires and extending above the same, said bars being secured at their lower ends and adapted to be moved laterally at their upper ends, said bars being for the purpose of preventing an excess lateral motion of the pile-threads.

In testimony whereof I have hereunto set my hand this 1st day of February, A. D. 1904.

WILLIAM G. HARTLEY.

In presence of—
ROBERT C. CLARK,
AZOR O. WEBSTER.