No. 768,224. PATENTED AUG. 23, 1904.

W. G. HARTLEY.

LOOM FOR WEAVING PILE FABRICS.

APPLICATION FILED JAN. 30, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

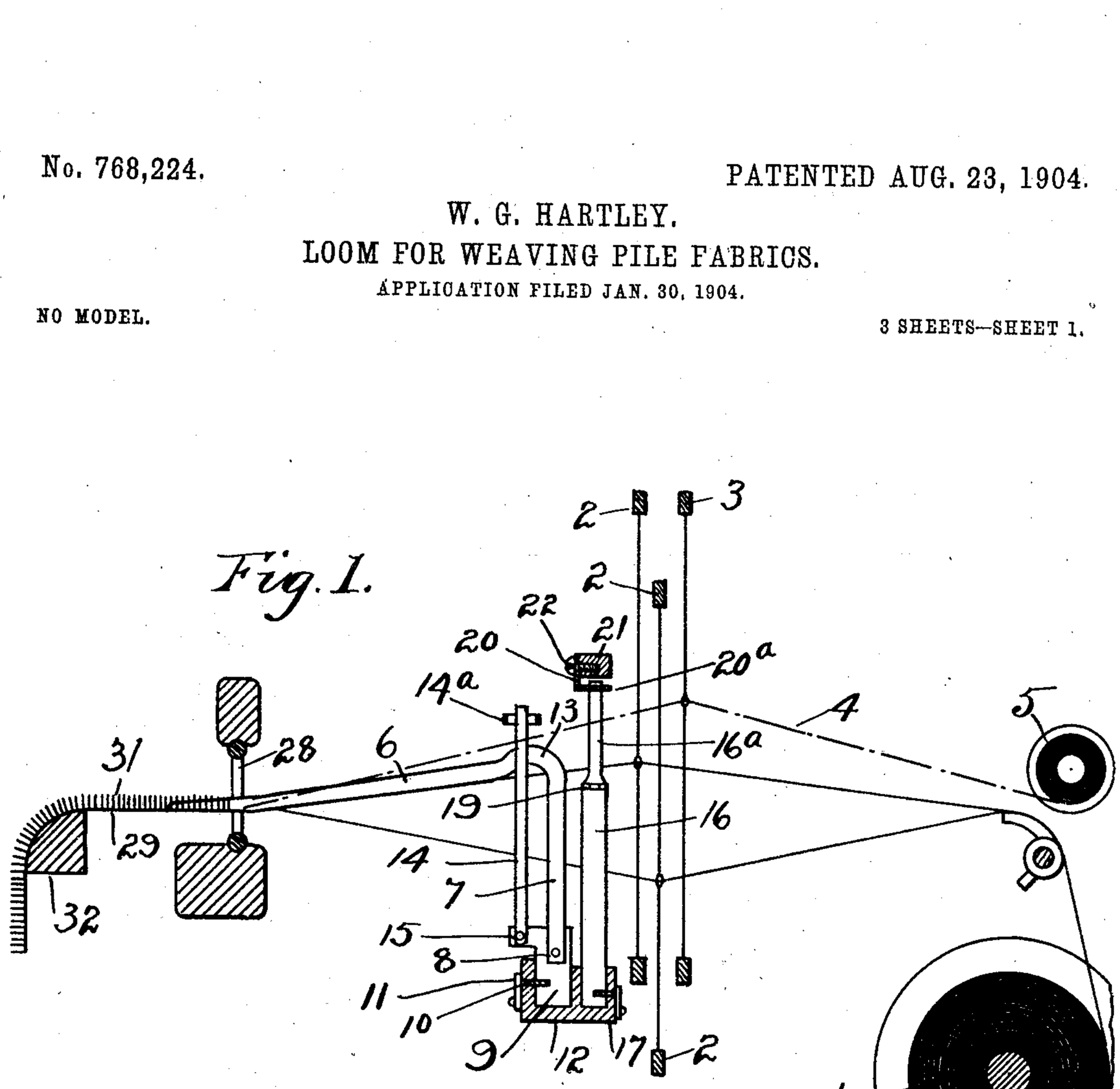


Fig. 3.

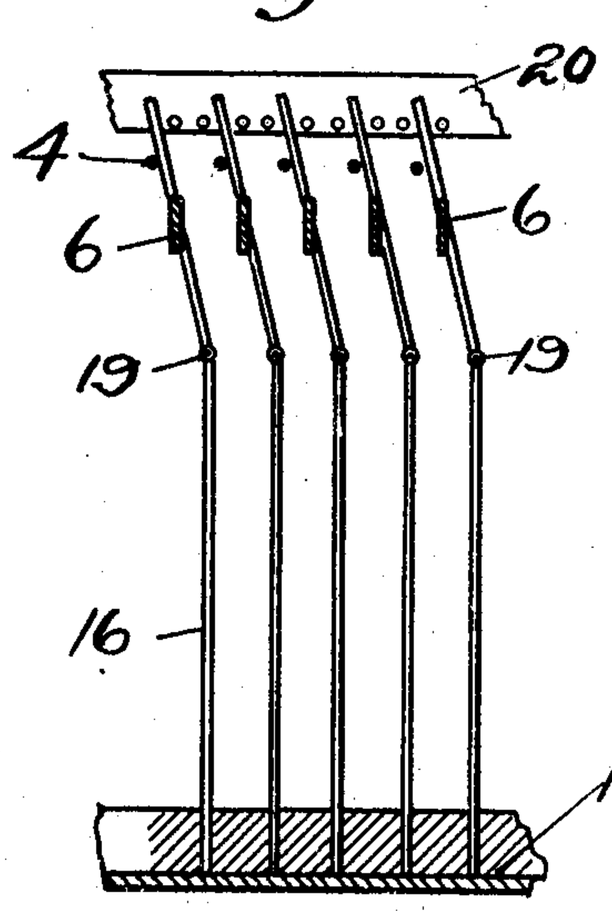
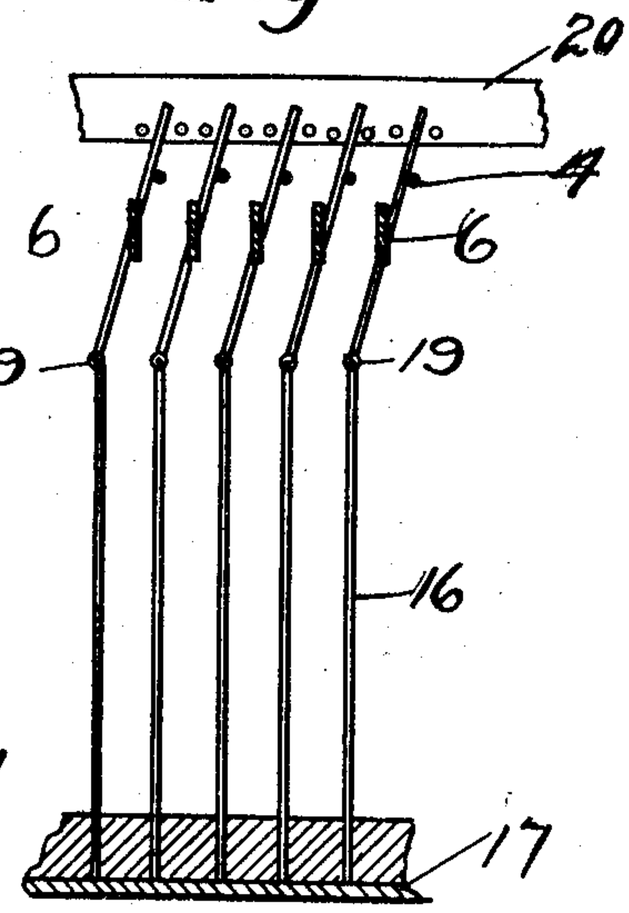


Fig. 4.



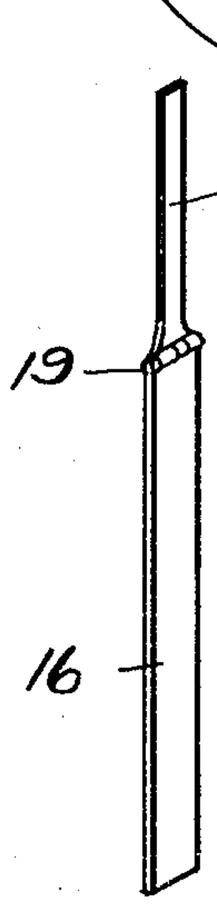
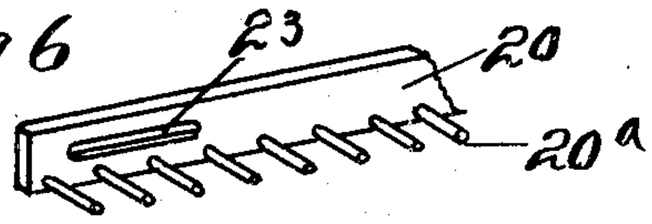


Fig. 5.

Fig 6



Witnesses

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

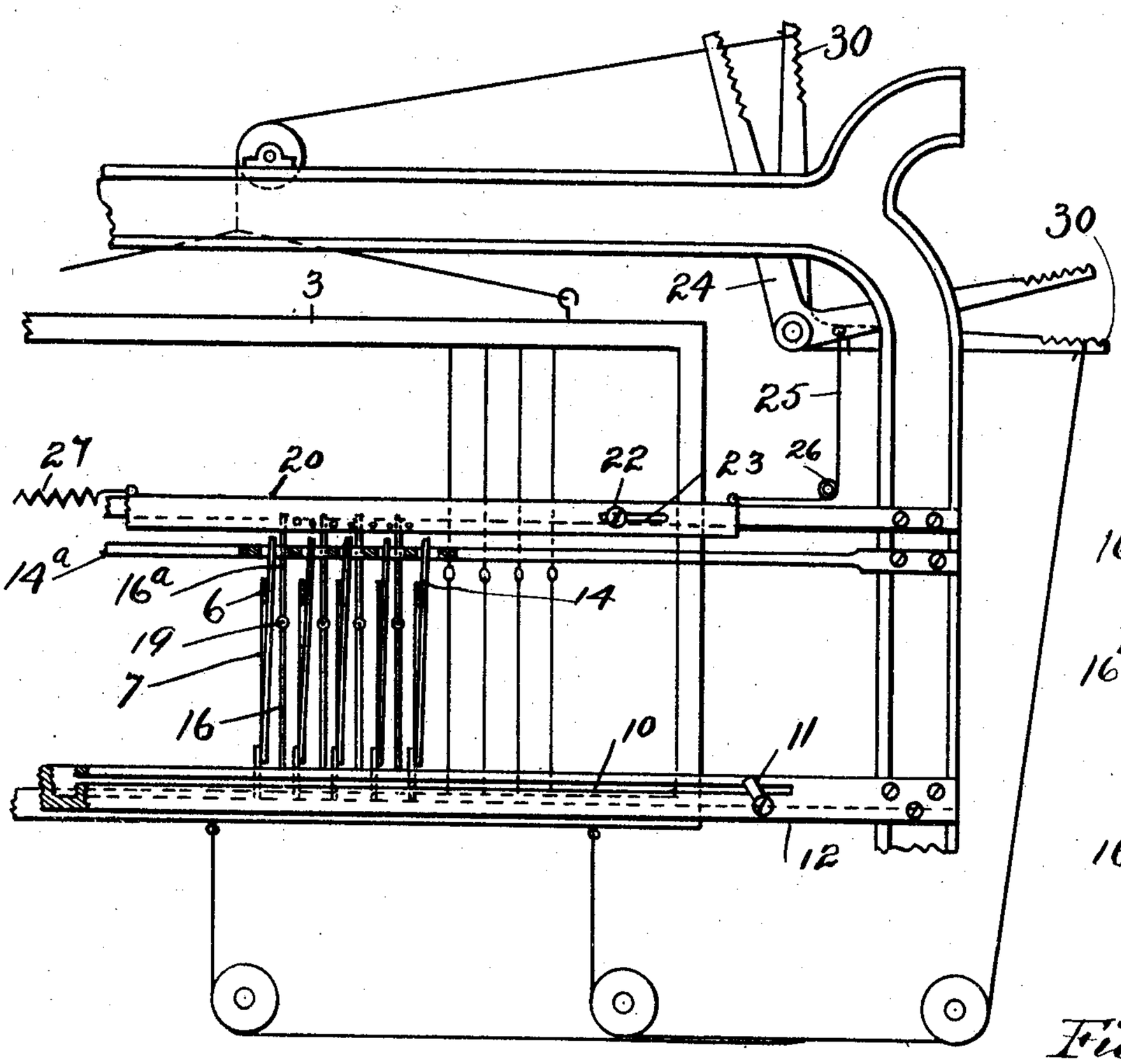

Fig. 5a

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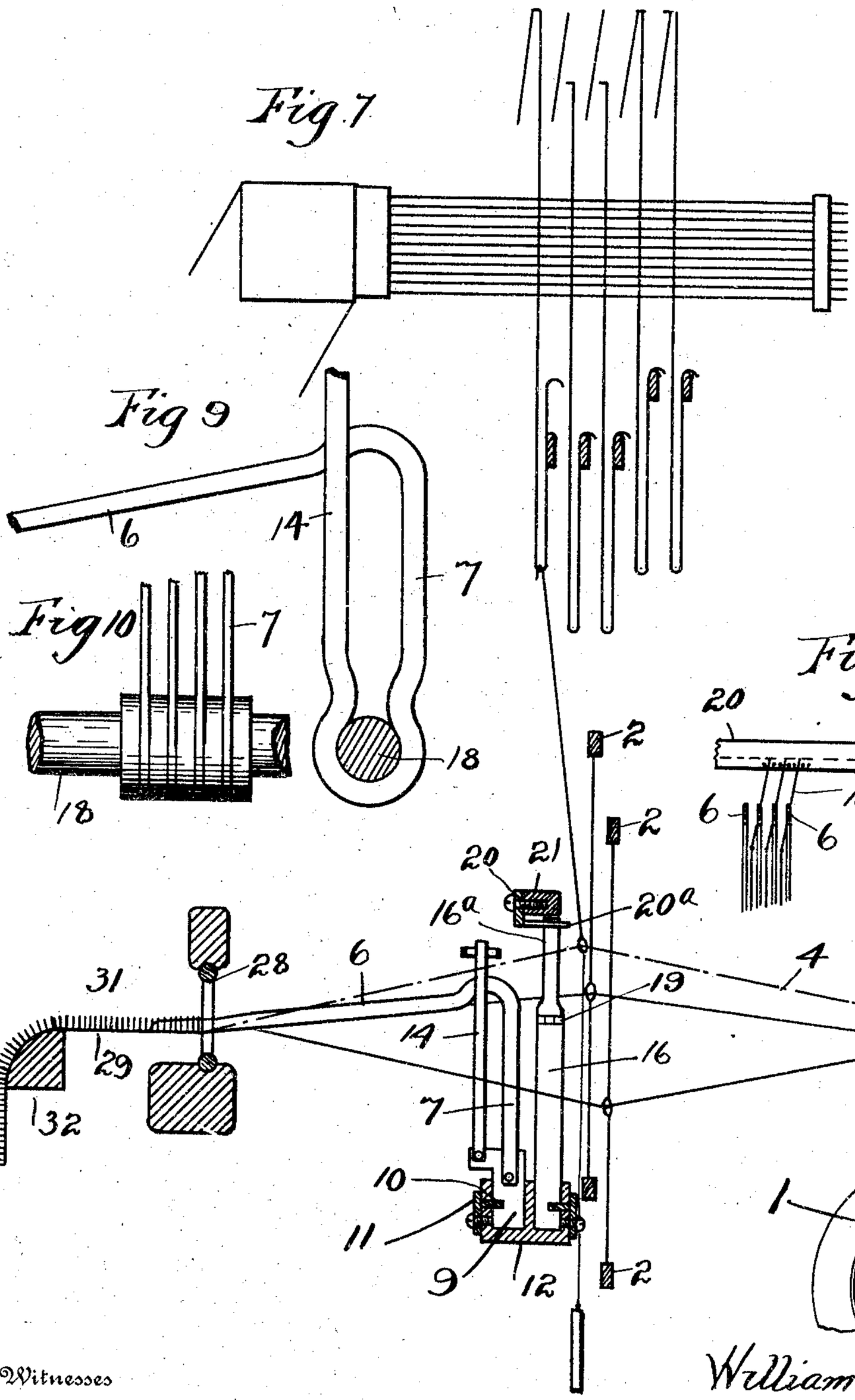
NO MODEL. 3 SHEETS—SHEET 3.



Witnesses

Frank A. Foster

E. D. Ogden

Inventor

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No. 768,224. Patented August 23, 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 FABRICS.

SPECIFICATION forming part of Letters Patent No. 768,224, dated August 23, 1904.

Application filed January 30, 1904. Serial No. 191,289. (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 figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in weaving pile fabric, and has for its object the construction of a simple and effective mechanism for forming loops over pile-wires and is adapted more particularly for use in weaving carpets. This mechanism consists of guide blades or wires set in between the pile-threads, the upper portion of each blade being capable of being moved alternately back and forth laterally or in the direction of the width of the fabric and carry the pile-threads over the pile-wires.

The invention consists of novel features and parts and combinations of the same, as will be fully decribed 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 blades and the laterally-reciprocating bar for operating the same. Fig. 3 shows the blades or guides, the lower portion of which are fixed and standing upright with their upper portion hinged to said fixed portion and carried over to the left by the transversely-sliding bar for the purpose of guiding the pile-threads to one side over the pile-wires, which pile-wires are shown in section. Fig. 4 shows the same as Fig. 3 with the exception that the swinging portion of the guides or blades have been carried to the right instead of the left side, as shown in Fig. 3. Fig. 5 shows a detail of one of the guides or blades in perspective. Fig. 5ª is a view of a modification. Fig. 6 shows a detailed perspective view of a portion of the transversely-movable slide-bar. Fig. 7 is a diagrammatic view illustrating the guides or blades and their operating mechanism and the manner of operating the pile-thread by a jacquard mechanism. Fig. 8 illustrates the sliding bar which engages the movable portion of said guides or blades as being operated by a jacquard-hook. Fig. 9 shows a modification in which the pile-wire and guides or blades are made integral or in one piece and bent at its lower end to form a loop to be strung on a bar with washers placed between to space them and assist in supporting them in the proper position. Fig. 10 illustrates an end view showing the washers between the pile-wires.

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 illustrated in Figs. 7 and 8 may be used in the manner hereinafter described.

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 in position by the depending leg 7, the lower end of which leg is pivoted at 8 on the shoe 9. This depending leg of the pile-wire is pivoted at its lower end, so it will more readily follow the movement of the ground or woven portion of the fabric on which the outer end rests as said woven portion is raised and lowered by the movement of the vertically-reciprocating harnesses. At 14 is a guide-bar which is also pivoted on this shoe at 15. This bar sits upright a short distance forward of the depending leg 7 and extends up past the humped portion 13, resting loosely against the pile-wire 6. 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 this guide-bar forward and the guide-blade back of the depending leg of the pile-wire plenty of room is left for the pile-thread to pass between them without binding. This is quite an essential point in the weaving of carpeting where large threads are used. 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.

By bending the pile-wire in the form illustrated in Figs. 9 and 10, making both the pile-wire and guide-wire in one piece, the construction may be simplified, doing away with some of the smaller parts. By stringing these pile-wires on the rod 18 the same object is attained as that by pivoting both the pile-wire and the guide-wire to the shoe 9. I do not, however, confine myself to any particular method of supporting and holding the ends of the pile-wire or the guide-wire, as any suitable method may be employed.

The shoes 9 are supported in a box or trough 12 and are locked firmly in position therein by the locking-bar 10, that passes through the side of the supporting box or trough and all of said shoes.

At 11 is a button or tongue pivoted to said box, which may be turned up over said locking-bar to hold the same in position in said trough. This supporting trough or box 12 passes across the loom and is fixed to the end frames.

To carry the pile-warps 4 over the pile-wires 6, first to one side and the other in the formation of loops over said wire, I preferably employ a series of thin guides or blades 16, which are fixed in an upright position, being supported at their lower ends from the box or trough 17. The upper portions of these guides or blades are shown as being hinged or jointed at 19. This hinge or joint may be constructed by thinning down the blade at 16[b], making it flexible, or any suitable means or material may be used whereby the lower portion of the blades may be fixed to stand comparatively stiff and the upper portion made capable of being oscillated transversely or in the direction of the width of the material. (See Fig. 5[a].) The upper ends of the transversely-movable portion of these guide-blades are engaged by the teeth 20[a] of a transversely-sliding bar 20. The pins of this sliding bar extend on the under side of a fixed bar 21 to engage the ends of these blades, the sliding bar being held in position on said fixed bar to slide endwise by screws 22, on which it slides through slots 23. This bar 20 is moved endwise in one direction by the harness-lever 24, to which it is connected by the cord 25 over the pulley 26, which harness-lever is operated by the dobby-head and is for the exclusive purpose of drawing this bar in one direction. The spring 27 is for the purpose of returning said bar when released by said jack-lever.

I do not wish to be confined to the exact construction shown and described, as it may be varied to suit the various conditions under which my apparatus is operated without departing from the spirit and scope of my invention.

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 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 sliding bar 20 endwise, the movement of which bar throws the transversely-movable portions 16[a] of the guides or blades 16 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 sliding bar 20 is released and allowed to be carried back by the tension of the spring 27 to its inward position, causing the transversely-moving portion in the guides or blades 16[a] 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 guides or blades, which are placed 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.

The modification shown in Fig. 7 of the drawings illustrates my device as being actuated by a jacquard mechanism and is used when it is desired to obtain figured work in weaving carpeting. The principle of using the guides or blades 16^a to press the pile-threads alternately from one side to the other of the pile-wires 6 is the same in both cases, the different-colored pile-threads used in making the figures being called as desired in the usual way by the guide-wires over the pile-wire 6 and down on the opposite side, forming the loops in the manner described above. In place of using the harness-lever 24 to operate the sliding bar 20 I connect the same cord 25 to a jacquard-hook, (see Fig. 8,) and thus operate this slide-bar 20 and the guide-blades 16^a at the proper time, the same as was done by the harness-levers in the dobby-head.

I have shown the pile-threads 4 as being operated by the harness-levers in a dobby-head and also by a jacquard mechanism; 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.

By the use of my device for weaving carpets the loom may be run at a much higher speed than by the old method and greater productions obtained. This construction also 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 or other pile fabric.

The mechanism for operating the different parts is not shown or 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 for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread, and a guide for the pile-thread, said guide being movable at its upper end.

2. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread, and a guide for the pile-thread, said guide being formed of a fixed member having an upper movable portion.

3. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread, a guide for the pile-thread laterally movable at its upper end, and a fixed guide-bar adapted to limit the lateral movement of the pile-thread.

4. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread, a guide laterally movable at its upper end, and means for causing said guide to engage and press the pile-thread laterally, whereby when said thread is carried down it will form a loop over said pile-wire.

5. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread, a guide for the pile-thread, and means for moving the upper end of said guide laterally.

6. In a loom for weaving pile fabrics, a series of pile-wires over which loops are formed by the pile-threads, guides for said pile-threads, and means for moving the upper ends of said guides.

7. In a loom for weaving pile fabrics, a series of pile-wires over which loops are formed by the pile-threads, guides for said pile-threads provided with laterally-movable members, and means for moving said members.

8. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, fixed upright guides adapted to guide the pile-threads vertically, and means supported by said guides for engaging and pressing the pile-threads laterally.

9. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-threads and an oscillating member hinged at its lower end for engaging and pressing said pile-threads laterally so that when said threads are carried down they will form loops over said pile-wires, and means for oscillating said member.

10. In a loom for weaving pile fabrics, pile-wires over which loops are formed by the pile-threads, fixed upright guides adapted to guide the pile-threads vertically, members pivotally mounted on said guides and adapted to engage the pile-threads to move them laterally, and means for oscillating said members.

11. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-

thread, a series of upright bars supported from below the warp-threads, an oscillating member supported on each upright bar, said oscillating members being arranged to swing and engage and press the pile-threads laterally so that when said threads are carried down they will form loops on said pile-wires, and means for oscillating said members.

12. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread and hinged or jointed guide members for engaging and pressing the pile-threads laterally so that when said threads are carried down they will form loops over said pile-wires, upright stationary members supporting said laterally-movable members and means for oscillating said hinged members.

13. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-thread and hinged or jointed guide members for engaging and pressing the pile-threads laterally so that when said threads are carried down they will form loops over said pile-wires, means for moving the oscillating members, and means for guiding the pile-threads vertically.

14. In a loom for weaving pile fabric, a pile-wire over which loops are made by pile-threads one end of said pile-wire being arranged to rest on the woven fabric, a depending leg for supporting the opposite end of said wire, which leg extends down through the warp-threads and is supported from beneath the same and hinged or jointed guide members for engaging and pressing the pile-threads laterally so that when said threads are carried down they will form loops over said pile-wires, means for moving the oscillating members, and means for guiding the pile-threads vertically.

15. In a loom for weaving pile fabric, a pile-wire over which loops are made by pile-threads, one end of said pile-wire being arranged to rest on the woven fabric, a depending leg for supporting the opposite end of said wire, which leg extends down through the warp-threads and is supported from beneath the same, and guides for said pile-threads, said guides having their upper ends free to move.

16. In a loom for weaving pile fabric, a pile-wire over which loops are made by pile-threads one end of said pile-wire being arranged to rest on the woven fabric, a depending leg for supporting the opposite end of said pile-wire, which leg extends down through the warp-threads and is supported from beneath the same, a guide for the pile-threads having one end free to move, and a guide adapted to limit the lateral movement of the pile-thread.

In testimony whereof I have hereunto set my hand this 27th day of January, A. D. 1904.

WILLIAM G. HARTLEY.

In presence of—
ROBERT C. CLARK,
DELL W. DOLBIER.