

No. 762,528.

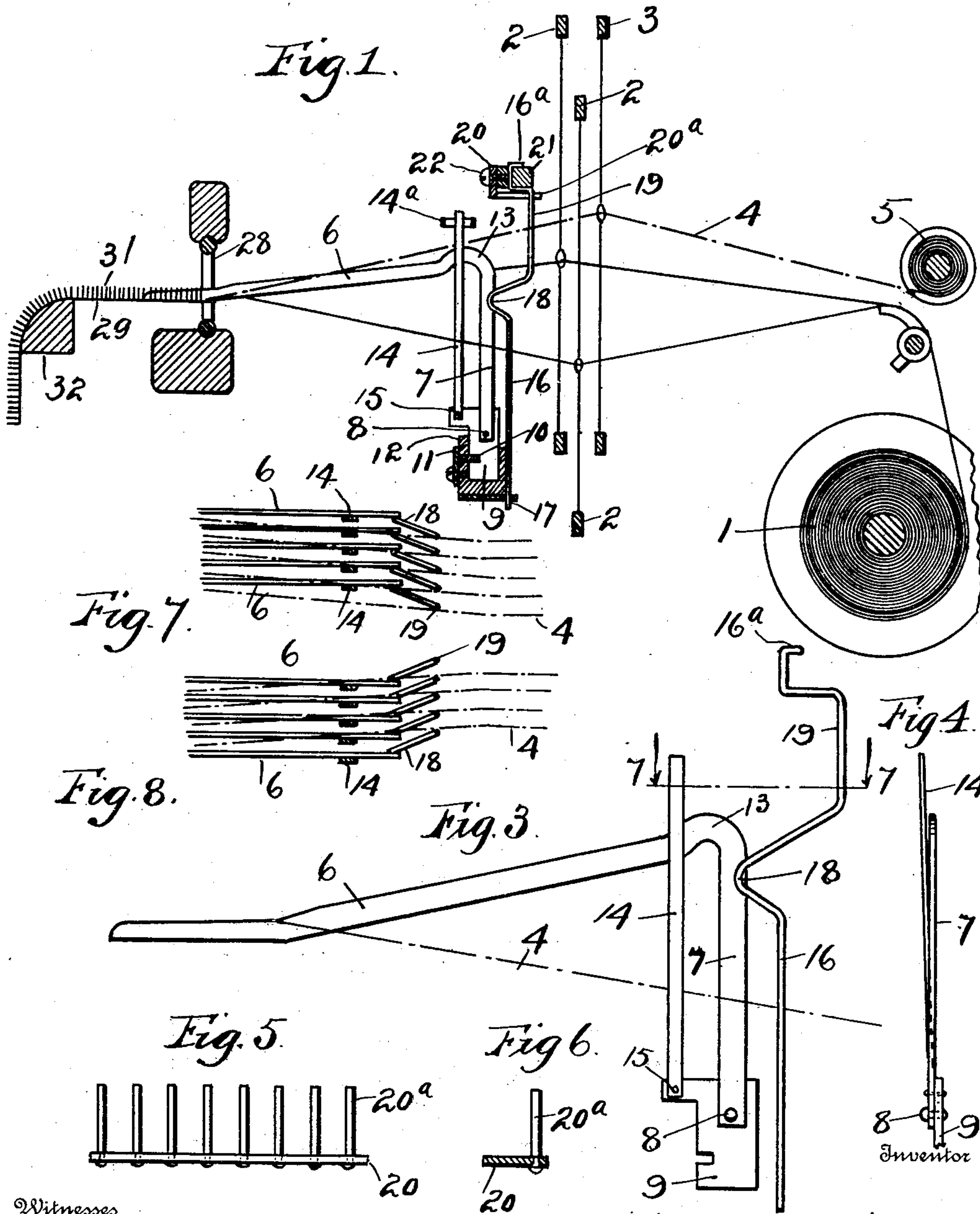
PATENTED JUNE 14, 1904.

W. G. HARTLEY.
LOOM FOR WEAVING PILE FABRIC.

APPLICATION FILED FEB. 2, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses

Frank A. Foster
E. D. Ogden.

By

William G. Hartley.
Howard E. Barlow
Attorney

No. 762,528.

PATENTED JUNE 14, 1904.

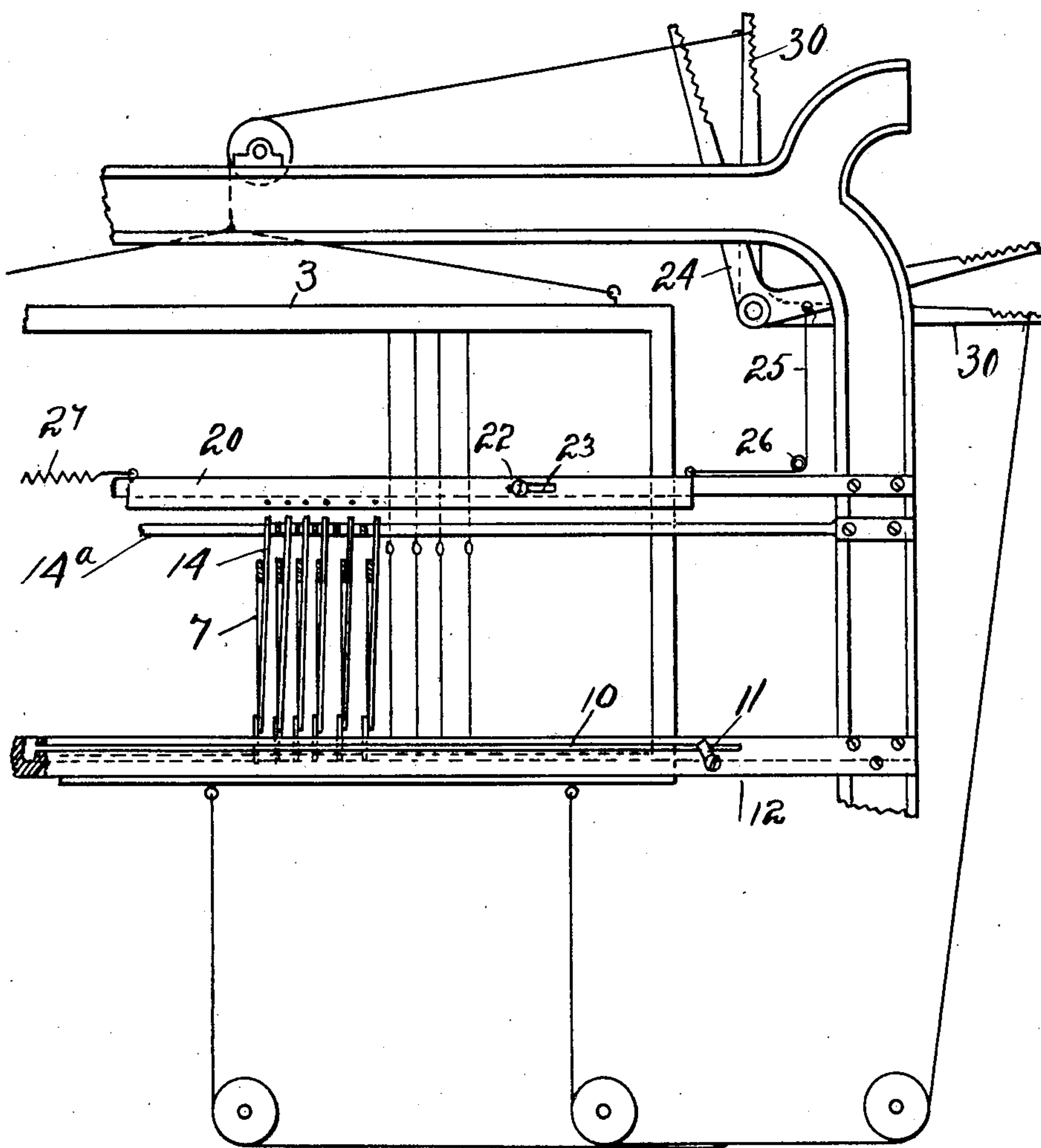
W. G. HARTLEY.
LOOM FOR WEAVING PILE FABRIC.

APPLICATION FILED FEB. 2, 1904.

NO MODEL.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

Frank A. Foster
E. D. Ogden

Inventor
William G. Hartley.

By

Howard E. Barlow.
Attorney

No. 762,528.

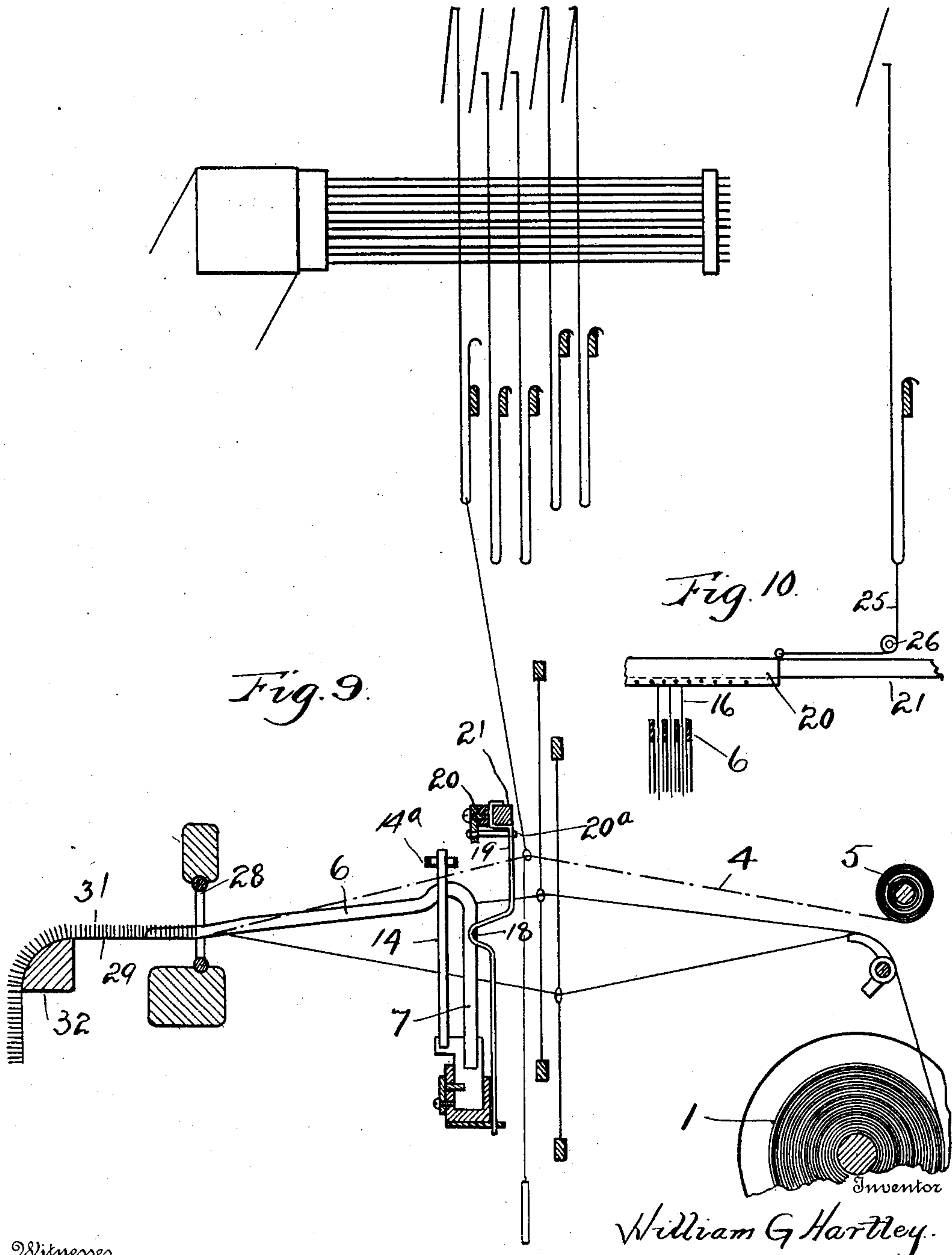
PATENTED JUNE 14, 1904.

W. G. HARTLEY.
LOOM FOR WEAVING PILE FABRIC.

APPLICATION FILED FEB. 2, 1904.

NO MODEL.

3 SHEETS—SHEET 3.



Witnesses

Frank A. Foster
E. J. O'Connell

By

Howard E. Barlow
Attorney

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. 762,528, dated June 14, 1904.

Application filed February 2, 1904. Serial No. 191,647. (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 characters 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.

One of the features of this invention is the manner of carrying the pile-threads over the pile-wires, which is done by guide-wires set in between the pile-threads, which wires are so arranged that they are operated automatically to engage and press the pile-threads first to one side and then to the other of the pile-wire and at the same time to engage and press the pile-wire in the opposite direction to that of the thread and carry said pile-threads alternately first one side and then the other, forming loops over said pile-wire. By pressing the pile-wire to one side and in the opposite direction to that of the pile-threads the amount of lateral motion of the pile-threads is proportionally reduced.

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 bar for operating the guide-wires. Fig. 3 is an enlarged detail of one of the pile-wires and guide-bars, showing the guide-wire in the relative position thereto. Fig. 4 is an end view of the pile-wire and the guide-bar. Fig. 5 is a detailed plan view of the sliding bar, the fingers of which engage and move the guide-wires. Fig. 6 is a sectional end view of the same. Fig. 7 is a top view of a series of pile-wires, taken on line 7 7 of Fig. 3, showing the guide-bars in section and the guide-wires in position to press the pile-threads to one side over the pile-wire and at the same time press the adjacent pile-wires in the opposite direction. Fig. 8 is the same as Fig. 7, with the exception that the guide-wires and pile-threads set in the opposite direction to that illustrated in Fig. 7. Fig. 9 is a diagrammatic view illustrating the manner of operating the pile-thread by a jacquard mechanism. Fig. 10 illustrates the sliding bar which engages and operates the guide-wires as being connected to and operated by a jacquard-hook.

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. 9 and 10) 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 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 sets 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-wire back of the depending leg of the pile-wire and in line with the same plenty of room is left for the pile-thread to pass between them without binding. This construction also leaves a clear passage for the threads of the ground-warp as they reciprocate vertically between the pile-wires. This is quite an essential feature in the weaving of carpeting, as large threads are used and considerable room is needed. 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.

I do not wish to 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 laterally over the pile-wires 6 first one way and then the other in the formation of loops over said wires, I preferably employ a series of guide-wires 16, which wires are bent so as to have two off-sets or cranks 18 and 19. The upper portion of this wire 16 is pivotally held in the fixed bar 21, the extreme end being bent back at 16^a over the top of this bar to prevent the wire from dropping out. Beneath the bar the wire is carried back forming the crank portion 19, which portion engages the pile-threads 4 and gives them their lateral motion. After extending downward for a short distance the wire is carried forward on the other side of its pivoting center, forming the crank portion 18, which portion engages the depending leg 7 of the pile-wire and serves at the same time to move it in the opposite direction to that which the upper crank 19 moves the pile-threads. The wire is then bent back to its pivoting center and extends down through the ground-warps and is pivoted at 17 in the plate below. As illustrated in Figs. 7 and 8, the upper crank portion 19 is engaging and pressing the pile-thread 4 over one pile-wire while the lower crank portion 18 engages and presses the adjacent pile-wire in the opposite direction, so that the next adjacent pile-thread may more easily be passed over the same. The depending leg of the pile-wire is made of thin flexible material. It is also loosely hung at its lower end and is readily deflected by the crank portion 18 when pressed against it. If it should be so desired, the second offset portion 18 of the guide-wire may be left off, and thus avoid engaging and pressing the pile-wire to one side, pressing only the pile-threads by the offset 19. The pins 20^a of this sliding bar 20 extend back on the under side of a fixed bar 21 to engage the crank portion 19 of the guide-wires, the sliding bar 20 being held in position to slide endwise on said fixed bar by screws 22, which enter the fixed bar through slots 23 in said sliding bar. 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 upper offset portions 19 of the guide-wires over against the pile-threads 4 and the lower offset portion 18 over against the pile-wire, bending it in the opposite direction and causing the threads 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 offsets in each guide-wire 16 to engage the opposite side of each adjacent pile-thread and pile-wire and press or guide said threads 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 guide-wires, 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. 9 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 or other pile fabric. The principle of using the guide-wires 16 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. 10,) and thus operate this slide-bar 20 and the guide-wires 16 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.

It will be noted that my improved mechanism for forming the loops, as best illustrated in Fig. 2, only extends about half-way up the loom-arch leaving a wide space above the upper bar, 20 and the top of the harnesses, which gives ample room for the operator to use his arms and hands in drawing in the threads through the harness and to mend any broken-down ends. This is an essential feature to the practical manipulation of this as well as any other class of loom and by my particular construction is successfully accomplished. 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 or other pile fabric.

The mechanisms for operating the different parts are 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 for weaving pile fabric, a pile-wire over which loops are formed by the pile-threads, means for engaging the pile-wires to move them laterally so that said pile-threads will be carried down on the opposite sides of said pile-wires forming loops over the same.

2. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-threads, and means for engaging the pile-wires and pile-threads simultaneously to move them each laterally and in opposite directions to facilitate the passing of said threads over said pile-wires.

3. In a loom for weaving pile fabrics, a pile-wire over which loops are formed by the pile-thread, and a series of guide-wires having two offsets or cranks, one crank arranged to engage the pile-threads and one arranged to engage the pile-wire to swing each laterally and in opposite directions so that when said threads are carried down they will form loops over said pile-wires.

4. In a loom for weaving pile fabric, a pile-wire over which loops are formed by the pile-threads, and a guide-wire having offsets adapted to simultaneously engage the pile-wire and pile-threads to move them in opposite directions.

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

threads and a guide-wire pivotally hung and having two offsets or cranks and arranged to move the pile-thread laterally in one direction, and the other arranged to move the pile-wire 5 in the opposite direction, so that when said threads are carried down they will form loops over said pile-wire.

6. In a loom for weaving pile fabric, pile-wires over which loops are formed by the pile-threads, guide-wires pivotally hung, and 10 means whereby said guide-wire is made to engage and move the pile-wires laterally so that when said threads are carried down they will form loops over said pile-wires, said guide- 15 wires being placed between the pile-wires and the harnesses.

7. In a loom for weaving pile fabrics, a pile-wire over which loops are formed by the pile-thread, a series of guide-wires having two off- 20 sets or cranks, one crank arranged to engage the pile-threads and one arranged to engage

the pile-wire and swing each laterally and in opposite directions so that when said threads are carried down they will form loops on said pile-wires, and a guide-bar by the side of each 25 pile-wire.

8. In a loom for weaving pile fabric, a pile-wire over which loops are made by pile-threads, a depending leg on said pile-wire, a guide-bar located by the side of each pile- 30 wire, and a guide-wire located between the pile-wires and the harnesses, means on said guide-wire for engaging and guiding or moving said pile-threads to one side so that when said threads are carried down they will form 35 loops on said pile-wire.

In testimony whereof I have hereunto set my hand this 29th day of January, A. D. 1904.

WILLIAM G. HARTLEY.

In presence of—

ROBERT C. CLARK,
GEORGE L. BRIGGS.