

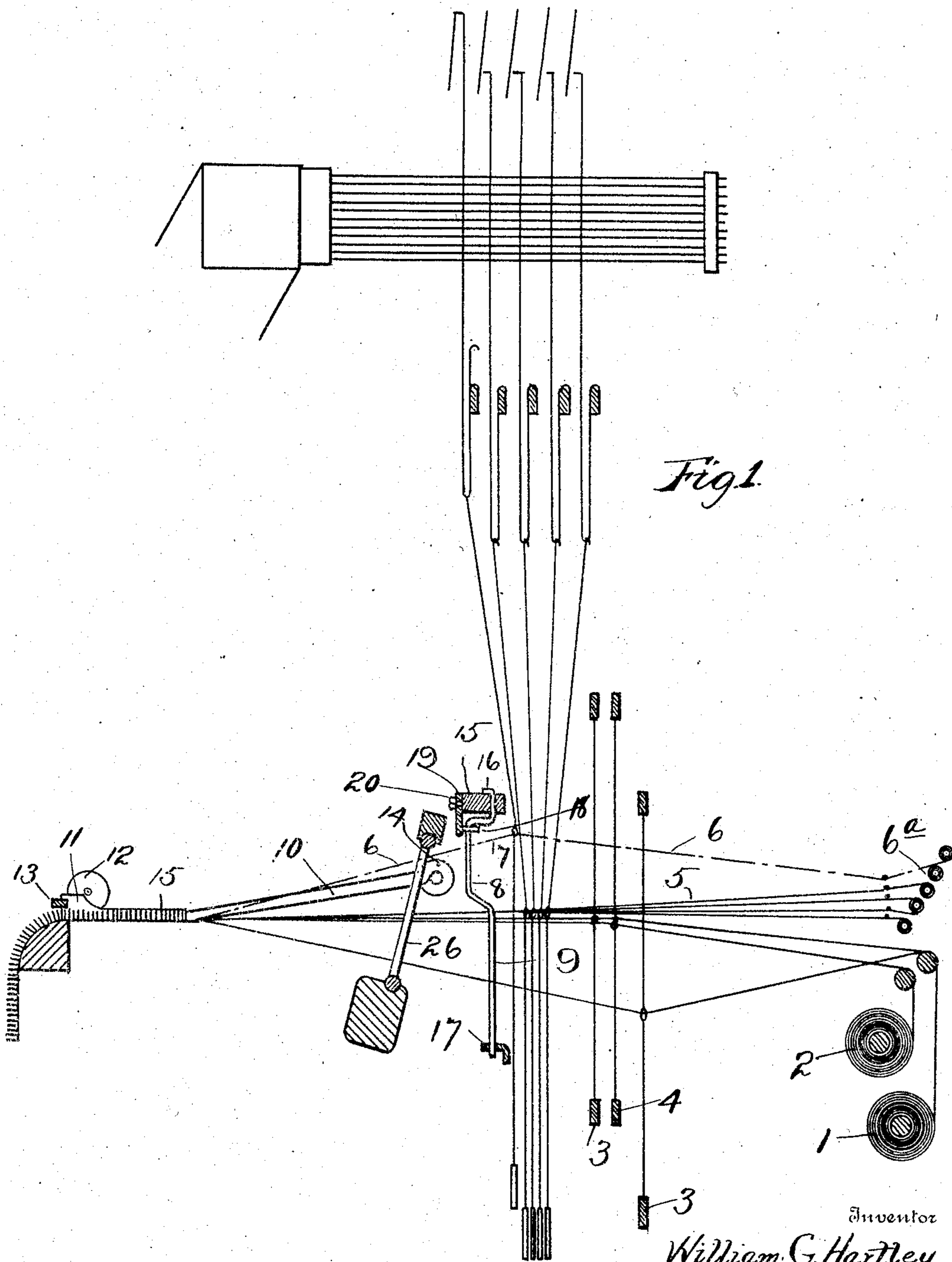
No. 778,363.

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

APPLICATION FILED MAY 11, 1904.

2 SHEETS—SHEET 1.



Witnesses

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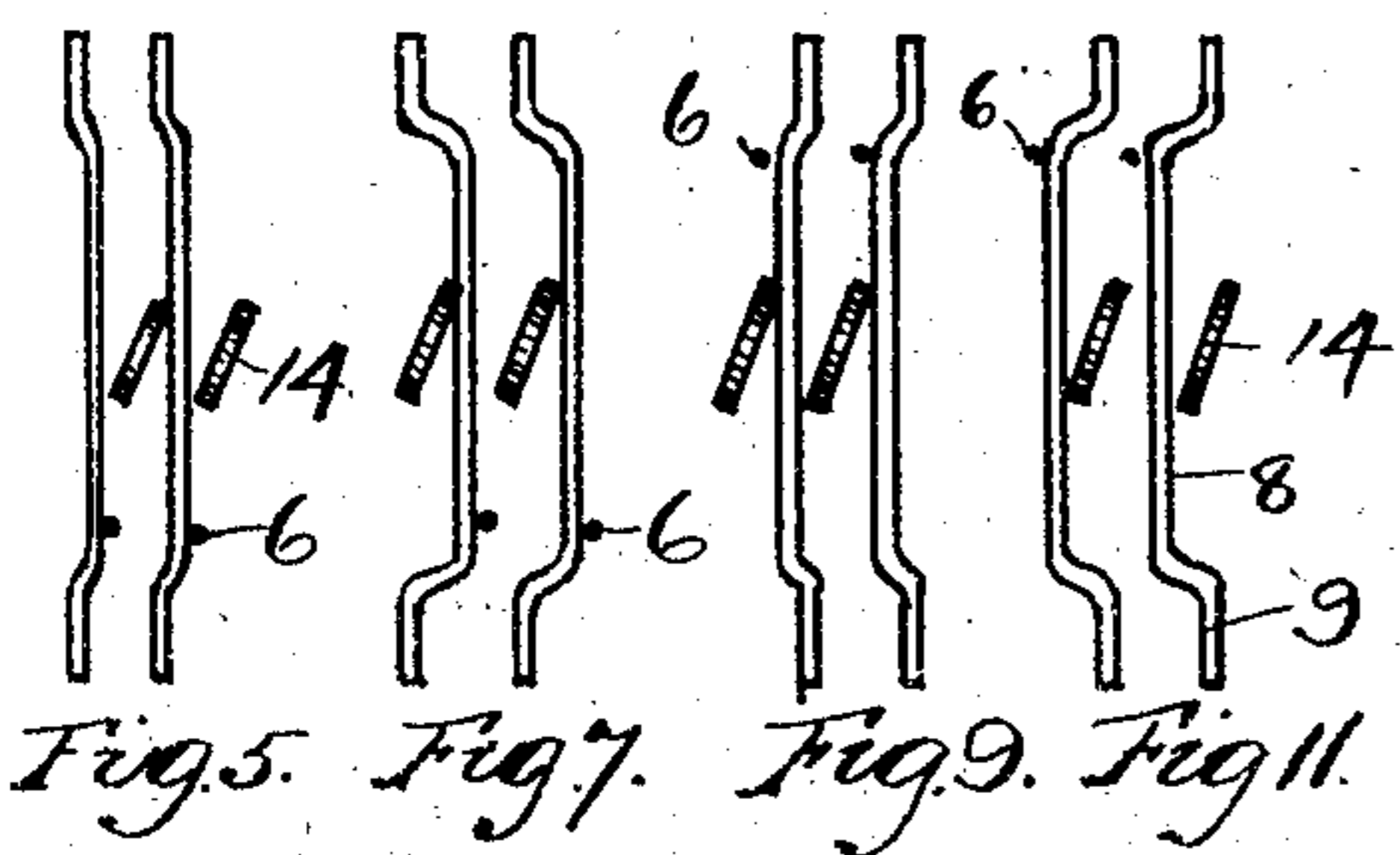
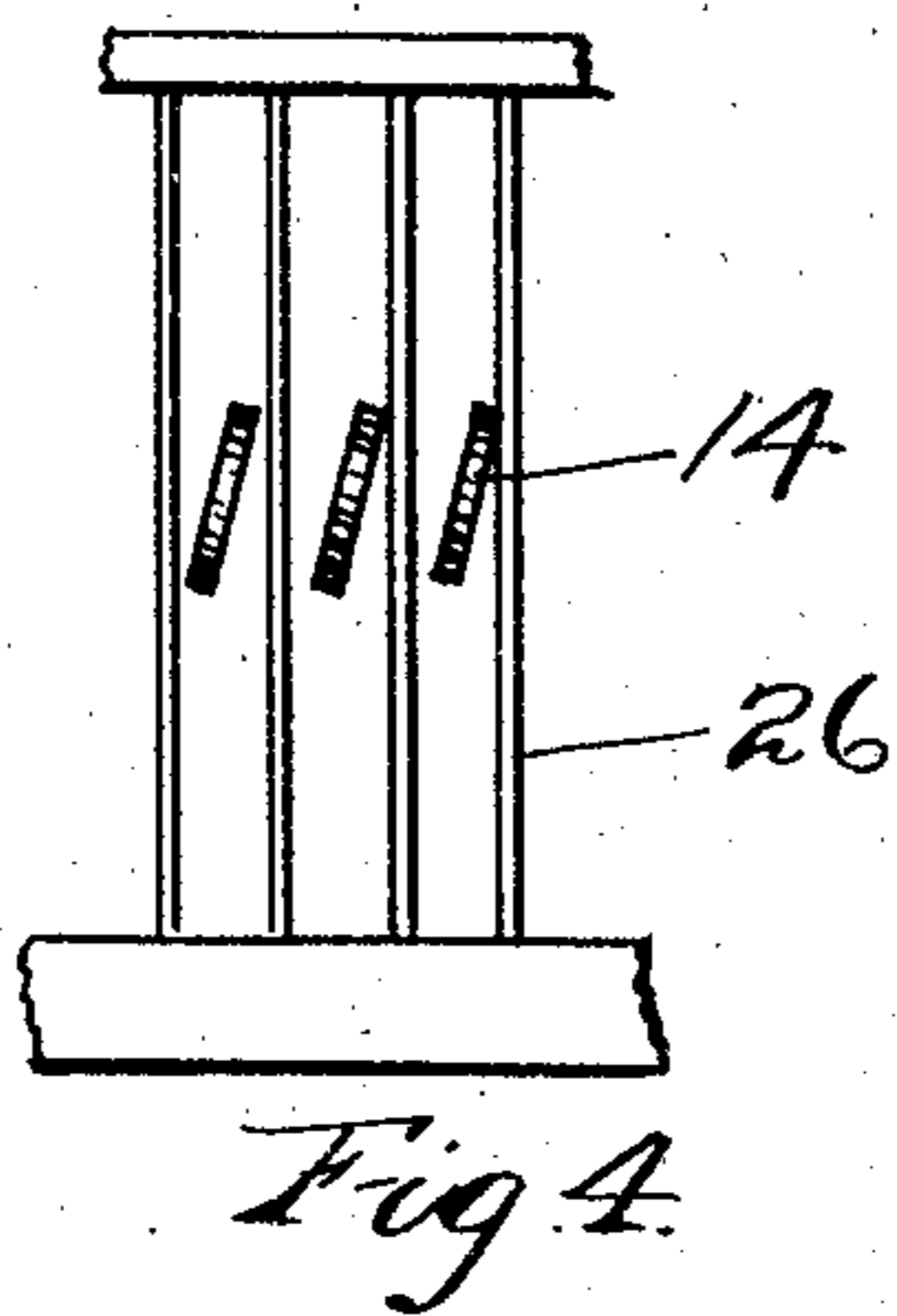
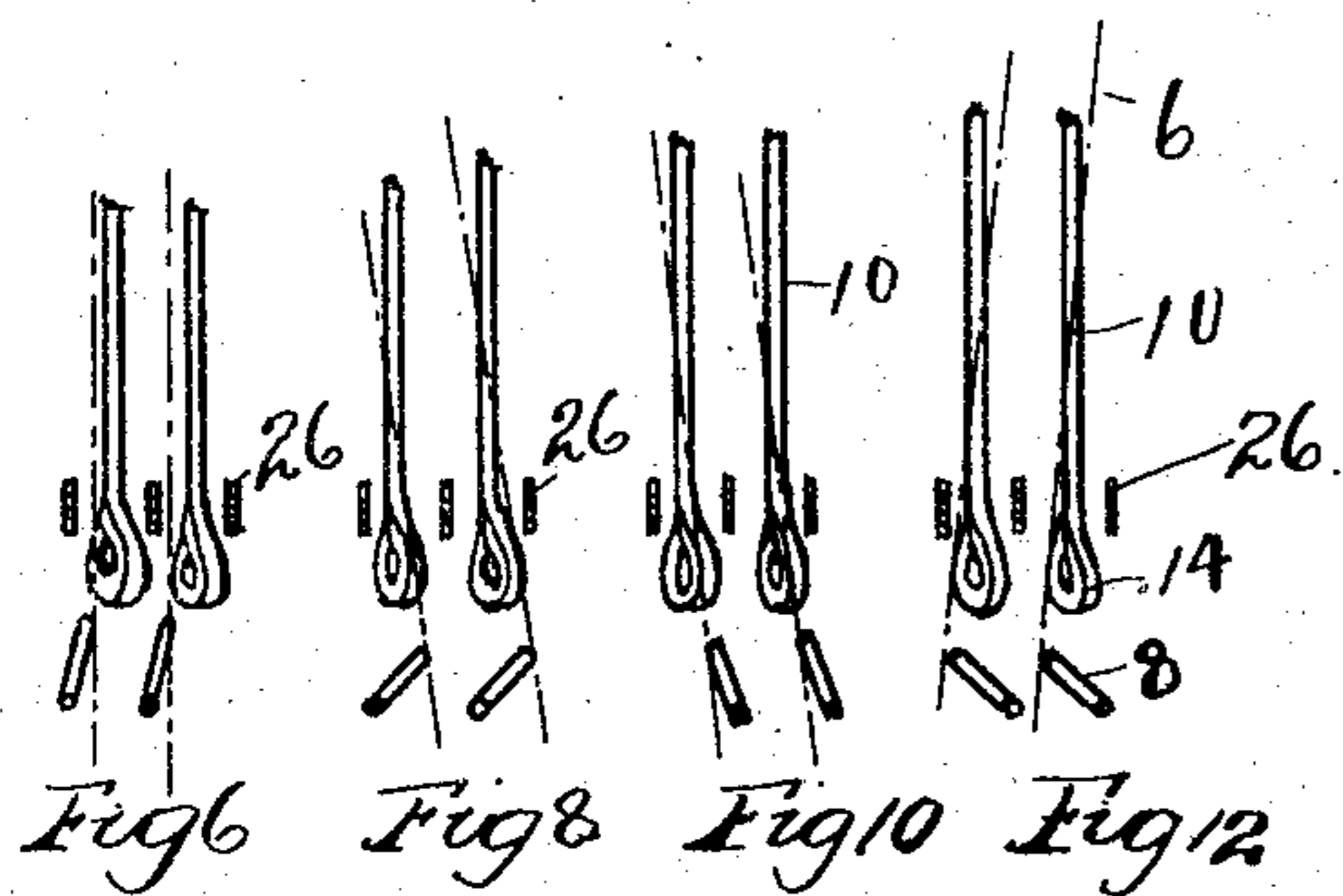
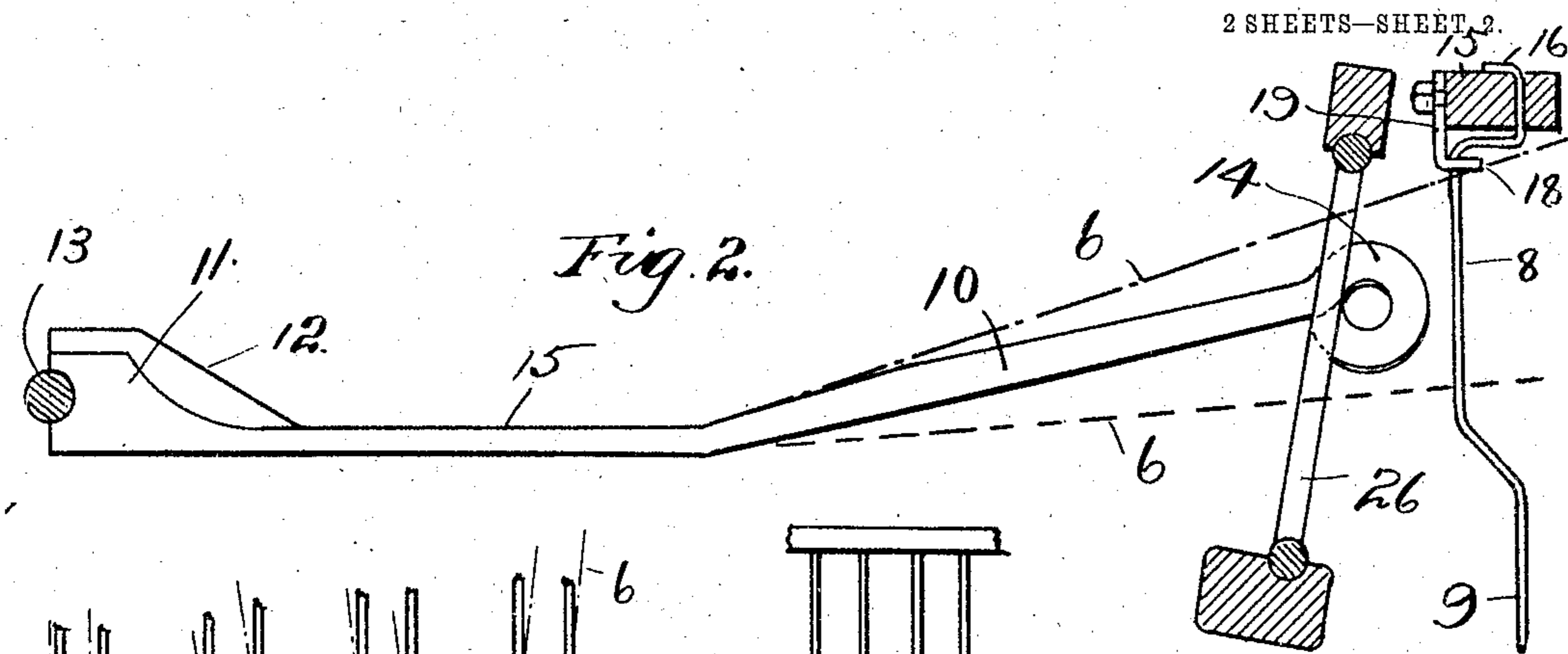
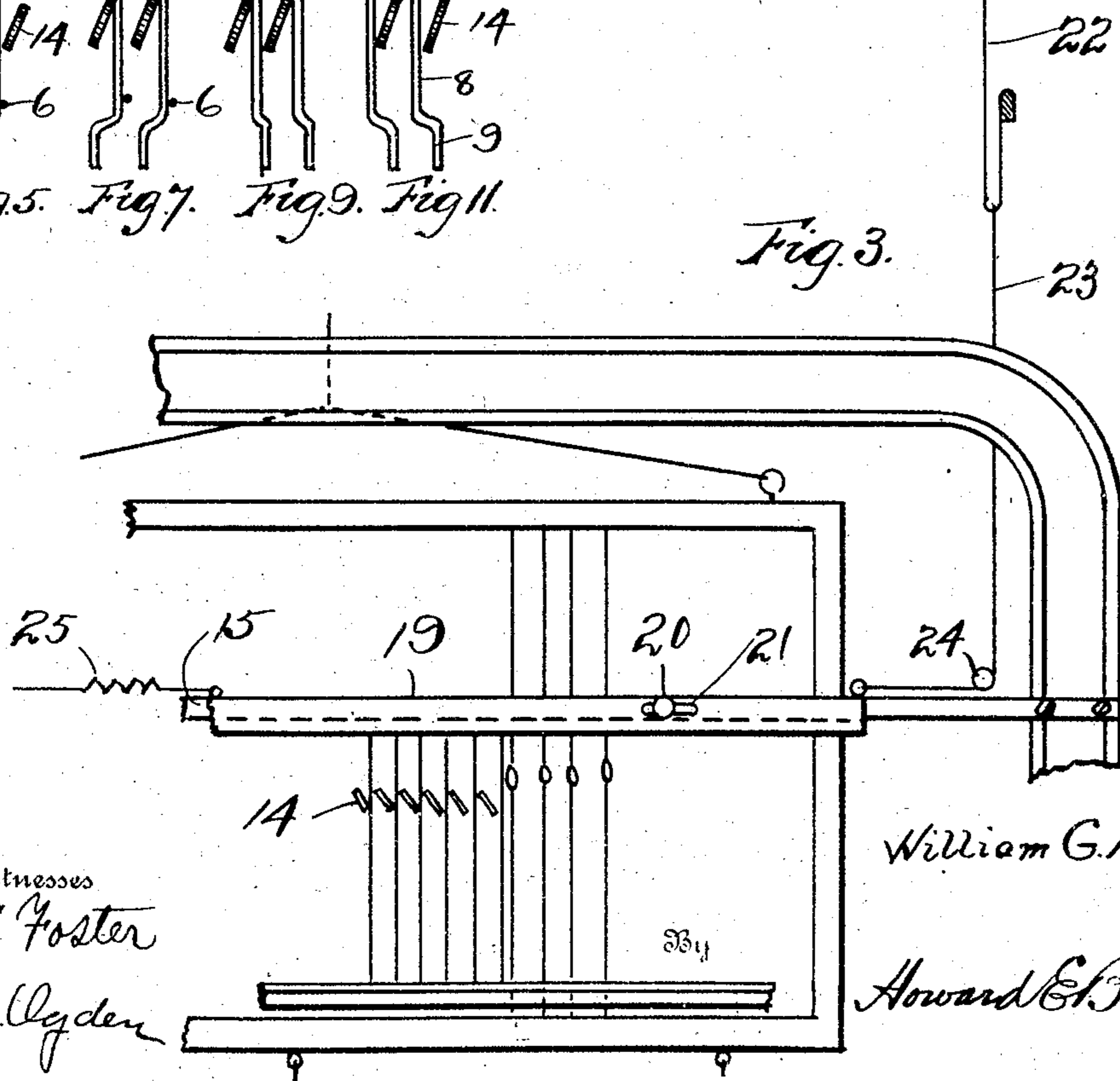


Fig. 3.



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UNITED STATES PATENT OFFICE.

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LOOM FOR WEAVING PILE FABRIC.

SPECIFICATION forming part of Letters Patent No. 778,363, dated December 27, 1904.

Application filed May 11, 1904. Serial No. 207,437.

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 letters 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 fancy figures on carpeting. In this class of looms for weaving pile fabric over pile-wires it has heretofore been impossible to weave fine or fancy figures in the goods, using a variety of colored threads, as the pile-wires have heretofore been supported at their rear ends by a depending leg or other similar means, thus necessitating the pile-threads being carried over the top of the same, first on one side and then back again onto the first side before it could rest until called up again. By thus passing the thread twice over the loop-wire in succession two loops of the same color were necessarily placed side by side, which combination was not always desired in the pattern. To obviate this difficulty, I have constructed the pile-wire having one end free, so that the pile-thread may pass completely around the end of the wire. In this way I can carry the thread called for over the wire forming the desired loop of the desired color, and then if not wanted again at that time I carry it beneath the wire to the opposite side, where it remains in readiness to be called again when desired.

Another feature of my invention is the twisting or setting the ends of the pile-wires off at an angle to facilitate the carrying of the pile-threads by the ends of said pile-wires and insure their being guided on the desired side thereof.

Another object of my invention is to so arrange the motions of the mechanism that the pile-threads will be carried laterally over the pile-wires at the time the reed is substantially at the rear portion of its stroke.

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 a plurality of pile-threads made up of different colors, these threads being operated by jacquard-hooks. The view is a diagrammatic 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 and showing the reed at the rear portion of its stroke, at which time the pile-threads are carried laterally over and under the pile-wires. Fig. 2 is an enlarged view of the pile-wire, showing the reed at the rear end of its stroke and the position of the pile-threads as they are carried under and over said pile-wires by the crank portion of the guide-wires. Fig. 3 is a front view showing a portion of the loom-frame and arch to which my device is attached and showing the laterally-reciprocating bar which operates the guide-wires as being actuated by a jacquard-hook. Fig. 4 is a view showing the twisted or angular end portions of the pile-wires in relation to the dents of the reed. Fig. 5 is an end view showing the position of the thread below the pile-wire. Fig. 6 is a plan view of the same. Fig. 7 shows the position of the thread as having been carried under the pile-wire by the guide-wire. Fig. 8 is a plan view of the same. Fig. 9 shows the pile-thread as having been raised above the pile-wire and in position to be carried over the top of the same. Fig. 10 is a plan view showing the same position. Fig. 11 shows these threads as having been carried laterally over the pile-wires by the guide-

wires ready to descend on the opposite side. Fig. 12 is a plan view of the same.

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, and 2 is the beam carrying the filler or stuffer used in weaving the ground-work in carpeting. On this ground fabric are formed the pile-loops, which when left uncut produce the Brussels effect, and when cut they produce the velvet or plush effect, such as formed on the face of carpeting or other pile fabric.

At 3 3 are the heddles or harnesses that control the ground warp-threads, and 4 is the heddle that controls the stuffer-thread.

In Fig. 1 I have shown a plurality of pile-threads 5 led from spools 6^a in the rear of the loom. Each thread is of a different color and is used to weave the figures on the face of the fabric. When it is desired to weave these figured goods, the jacquard mechanism (illustrated in Fig. 1) is used to control the vertically-reciprocating movement of each individual pile-thread 5. When any particular thread is called, it is drawn up above the pile-wire 10, as shown at 7 in Fig. 1, while the other threads 5, including the upper shed of the ground warp-threads, remain just below the offset portion 8 of the guide-wire 9, so that these threads will not be affected by the lateral movement of said guide-wires. When it is desired to weave plain carpeting, heddles operated by cams, the ordinary jack-lever in a dobby-head, or any other suitable means may be used for controlling these pile-threads.

In Figs. 1 and 2 I show a pile-wire which has its forward or loop end extended and made into the form of a shoe or case 11 to hold or guide the cutter-knife 12. Through this outer end is a bar 13, which holds the pile-wire in place and supports the free or rear end 14. A portion of the pile-wire 15 that lays on the woven fabric is drawn down to the size of the loops desired to be formed over it. The main arm 10 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. The free end of this arm is preferably rounded over on its end, forming a ring-like raised portion or protuberance 14 both above and below the main portion of the arm. The body of the pile-wire is twisted adjacent the ring-like portion 14, whereby the latter is set at an angle to the main portion of the wire. This twisted portion enables the end 14 to catch the pile-thread as it ascends and descends and guide said thread positively onto the desired side of the wire as it is being carried past the end by the jacquard-hooks to form a loop over said wire.

To carry the pile-threads 6 laterally over the pile-wires 10 and back again underneath the same in the formation of loops over said wires, any suitable mechanism may be used;

but I preferably employ a series of guide-wires 9, one for each thread, which wires are bent so as to have a long offset or crank 8. The upper portion of each wire 9 is pivotally held in the fixed bar 15, the extreme end being bent back at 16 over the top of this bar to prevent said wire from dropping out. Beneath the bar the wire is carried forward, forming a crank portion 8, which portion engages the pile-threads 6, that have been called by the jacquard. The crank portion or offset 8 extends downward just beyond the lower portion of the rounded end 14 of the pile-wire, so that it may engage and carry the pile-threads 6 laterally underneath said pile-wire. The wire 9 is then bent back to its pivoting center and extends down through the ground-warps and is pivoted at 17 in the plate below. It will be noted that by the extending of these wires down through the ground-warp the pile-threads are each guided both up and down without disturbing or moving the ground warp-threads, thereby insuring the return of said pile-threads to their proper position when they are called for to be acted upon again as before.

As illustrated in Figs. 5 to 12, inclusive, the lower portion of this crank 8 (see Fig. 5) engages the pile-thread 6 and carries it laterally underneath the end 14 of the pile-wire to the opposite side thereof, (see Fig. 7,) where it lies until wanted. When the thread is called again, it is raised in the usual way to the position shown in Fig. 9, when it is acted on, not by the same guide-wire, but on its opposite side by the adjacent wire, and carried laterally over the top of the pile-wire, as illustrated in Fig. 11. Fig. 2 in a side elevation of the mechanism illustrates the pile-thread 6 in dotted lines below the pile-wire and in position to be carried laterally under the same by the lower portion of the crank, while the dot-dash line above the pile-wire illustrates said thread as being in position to be carried back over the top of said pile-wire.

The pins 18 of the sliding bar 19 extend back on the under side of a fixed bar 15 to engage the crank portion 8 of the guide-wires, the sliding bar 19 being held in position to slide endwise on said fixed bar by screws 20, which enter the fixed bar through slots 21 in said sliding bar. This bar 19 is moved endwise in one direction by the jacquard-hook 22, to which it is connected by the cord 23 over the pulley 24, which jacquard-hook is operated in the usual way and is for the exclusive purpose of drawing this bar in one direction. The spring 25 is for the purpose of returning said bar when released by said jacquard-hook. Although I have shown this sliding bar as being operated by a jacquard-hook, it may be operated by a dobby-head, cam, or any other suitable mechanism.

In Fig. 2 I have shown a portion of the reed 26 in the position taken when the lay is in its

extreme backward stroke. I find in practice that by carrying the pile-threads laterally over the pile-wire when the reed is in this position it serves as a perfect guide for said threads, confining them strictly within the space where they are desired to work. While the crank which controls the movement of this reed is approaching, going over, and receding from the back center the pile-threads are carried laterally over the pile-wires and dropped down to the height of the upper warp-threads of the open shed, when all of the threads descend together, said pile-threads remaining down until the desired number of binding-picks have passed over them. By operating the threads as above described when the reed is in this rear position the guiding of these threads is greatly simplified and successfully avoids the use of extra guide-bars and the like, which I have heretofore been obliged to use to accomplish the same purpose.

As described above, I use the pile-cutting knife, supported at the end of the pile-wire, for cutting the loops of the woven fabric and by which construction I am enabled to support the back or free end of said pile-wire by the use of the locking-bar 13, which, together with the loops that are tightly drawn over the forming portion of said wire, tend to hold the free end of the same in position without further support; but when I wish to weave the Brussels carpeting or a fabric without cutting the loops I find that it is necessary to have a support for this free end and also a support for the loop-forming end to keep it from being carried forward when the threads are beat up by the reciprocating reed.

I do not wish to be confined to the exact construction of mechanism 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.

Any number of flattened wires 10 and any number of different-colored pile-threads 5 and corresponding jacquard-hooks may be employed, according to the style of goods desired.

By the use of the pile-wires arranged as above described any desired weave or figure may be obtained in the weaving of carpeting. The loom also may be run at a much higher speed, and a much greater width of carpet may be woven than by the old method of using transverse pile-wires, and consequently a greater production 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 all of 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 class described, pile-wires, said pile-wires having one end set obliquely to insure the passing of the pile-threads up or down on the desired side thereof and oscillating guide-wires for carrying the pile-threads transversely across the pile-wires.

2. In a loom of the class described, pile-wires, said pile-wires having one end set obliquely to insure the passing of the pile-threads up or down on the desired side thereof, and offset oscillating guide-wires for carrying the pile-threads transversely across the pile-wires.

3. In a loom of the class described, pile-wires, said pile-wires having one end set obliquely to insure the passing of the pile-threads up or down on the desired side thereof and guide-wires pivotally hung for carrying the pile-threads across the pile-wires.

4. In a loom of the character described, pile-wires each having their free ends provided with a hump or protuberance, the bodies of said wires being twisted adjacent said hump or protuberance, whereby the latter is set at an angle to the body of the wire.

5. A loom of the character described comprising a plurality of stationary pile-wires, said wires being twisted, whereby the free ends thereof are disposed at an angle, means for raising and lowering the pile-threads, and a reciprocating reed adapted to prevent excess lateral movement of said pile-wires.

6. A loom of the character described comprising a plurality of stationary pile-wires, said wires being twisted, whereby the free ends thereof are disposed at an angle, a reciprocating reed on the lay adapted to prevent excess lateral movement of said pile-wires, and means whereby the pile-threads may be carried over the pile-wires while said reed is approximately at the rear of its stroke.

7. A loom of the character described comprising a plurality of stationary pile-wires, said wires having ring-like ends and being twisted adjacent said ends, whereby the latter are disposed at an angle, means for preventing excess lateral movement of the free ends of said wires, and independent means for imparting a lateral movement to the pile-threads.

8. A loom of the character described comprising a plurality of stationary pile-wires having their free ends rounded over to form protuberances, said wires being twisted adjacent said ends, whereby said protuberances are disposed at an angle.

9. A loom of the character described comprising a plurality of stationary pile-wires having their free ends rounded over and twisted to form angularly-disposed protuberances,

and means including a reciprocating reed for preventing excess lateral movement of said free ends.

10. In a loom of the class described, pile-wires, a reciprocating reed supported from the lay, means whereby said reed will be approximately at the rear end of its stroke while the pile-thread is carried across the pile-wires and offset guide-wires for carrying said pile-thread across said pile-wire.

11. In a loom of the class described, pile-wires, said pile-wires having their inner ends set obliquely to insure the pile-threads passing up and down on the desired side thereof, a reciprocating reed supported from the lay, means whereby said reed will be approximately at the rear end of its stroke while the

pile-thread is carried across the pile-wires, and offset guide-wires for carrying said pile-threads across said pile-wires.

12. In a loom of the class described, pile-wires, having ring-like ends set obliquely to insure the passing of the pile-threads up or down on the desired side thereof, means for carrying the pile-threads laterally across said pile-wires and dents or guide-bars on each side of said oblique heads to prevent an excess lateral motion of said threads.

In testimony whereof I have hereunto set my hand this 9th day of May, A. D. 1904.

WILLIAM G. HARTLEY.

In presence of—

H. F. CAREY,

F. E. HODGE.