Sheet 1- 4 Sheets.

W. Weild.

Weaving Pile Fabric.

No. 81,443. Patented Aug. 25, 1868.

Fig 1

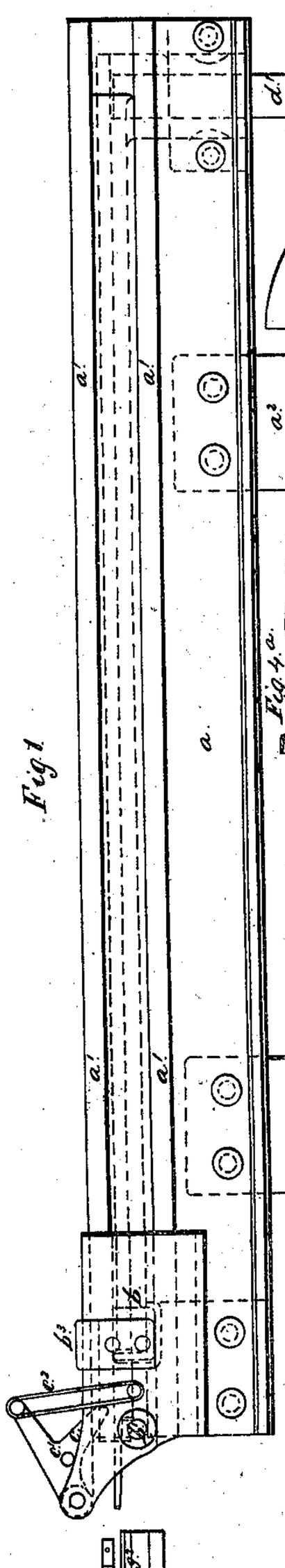


Fig 2.

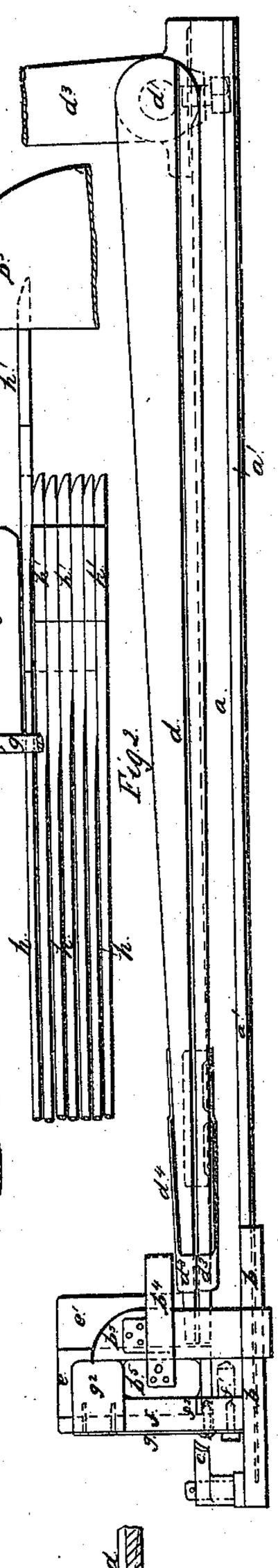


Fig 5.

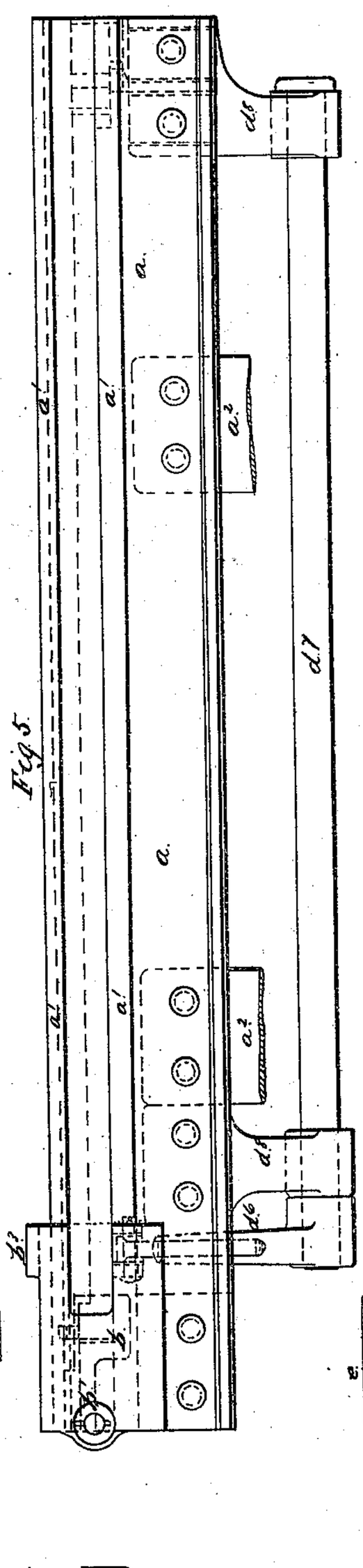


Fig 6.

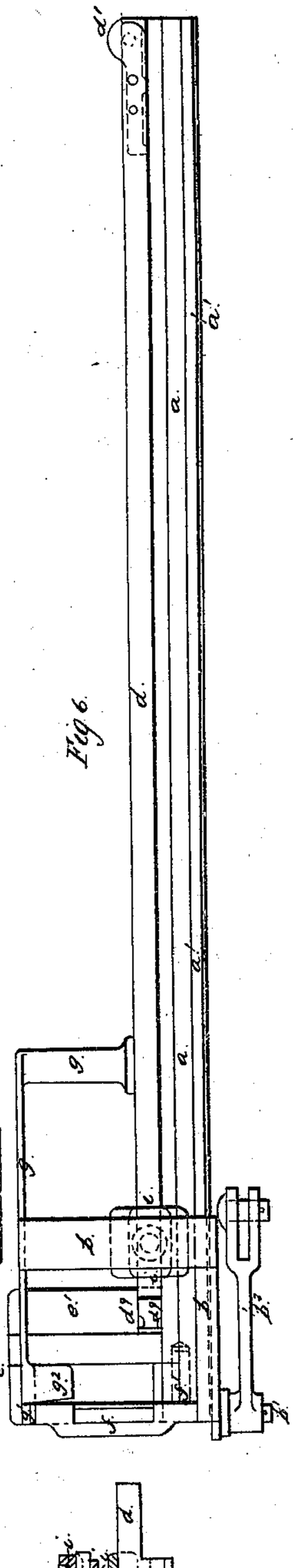


Fig 3.

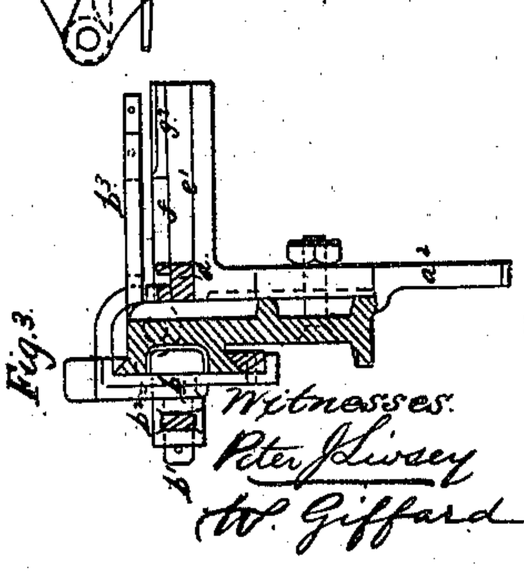


Fig 4.

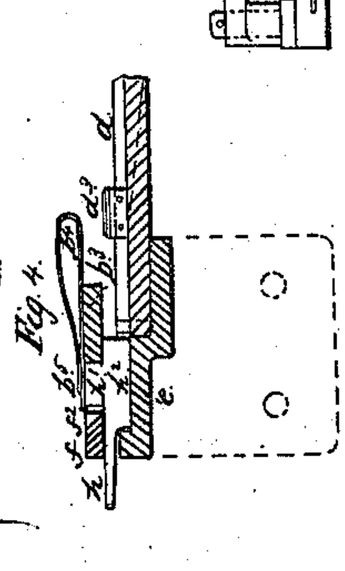


Fig 7.

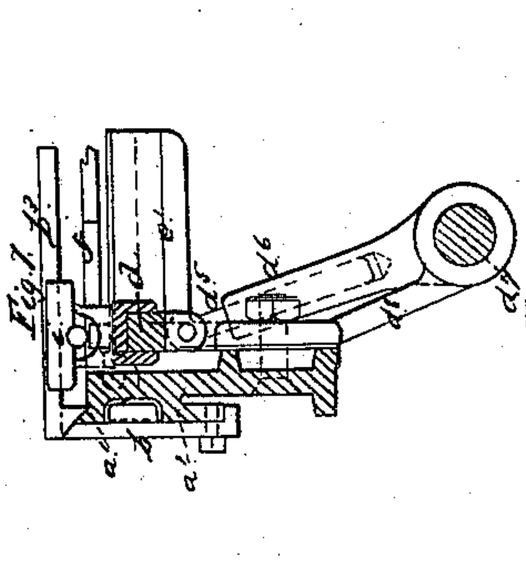
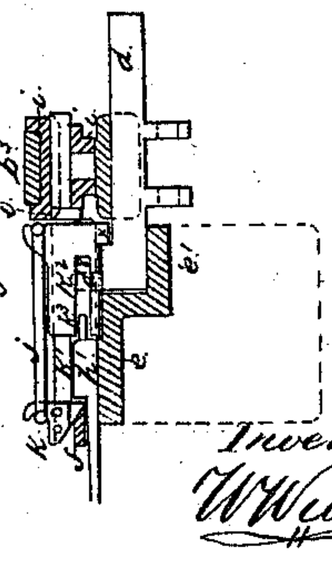


Fig 8.



Witnesses:
Peter J. Livesey
W. Gifford

Inventor.
W. Weild

Sheet 2-4 Sheets.

W. Weild.
Weaving Pile Fabric.

N°81,443. Patented Aug. 25, 1868.

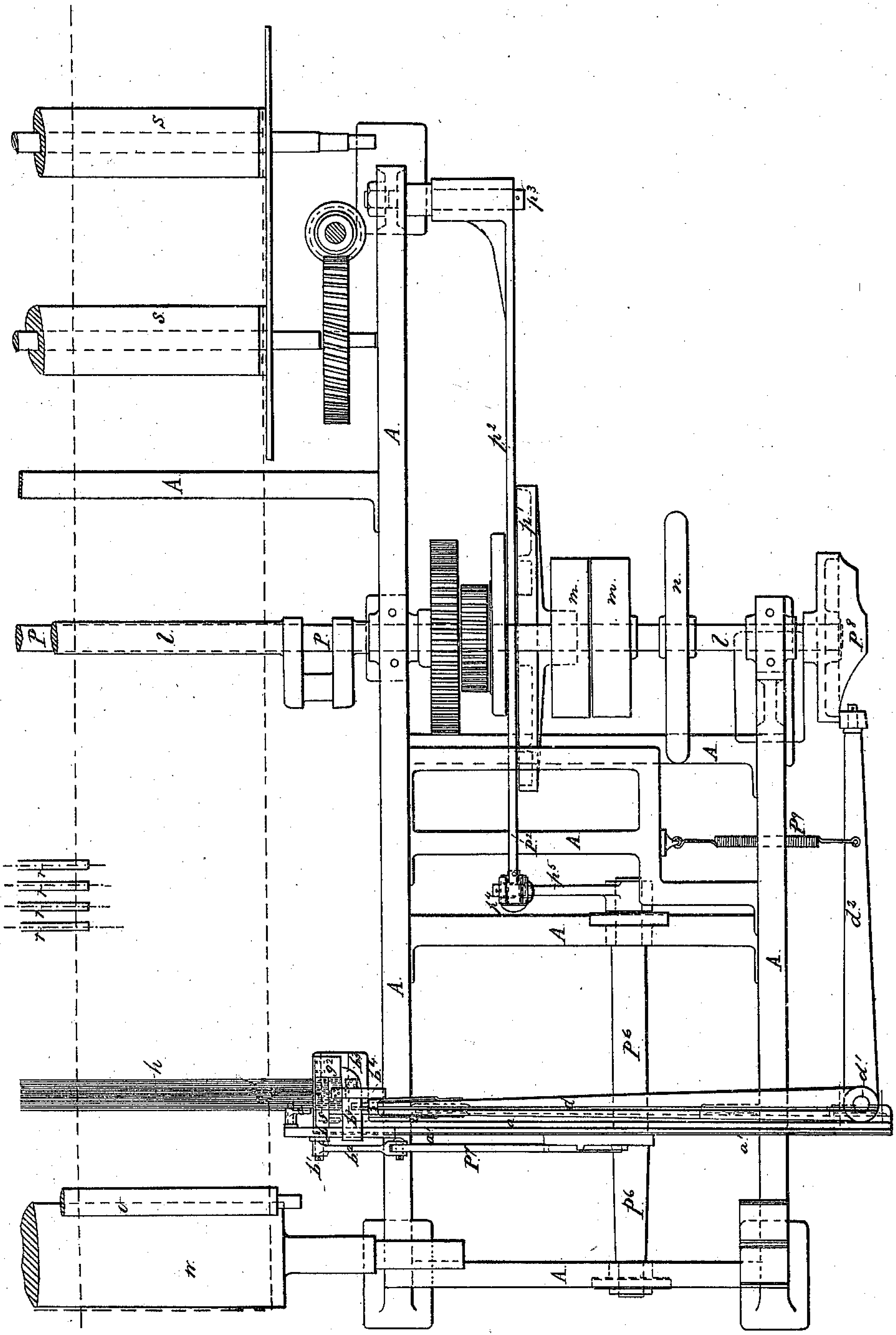


Fig. 9

Witnesses
Peter J Linsey
W. Giffard

Inventor
W Weild

Sheet 3 - 4 Sheets.

W. Weild.

Weaving Pile Fabric.

No. 81,443. Patented Aug. 25, 1868.

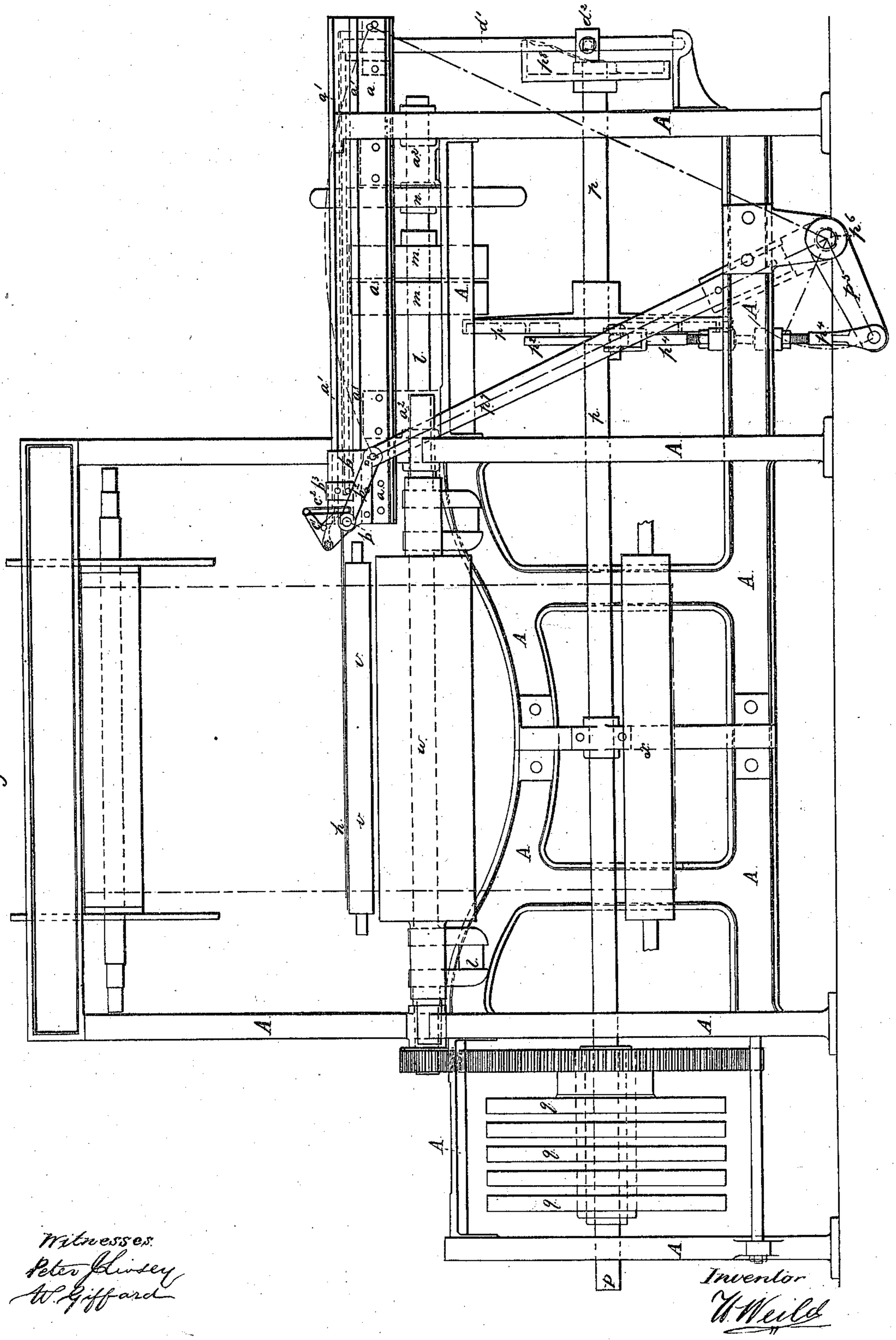


Fig. 10.

Witnesses.
Peter Hinsey
W. Giffard

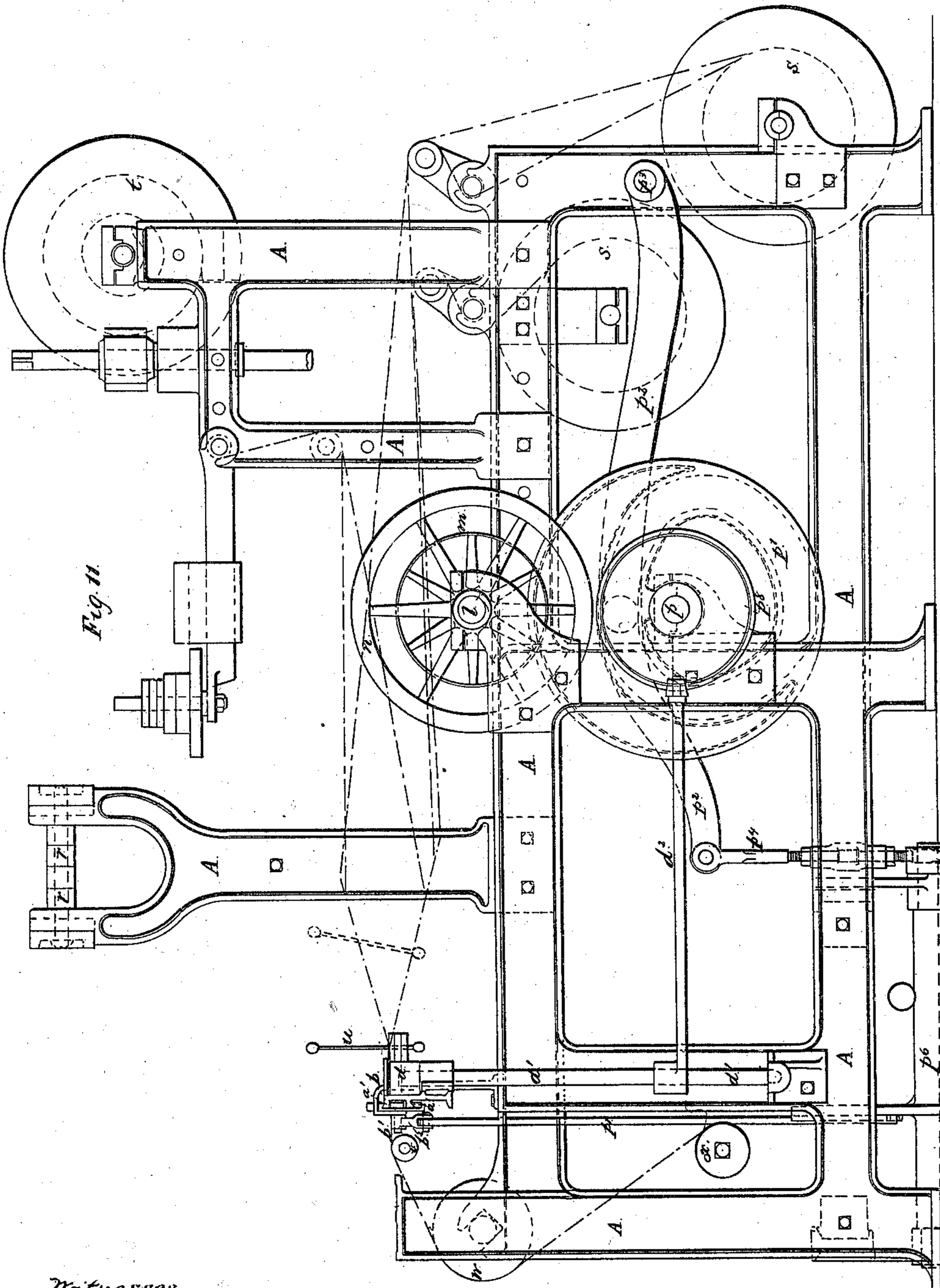
Inventor
W. Weild

Sheet 4-4 Sheets.

W. Weild.

Weaving Pile Fabric.

No. 81,443. Patented Aug. 25, 1868.



UNITED STATES PATENT OFFICE.

WILLIAM WEILD, OF MANCHESTER, ENGLAND, ASSIGNOR TO ELIAS S. HIGGINS, OF NEW YORK CITY.

IMPROVEMENT IN MECHANISMS FOR OPERATING PILE-WIRES IN LOOMS.

Specification forming part of Letters Patent No. **81,443**, dated August 25, 1868.

To all whom it may concern:

Be it known that I, WILLIAM WEILD, of the city of Manchester, in the county of Lancaster, in the United Kingdom of Great Britain and Ireland, have invented new and useful Improvements in Machinery applicable to Looms for Weaving Pile Fabrics; and I do hereby declare the following to be full, clear, and exact description of the same, reference being had to the accompanying four sheets of drawings, which form a part of this specification, and to the letters of reference marked thereon.

My invention relates to mechanism for actuating the wires in that class of looms for weaving pile fabrics where the terry-loop forming the pile is obtained by inserting wires in a shed formed between the body-warp and pile-warp, which wires are woven in the fabric, to be again withdrawn in succession when a sufficient number of wires have been woven in the fabric to secure the loops or woven pile against the strain produced in the process of weaving.

The improvements to be described in this specification are part of those for which I obtained Letters Patent for Great Britain, No. 1,311, and dated the 27th May, in the year of our Lord 1859, which are improvements upon those described in the specification of Letters Patent granted to me for Great Britain, numbered 267, and dated 29th January, in the year of our Lord 1857, and numbered 505, and dated the 7th March, in the year of our Lord 1855.

On Sheet 1 of the accompanying drawings my improvements in wire-motions are illustrated detached from the loom.

Figure 1 is a front elevation; Fig. 2, a plan view; Fig. 3, a cross-sectional elevation, looking toward that end of the wire-motion nearest the edge of the fabric; and Fig. 4 is a section through part of the trough or grooved bar, and the parts in which the heads of the wires are held when woven in the fabric. Fig. 4ª is a plan view of parts of the wire as held in the box for the heads, and showing one wire in the act of being inserted.

The views above named illustrate my improved wire-motion, and the figures 5, 6, 7, and 8, described below, illustrate a modification thereof. Fig. 5 is a front elevation; Fig. 6, a plan view; Fig. 7, a cross-sectional elevation, looking toward that end of the wire-motion nearest the fabric; and Fig. 8 is a side view, partly in section, of the bracket or box which receives the heads of the wires, the instrument which engages with the heads of the wires, the slide which carries the instrument, and the end of the bar which gives lateral motion to the slide.

Some of the parts of the wire-motions shown by these views are omitted, and others are supposed to be broken away, to show more clearly the parts to which the improvements relate.

Fig. 9, Sheet 2, is a plan view. Fig. 10, Sheet 3, is a front elevation, and Fig. 11, Sheet 4, is an end elevation, each view showing so much of a loom as will be necessary for illustrating the mode of applying and actuating my improved wire-motion.

The main peculiarity of my improvements consists in guiding the head and point end of the wire during its insertion into the shed and withdrawal from the fabric, and in transferring the point end of the wire by means of a trough or bar hinged at one end, so that the other end may oscillate backward and forward, together with other combined arrangements for carrying out this mode of operation. A similar oscillating trough was used by me prior to this invention; but the entire length of the wire lay in the groove or trough, while, according to my present improvements, the groove or bar is only used to guide the head end of the wire, as springs or projections upon the end of the trough or bar are used for guiding, directing, and transferring the point end of the wire.

In the wire-motion shown by Figs. 1, 2, 3, 4, and 4ª, *a* is the plate upon which the slideway a^1 is formed, and a^2 are brackets attached to the framing of the loom, to which the plate *a* is secured. *b* is a slide working on the slideway, which gives end motion to the wires. b^1 is a stud fixed in the slide *b*, upon which a link, b^2, (shown in Figs. 3 and 6,) is jointed, which conveys reciprocating motion to the slide. A stud in the slide *b* carries the withdrawing-instrument *c*, which has a pin, c^1, on one side to keep it from

falling too low, and c^2 is an india-rubber spring, which is attached at one end to a pin on the arm of the withdrawing-instrument, and at the other end to a pin in the slide *b*.

As the withdrawing-instrument *c* does not enter the groove of the trough *d*, as it did in my prior invention, it does not require to be lifted out of the way before the trough or grooved bar can be moved, as is requisite in the wire-motion according to my prior invention. The slide *b* also carries a projection, b^3, which pushes against the head of each wire when inserted into the shed. The trough or grooved bar *d* (shown in Figs. 2 and 3) is mounted at the outer and upon a vertical shaft, d^1, from which it receives oscillating motion through an arm, d^2, (shown partly in Fig. 2,) the arrangement of which will be further described hereinafter. On the inner end of this trough two pieces, d^3, are placed, each of which is mounted on the end of a spring, d^4, secured to the outside of the trough *d*. These pieces d^3 fit into spaces cut out of the sides of the trough *d*, and have each a semicircular cavity, so that when pressed together, as shown in Fig. 2, a circular hole is formed by such cavities, through which the wires pass freely. Both ends of the pieces d^3 are beveled off, so that when the head of the wire comes against them they will open, and allow it to pass either into or out of the groove.

The object of these pieces d^3 is to support the point end of the wire when it is withdrawn from the fabric, and carry it, when the trough moves, to the point at which it is to be again inserted. The end of the trough *d* which is nearest to the fabric rests and slides upon a ledge, *e'*, which forms a part of the bracket *e'* for holding the heads of the wires in their places when in the fabric. *f* is the part of this bracket which forms a stop against which the heads of the wires are pushed; it turns upon a center at f^1, and is held in the position in which it is shown in the drawings by a pin passing through a hole in the bracket and through its axis f^1. The part *f* is arranged as described, so that it may be turned upon its pivot or hinge f^1, to liberate the heads of the wires when required. On the side of the part *f* a spring, *g*, is secured, to the end of which a piece, g^2, is attached. This piece presses against the head of the last wire inserted, and keeps it against the heads of the wires previously inserted, so that the head of the wire next to be withdrawn from the fabric is close against that end of the recess opposite to the part g^2. The arrangement of the spring *g*, part g^2, and mode of securing it to the hinged part *f*, as shown, is an improvement upon that described in my British specification, which is the same as that shown in the modification to be hereinafter described; but I make no claim to the improved arrangement of the said parts *g* and g^2. The shape of the heads of the wires *h*, used in this wire-motion, is shown in Fig. 4 and in Fig. 4^a, which is a plan view of the heads of a few wires, as they are held when woven in the fabric, and part of the presser g^2 acting upon them, part of the projection b^3 being shown in the act of pushing the head of a wire home into the receptacle.

There is a projection, h^2, downward, which enters the groove of the trough *d*, and another upward, h^1, against which the inserting and withdrawing instruments act. Both the inner and outer end of that part, h^2, of the head projecting on lower side of the wire is beveled off, (see plan view, Fig. 4^a,) to facilitate the entrance of the head of the wire which is being inserted between the head of the wire previously inserted and the piece g^2 on the spring *g*. The end of the withdrawing-instrument *c* which acts upon the head of the wire is equal in thickness to the head of the wire, and enters a nick, f^2, in the hinged piece *f* when about to withdraw a wire from the fabric. A spring, b^4, is attached to the inserting-instrument b^3, with a plate, b^5, upon its end, as shown in Figs. 2 and 4. It presses upon the head of the wire during the time it is being withdrawn and inserted, and gives sufficient friction against the bottom of the groove in the bar *d* to prevent the wire from being shot forward by its momentum when the loom is suddenly stopped during the insertion of a wire; but no claim is made to it, as it is an addition made since the date of my British patent.

The manner in which the wire-motion operates is as follows: A given number of wires are used, and their heads, when close together side by side, just fill the recess of which the part g^2 forms one end. The heads of all the wires used are held in the recess just before the instrument *c* begins to withdraw a wire. When the slide *b* is withdrawn the end of the instrument *c* enters the nick f^2, which is just opposite the wire to be withdrawn, and also opposite the groove in the bar *d*. The head of the wire pushes against the spring-pieces d^3, and opens and passes through when they close round a wire.

When the slide *b* has come to the end of its outward movement the point of the wire is clear of the heads left in the recess, and is supported by the spring-pieces d^3. Now the trough *d*, which has been stationary in the position shown in Fig. 2 during the withdrawal of the wire, is moved to present the point end of the wire toward its entrance into the shed, when the slide *b* moves quickly inward, and by the time the head of the wire has arrived at the recess the end of the trough has arrived in a line with the face of the part g^2, where the trough remains till the head of the wire is pushed home, as shown in Fig. 4. Then the trough is again moved into the position to receive the wire to be withdrawn, and the operations are again repeated. I shall now proceed to describe the modification of my improved wire-motion. (Shown by Figs. 5, 6, 7, and 8.) *a* is the plate, upon which the slideway a^1 is formed. a^2 are brackets or feet,

by which it is secured to the framing of the loom. *b* is the slide which gives end movements to the wires. b^3 is a projection from the slide *b*, and *d* is a bar hinged at its outer end at d^1. This bar may be actuated in the same manner as the trough *d* in the wire-motion hereinbefore described; but, by the arrangement shown in the drawings, the inner end of the bar *d* receives oscillating movement from a rod, d^5, jointed with two projections from the under side of the bar *d*. This rod d^5, being round, is free to turn and slide in and out of a socket in an arm, d^6, secured to the end of a shaft, d^7, carried by two brackets, d^8. This shaft receives oscillating movements from a cam placed upon the tappet-shaft of the loom. The end of the bar *d* rests and slides upon a ledge, *e'*, connected with the bracket *e*, which holds the heads of the wires when in the fabric. *g* is a spring secured to the plate *a*, the end of which carries the piece g^2, for pressing against the heads of the wires. The end g^1 of this spring serves as a latch to hold down the part *f*, which is beveled off to allow the withdrawing-hook to pass from the wire last inserted to that to be withdrawn.

The instrument for engaging with the ends of the wires is inserted in a swivel-slide. The lower part of this slide grasps and slides upon the bar *d*, and it has a pin projecting upward from it, (see Fig. 8,) which fits a hole in the upper part of the slide *i*, that grasps the projection b^3. (See Figs. 7 and 8.) By this arrangement lateral motion is given to the instrument engaging with the heads of the wires.

The instrument for engaging with the heads of the wires is similar to that described in the specification of a prior British patent, and therefore I make no claim to it separately and apart from the mode of actuating it, as herein described, but will explain its construction and mode of action. The part k^1 is of equal thickness to the heads of the wires. Its end is fixed in the slide. The part k^1 is surrounded with a hoop, k^2, which can slide to and fro on the part k^1, and upon the end of the part k^1 a hook, *k*, is riveted. The hook *k* and hoop k^2 have each a projection, upon which an india-rubber band, *j*, is placed, which will draw the hoop when at liberty till its end comes in contact with the hook *k*. From the side of the part k^1 there is a projection, k^3, about half an inch long, which serves to push against the end of the heads of the wires last inserted, to keep them in their places, and insure clearance for the instrument when slid from the wire last inserted to that to be withdrawn. There is a projection, *x*, from the hoop k^2, which comes in contact with a ledge or projection on the end of the bar *d*, as shown in Fig. 8, before the slide *b* arrives at the end of its inward movement, so as to hold back the hoop k^2, as shown, while the hook *k* and part k^1 push forward. The manner in which this wire-motion acts is as follows: Just before a wire is to be withdrawn the instrument *k* and bar *d* are in the position shown in the drawings. The hook part *k* is just opposite the head of the wire to be withdrawn.

When the slide *b* moves outward the head of the wire is drawn out, the spring *j* holds the hook k^2 until the hook *k* brings up against it, so that the head of the wire is inclosed by the hoop k^2, and it cannot get away from or out of the instrument. When the point of the wire is withdrawn it rests between two projections, d^9, at the end of the bar, which serve to transfer and direct it into the shed, when the bar *d* is moved at the end of the outward stroke of the slide *b*, and when the slide has completed its inward stroke the bar has moved the instrument engaging with the head of the wire on a line with the face of the part g^2. The hook part *k* is then disengaged from and the wire-head is forced home, and the instrument then spans over the heads of the wires, and can be slid over them from the wire inserted to that to be next withdrawn.

The hook part *k* may be dispensed with, the end being simply cut off, except the projection to hold the india-rubber spring *j*, using in place of the hook *k* the withdrawing-instrument *c*. (Shown in Figs. 1 and 2.)

I shall now describe the manner in which my improvements are applied to a loom and actuated, by the assistance of the figures upon Sheets 2, 3, and 4. The following are some of the ordinary parts of a carpet-loom, which are shown wholly or partly in the figures last referred to, some of the parts being supposed broken away. A is the framing. *l* is the first-motion shaft, also the crank-shaft. *m* are the driving-pulleys. *n* is the fly or hand wheel. *p* is the tappet-shaft. *q* are the tappets for working the healds; *r*, the heald-levers; *s*, the rollers for the body-warp; *t*, the roller for the pile-warp; *u*, the reed; *v*, the supporting-roller for the woven fabric; *w*, the taking-up roller; *x*, the roller upon which the woven fabric is wound.

The same letters of reference as have been hereinbefore used in describing the wire-motion, Figs. 1 to 4, will be found upon such of the principal parts of it as are shown in Figs. 9, 10, and 11, so that the position of the wire-motion in relation to the ordinary weaving parts of the loom will be readily understood.

The lateral oscillation of the trough or bar *d* may be produced in either of the two wire-motions hereinbefore described by means of the arrangement shown in Figs. 5 and 7, the shaft d^7 receiving movement from a disk-cam upon the end of the tappet-shaft, acting upon a bowl fixed on a lever having its fulcrum on a stud secured in the framing, this lever being connected by a rod jointed with an arm upon the shaft d^7; or the trough or bar *d* may have oscillations imparted to it, as shown in Figs. 1, 2, 9, 10, and 11.

The cam p^1, for giving end motion to the wires, is placed upon the tappet-shaft *p*, and it acts upon an anti-friction bowl on a stud fixed in the lever p^2, which has its fulcrum on a stud, p^3, secured in the framing of the loom.

To the other end of this lever p^2 one end of an adjustable link, p^4, is jointed, the other end being jointed to an arm, p^5, fixed on the end of a shaft, p^6, carried by two brackets secured to the framing. To a short arm of the shaft p^6 another arm, p^7, is secured, to the upper end of which one end of a link, b^2, is jointed, the other end being placed on the stud b^1 in the slide b.

The oscillations of the trough or bar d are given by the vertical shaft d^1, which has a foot-step bearing in a bracket secured to the framing. Upon the lower end of the shaft d^1 an arm, d^2, is fixed, upon the end of which an anti-friction bowl is placed, which is acted upon by a cam, p^8, fixed on the end of the tappet-shaft p, the anti-friction bowl being kept against the cam by a spring, p^9, secured to the arm d^2 at one end, and to a bracket upon the framing of the loom at the other end.

The cam for actuating the slide for inserting and withdrawing the wires is shaped so as to begin to insert the point of the wire as soon as the shed is sufficiently open, pushing the head of the wire home a little before the reed beats up, and it is shaped to begin and end slow, having the quickest movement in its mid-stroke. The cam is shaped to cause a short dwell at each end of its stroke, all the remainder of the cam being used for moving the slide back slowly to draw out a wire.

The cam for actuating the bar or trough d^1 is made to hold the trough stationary while the wire is being withdrawn; then to move to the point where the wire is to be inserted, and hold the trough or bar in this position till the wire is about half inserted; then gradually to move back till opposite the place where the head is to be forced home; then back to the position to receive the next wire.

The shape and construction of these cams are well known, being used by me in prior inventions.

I have now particularly described the nature of my invention, and the manner in which it may be carried into effect, and claim as my invention—

1. Wire-motions where the head of the wire only is guided during its insertion and withdrawal, and the point is supported and transferred from the point of withdrawal to the point of insertion by a trough or bar, d, oscillating on a fulcrum or joint, substantially as hereinbefore described.

2. The combination of wires, with heads of the shape shown in Figs. 4 and Fig. 4^a, with an oscillating grooved trough, d, substantially as hereinbefore described.

3. The spring-pieces d^3, or their equivalents, in combination with the oscillating grooved trough d, substantially in the manner described.

4. The slide b, provided with a projection, b^3, for pushing directly against the head of the wire, when combined with an oscillating trough, substantially as hereinbefore described.

5. The combination and arrangement of the mechanism of the wire-motion shown by Figs. 1, 2, 3, 4, and 4^a, and hereinbefore described.

In testimony whereof I have signed my name to this my specification in the presence of two subscribing witnesses.

W. WEILD.

Witnesses:

PETER J. LIVSEY,

W. GIFFARD.