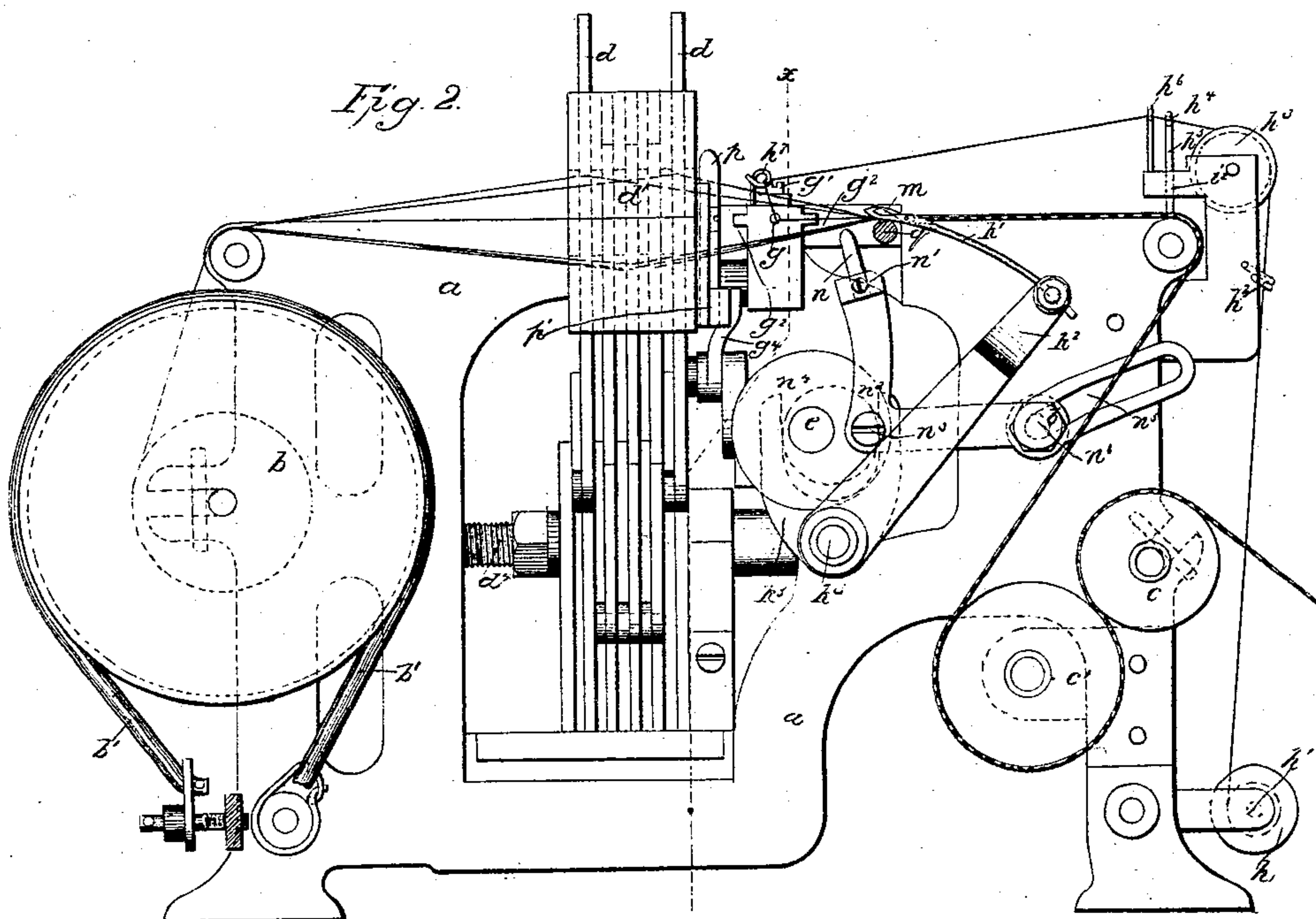
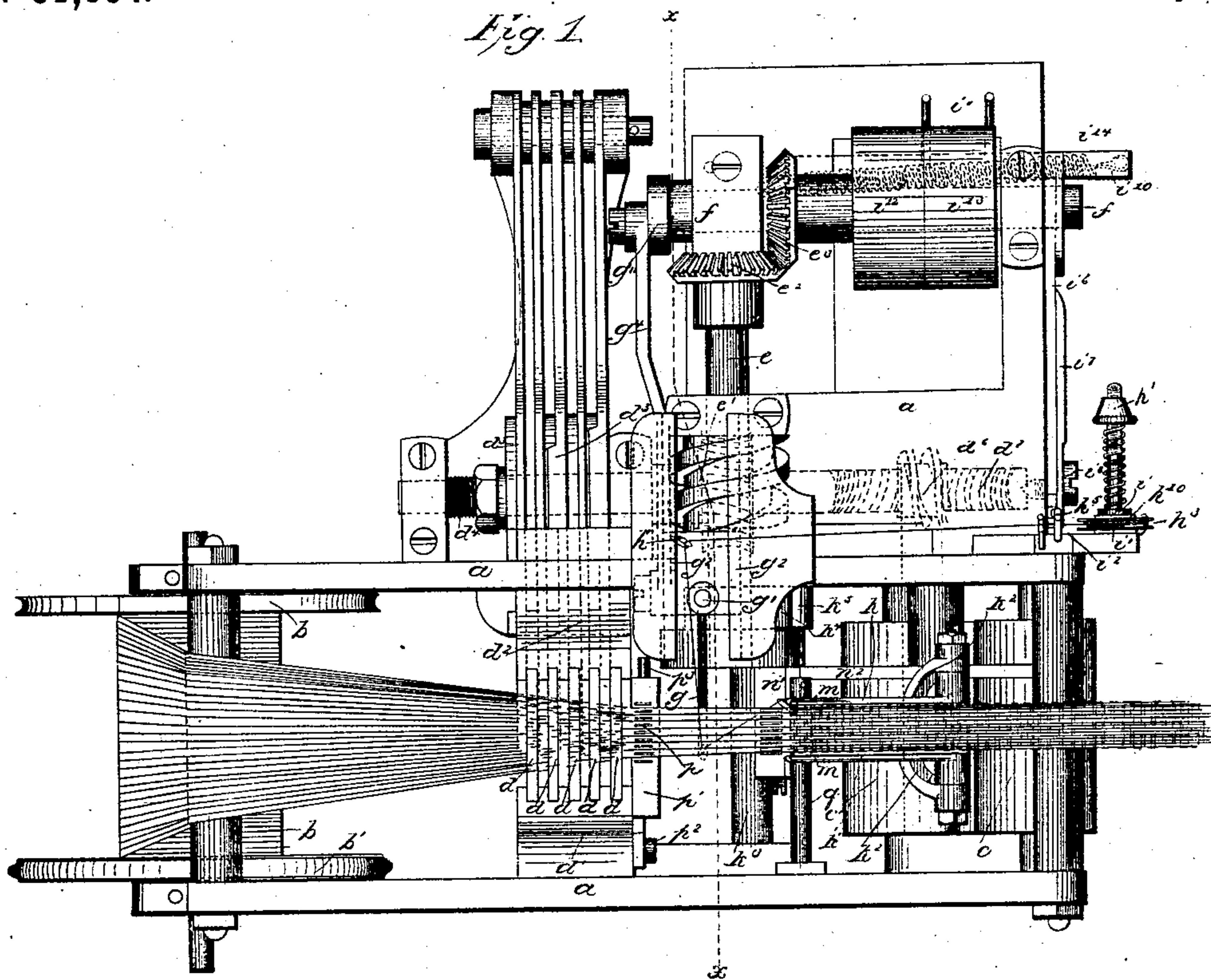


J. DUCKWORTH.

Needle Loom.

No. 96,564.

Patented Nov. 9, 1869.



Witnesses:  
E. M. Wood  
John C. Duckworth.

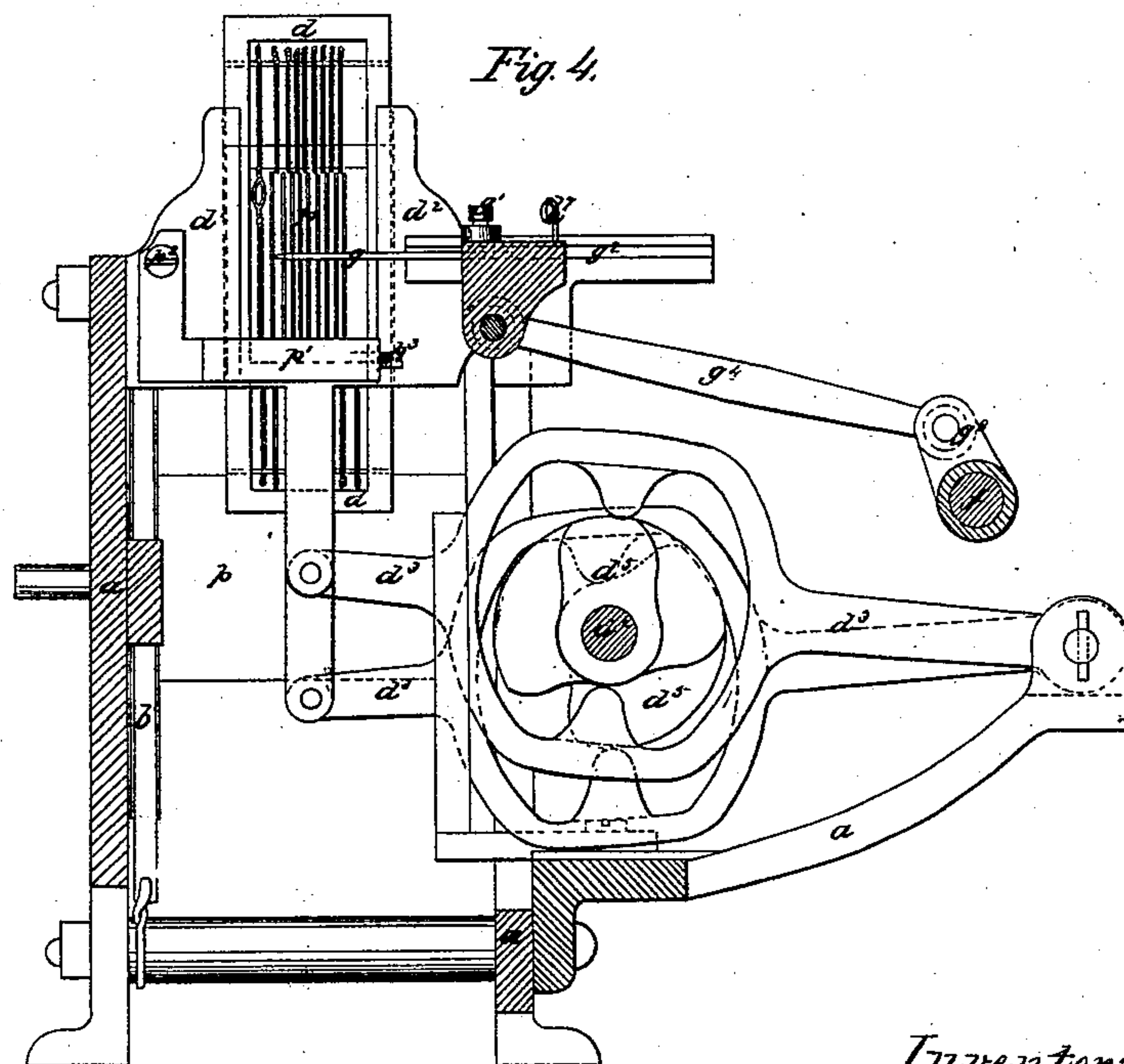
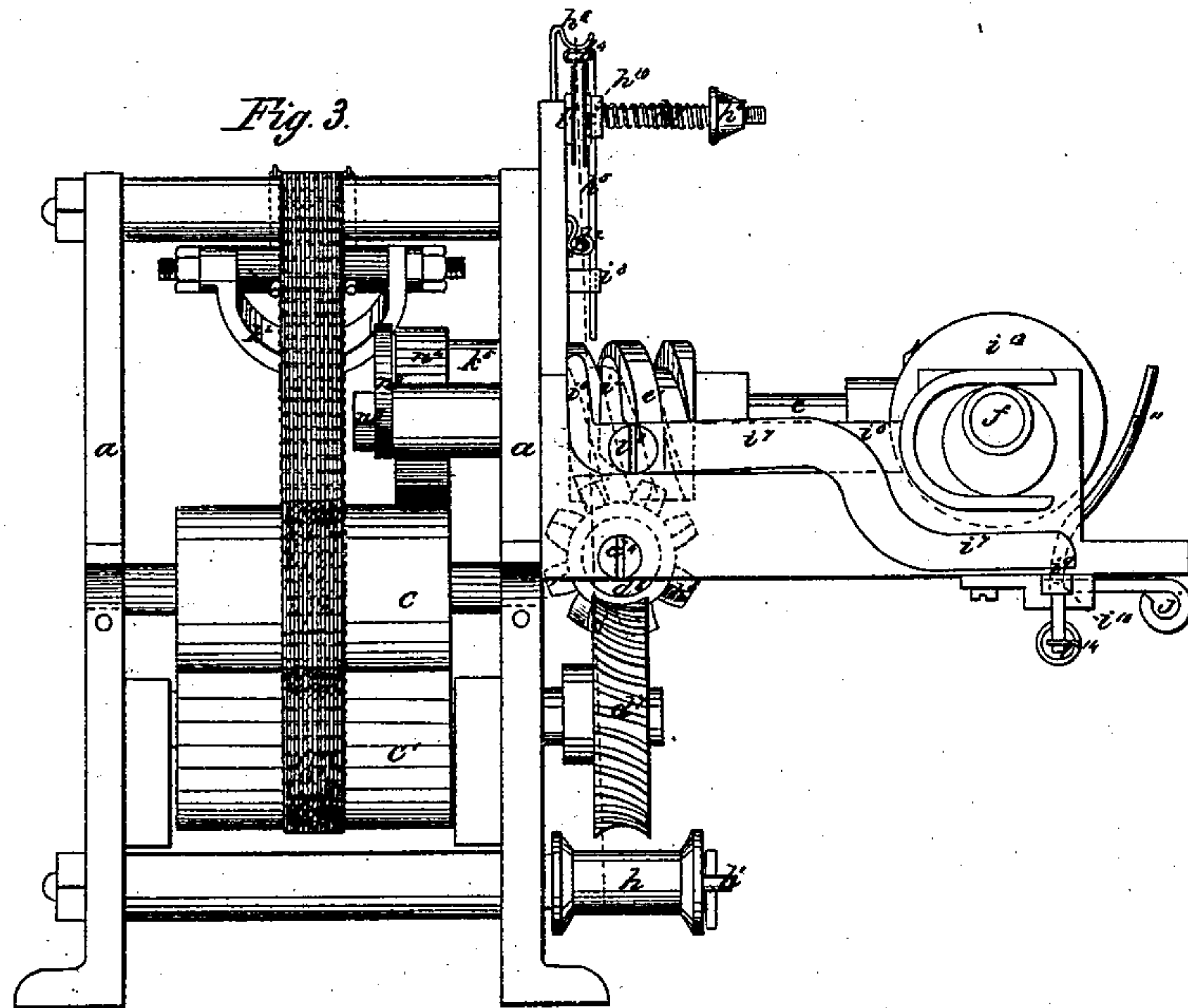
Inventor:  
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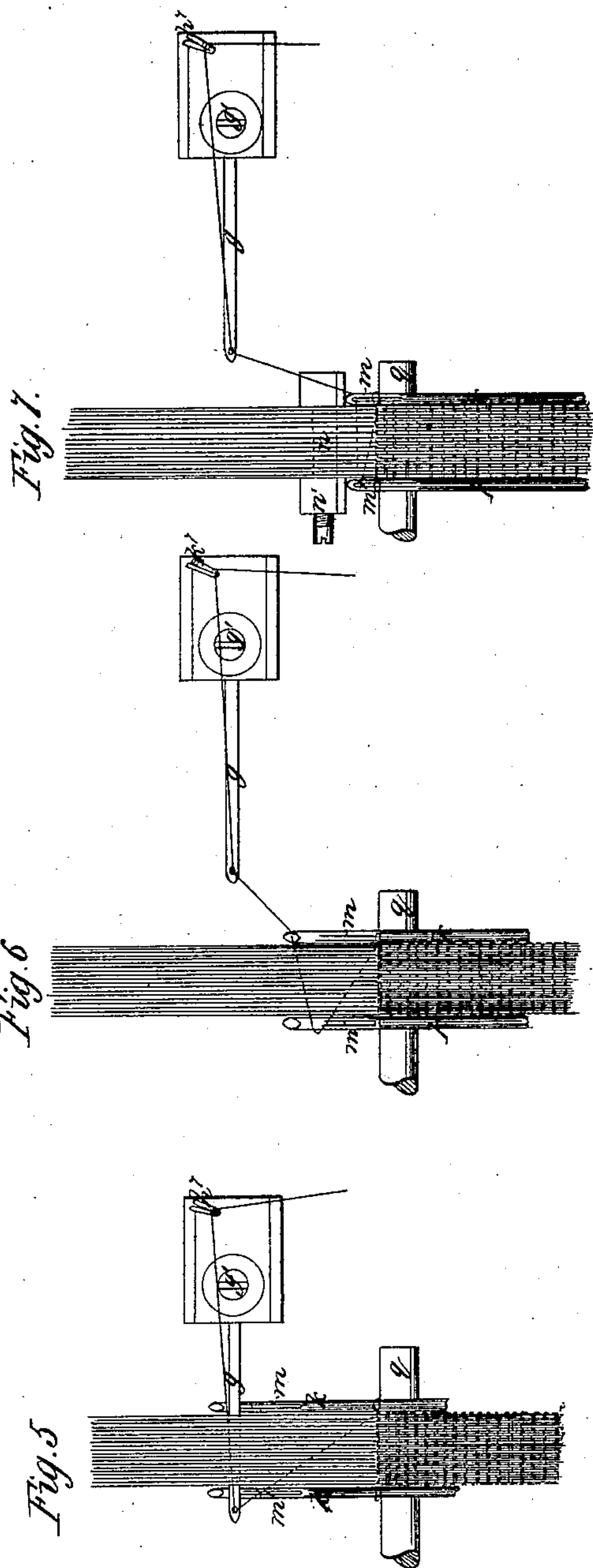
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# United States Patent Office.

JAMES DUCKWORTH, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO  
DUCKWORTH & SONS, OF SAME PLACE.

Letters Patent No. 96,564, dated November 9, 1869.

## IMPROVEMENT IN LOOMS FOR WEAVING TAPE, &c.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES DUCKWORTH, of Pittsfield, in the county of Berkshire, and State of Massachusetts, have invented certain new and useful Improvements in Looms for Weaving Tapes and other narrow wares; and I do hereby declare that the following is a full and correct description thereof, reference being had to the accompanying drawings and the letters of reference thereon.

My invention relates to looms for weaving narrow wares, wherein the filling-thread is supplied from a spool or bobbin at the side of the loom, and introduced into the web in loops by means of a reciprocating eye-pointed thread-carrier.

The first part of my invention consists in combining with the filling-thread carrier a comb, for beating up the filling-threads, in place of the slay formerly used, the comb being so combined with the mechanism of the loom as to enter the web and move forward to beat up the filling-thread, and then retreat from the web and move backward outside of the web until it has completed its backward stroke, when it again enters the web and moves forward to beat up the filling-threads, leaving the shed clear during the whole back stroke of the comb-beater for the operation of the filling-thread carrier, the comb-beater during that time being entirely removed from the web.

My invention also consists in a combination of mechanism whereby the belt-shipper is released when the filling-thread breaks, for the purpose of stopping the loom.

But more particularly to describe my invention, I will refer to the accompanying drawings, of which—

Figure 1 is a plan view of the loom;

Figure 2, a side elevation with a side frame removed;

Figure 3, an end view;

Figure 4, a transverse section through the red lines *x x*, figs. 1 and 2; and

Figures 5, 6, and 7, detached views, illustrating the operation of the filling-thread carrier, looping-needles, and comb-beater.

Letter *a* represents the frame of the loom.

*b*, the yarn-beam, provided with the usual friction-band.

*b' c c'*, the take-up rollers.

The leaves of heddles *d* move up and down in slides in the bracket-frames *d' d''*, and are connected to a series of treadles, *d'''*, one for each leaf of heddles.

A horizontal rotating shaft, *d''*, parallel with the side of the loom, carries the cams *d'''*, that move the heddles up and down to form and shift the shed.

The shaft *d''* also carries a worm, *d'''*, which imparts a slow continuous motion to the take-up rollers by means of a worm-wheel, *d'''*, fast to the shaft of the lower take-up roller. The surfaces of one or both of the take-up rollers are roughened to aid in grasping the cloth.

The shaft *d''* has also upon it a worm-wheel, *d'''*, by which it receives its motion from a worm, *e'*, upon the rotating shaft *e*, which latter is connected with and driven from the main driving-shaft *f* by mitre-wheels *e'' e'''*.

The thread-carrier *g* is a blunt eye-pointed needle, secured by a set-screw, *g'*, in a socket in front of a cross-head, which reciprocates in slides *g''*, motion being imparted to it from the main driving-shaft by a crank, *g'''*, fast to one end of the main driving-shaft *f*, which is connected to the cross-head by a link, *g''''*.

A spool or bobbin, *h*, upon which the filling-thread is wound, is placed upon a spindle, *h'*, upon which it turns freely, the thread passing through the eye-guide *h''*, thence around the grooved tension-pulley *h'''*, thence through an eye, *h''''*, in a thread protector, *h'''''*, thence over the hook-guide *h''''''*, and through the eye-guide *h'''''''*, upon the cross-head which carries the filling-thread carrier to the eye of the filling-thread carrier, through which it passes and connects with the fabric in the usual manner.

An adjustable friction is applied to the tension-pulley *h'''*, by means of an adjusting-screw, *h''''*, an adjusting-spring, *h'''''*, a washer, *h''''''*, and friction-pads *i i'*, in the form of washers of felt or other suitable material at each side of the pulley.

The thread-protector *h'''''* is a part of the mechanism for stopping the loom when the filling-thread breaks. It is a wire suspended from the filling-thread between the tension-pulley and the thread-carrier, and plays up and down loosely in guides *i'' i'''*, directly over the jaws *i'''' i'''''*, formed by the bent ends of the two levers *i'''''' i'''''''*, arranged like a pair of forceps, upon a fulcrum-pin, *i''''''''*.

One of these levers, *i''''''*, has a forked arm, which embraces an eccentric fast to the driving-shaft, and is thereby vibrated once for every revolution of the driving-shaft; and the other lever, *i'''''''*, is bent downward, and by means of a pin, *i''''''''*, projecting from it, locks the sliding belt-shipper *i''''''''''*, which has a pin-hole placed in it for that purpose, in such position that when the belt-fork *i'''''''''''*, attached to the shipper, is moved from the loose pulley *i''''''''''''*, to the tight pulley *i'''''''''''''*, against the action of the spiral spring *i''''''''''''''*, the pin *i''''''''''''''* upon the lever drops into the hole by reason of the weight of the arm of the lever *i''''''''*, to which it is attached.

The jaws of the two levers beneath the thread-protector are placed at a little distance apart, so that the vibration of the lever *i''''''* will not move its jaw, *i''''''''*, sufficiently to come in contact with the jaw *i''''''''''* of the lever *i'''''''''*, which locks the belt-shipper, but the distance between the jaws is so small that whenever the end of the thread-protector descends between them by reason of the breaking of the filling-thread in the web or for want of sufficient tension upon the filling-thread to keep it suspended above the jaws, the moving jaw presses it against the opposite jaw of the locking-lever, in the manner of a pair of forceps seizing a wire,



which has the effect to raise the locking-arm of the lever and release the belt-shipper.

A handle, *j*, is placed upon the belt-shipper for convenience of moving it to start the loom.

The latched looping-needles *k k'* are placed, one at each edge of the web, and are mounted upon a forked rocking-arm, *k<sup>2</sup>*, fast to the rock-shaft *k<sup>3</sup>*, the rocking motion being given to the shaft by means of an eccentric, *k<sup>4</sup>*, upon the rotating shaft *e*, and a forked arm, *k<sup>5</sup>*, fast to the rock-shaft.

The looping-needles *k k'* are curved correspondingly to the curve of their motion by the rocking-arm, and are formed with a hook or barb upon their ends to seize the loop of needle-thread projected through the shed by the thread-carrier, and are also each provided with a latch, *m*, (like latched knitting-needles,) operated by the loops of thread upon the needles.

The comb-beater for beating up the filling-thread is an instrument consisting of a series of flat metal blades, *n*, like the teeth of a comb, secured by a clamping set-screw in a channel or mortise in the horizontal part *n<sup>1</sup>* of a bent lever, *n<sup>2</sup>*, which latter has for its fulcrum a crank-pin, *n<sup>3</sup>*, projecting from the side of the rotating circular plate *n<sup>4</sup>*, which is fast to the end of the rotating shaft *e*.

The bent lever *n<sup>2</sup>* has a tail in which is a curved slot, *n<sup>5</sup>*, which plays freely upon the neck of a bolt, *n<sup>6</sup>*, screwed into a stud projecting from the side frame.

The side of the rotating disk is smoothed to act as a guide to the side of the bent lever which is in contact with it, in order to keep the teeth of the comb accurately in their proper planes of motion when entering the web.

The comb-beater is lifted to enter the web, moved forward in the web to beat up the filling-thread, and then withdrawn downward from the web and moved backward beneath the web out of the way of the filling-thread carrier by means of the crank-pin *n<sup>3</sup>* and bent lever *n<sup>2</sup>*, the curved guide-slot in the tail of the bent lever and the pin upon which it plays, serving to keep the comb-teeth in their required vertical position.

The number of teeth in the comb-beater may be varied to suit the web, the clamping-screw and mortised clamp being provided for that purpose.

In the use of the comb-beater it is desirable to have the warp-threads lie in fixed vertical planes, in order that the comb shall enter the web properly, and therefore a web-guide, *p*, composed of similar comb-teeth, arranged in the same manner in a clamp-frame, *p<sup>1</sup>*, is attached to the loom just in front of the heddles by a screw, *p<sup>2</sup>*, the comb-teeth of the guide being secured by a clamping-screw, *p<sup>3</sup>*.

The comb-teeth of the web-guide being arranged in the vertical planes of motion of the teeth of the comb-beater, when the latter rises to enter the web just in front of the web-guide, the warp-threads are divided and properly placed for the teeth of the comb-beater to enter the web between them.

The operation of the loom is as follows:

The filling-thread being drawn through the eye of the filling-thread carrier, and the tension properly adjusted, the operator holds the end of the filling-thread in his hand at the edge of the web. The loom being set in motion, the filling-thread carrier advances a loop of filling-thread through the shed, the looping-needles then move forward under and across the filling-thread carrier, and between it and the loop, as in fig. 5. The thread-carrier then moves back, leaving the loop of filling-thread looped around both of the looping-needles, which immediately begin to move back, drawing the loop of filling-thread with them, as in fig. 6, when the comb-beater enters the web, as in fig. 7, and follows the looping-needles to the fell, beating up the filling-thread, and then retreats downward from the web and finishes its stroke below the web, out of the way of the filling-thread carrier, which latter has moved into the shed to carry in another loop of filling-thread. The looping-needles then move forward through the loop of filling-thread which has been beaten up and confined in the web by shifting the shed, and the loop, being around the looping-needles cause the latches to turn over as they pass beyond the loops, leaving them upon the shank of the looping-needles, and when the latter move back again with a new loop of filling-thread, they draw it through the preceding loops, which slip over the barb, the latches having been thrown over the barb by the loops that are thus cast off.

In commencing to weave, the latches of the looping-needles should be thrown back to enable them to take the first loop of filling-thread, and afterward they will be opened and closed by the loops themselves.

It is not necessary to use the looping-needle at the edge of the web next to the filling-thread carrier, because the web holds the filling-thread at that side, but it is preferable to do so on account of uniformity of the selvage and facility of working.

A horizontal bar, *q*, secured at one end to the frame passes under the web and looping-needles, and serves to support and steady the web and the ends of the looping-needles when the comb beats up, giving greater certainty to the operation of the looping-needles.

I claim—

1. In combination with the filling-thread carrier, the comb-beater for beating up the filling-threads, having the mode of operation substantially as herein described.

2. In combination with the belt-shipper, the thread-protector and the levers and cams which constitute the mechanism for releasing the belt-shipper, to stop the loom, substantially as described.

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Witnesses:

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