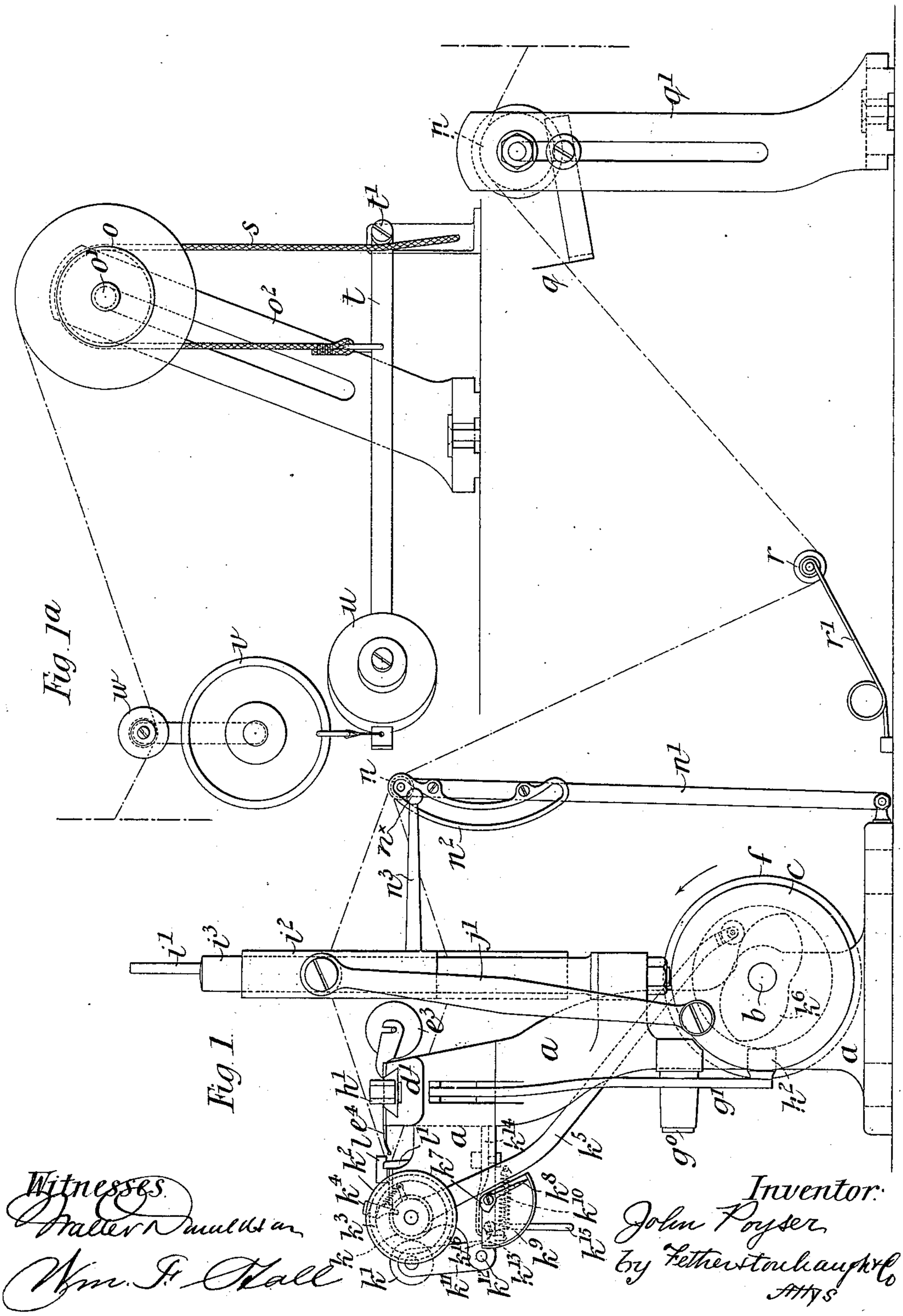
No Model.)

5 Sheets—Sheet 1.

J. POYSER.

LOOM FOR WEAVING.

No. 547,130. Patented Oct. 1, 1895.



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J. POYSER.

LOOM FOR WEAVING.

No. 547,130. Patented Oct. 1, 1895.

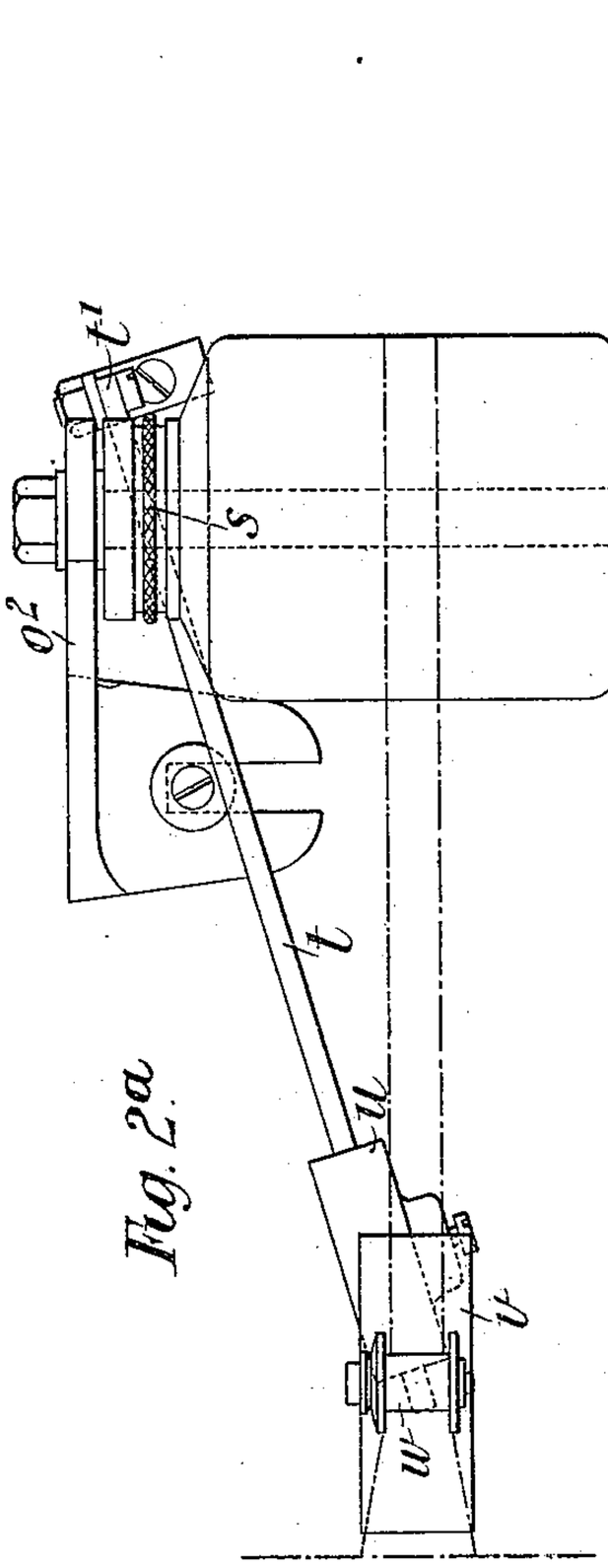


Fig. 2a

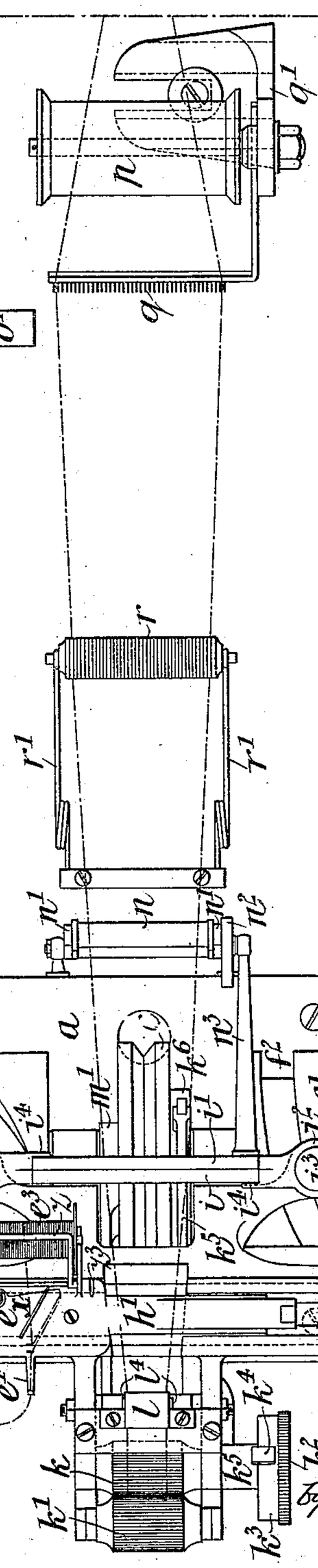


Fig. 2

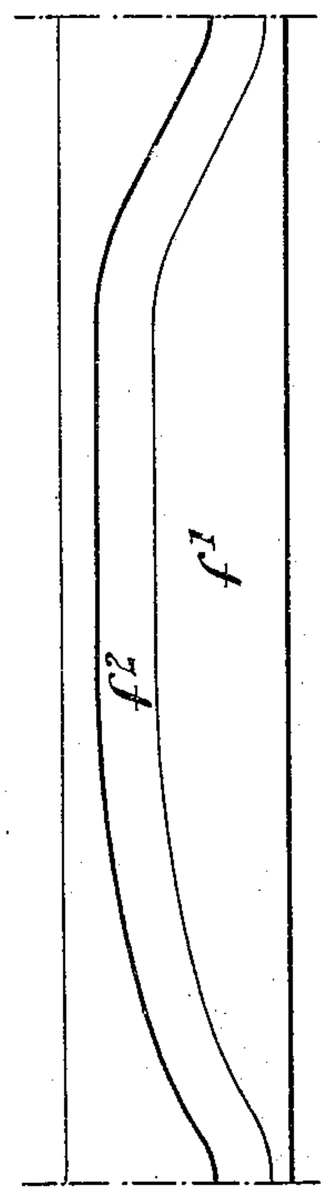
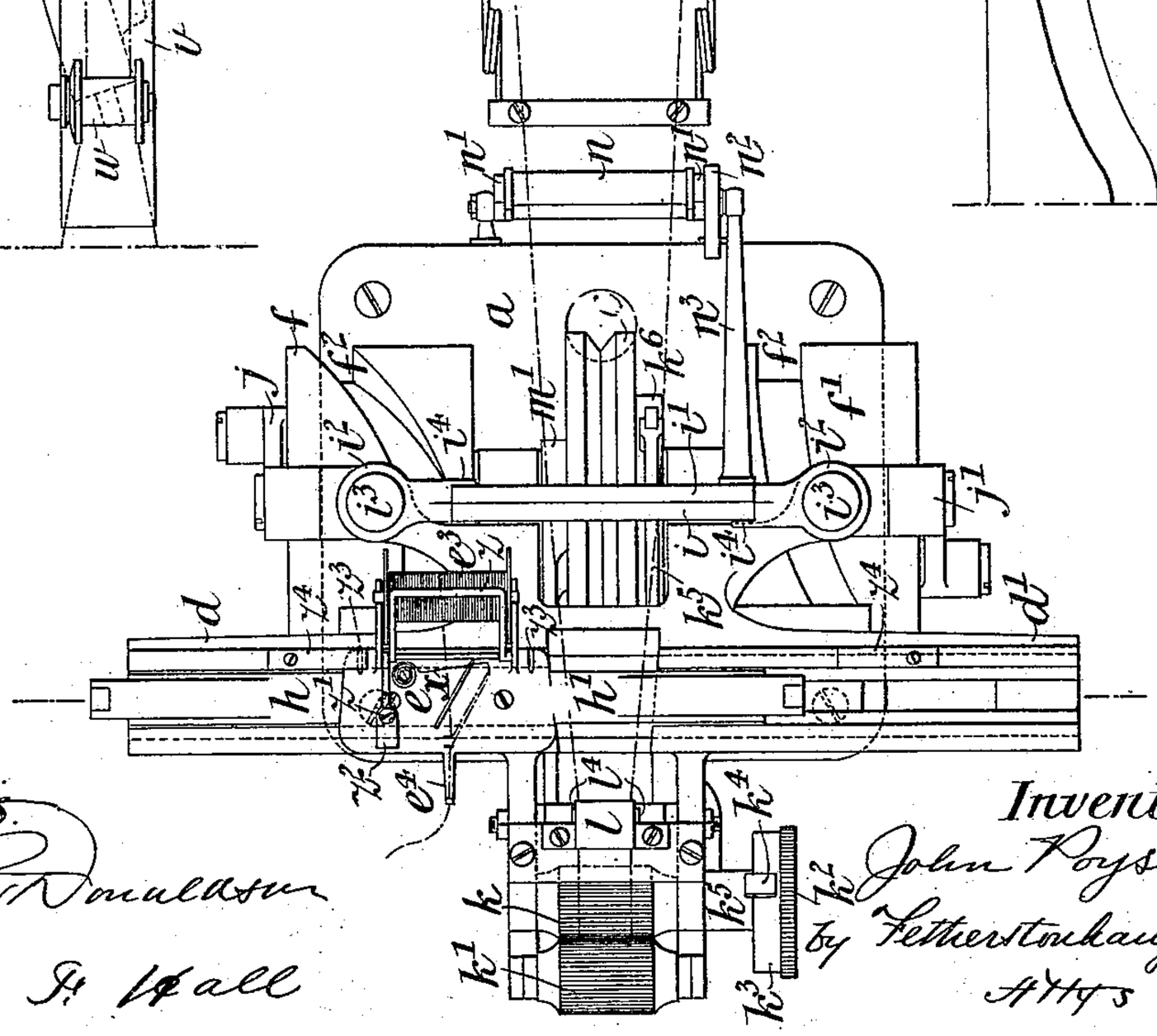


Fig. 7



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(No Model.) 5 Sheets—Sheet 3.

J. POYSER.

LOOM FOR WEAVING.

No. 547,130. Patented Oct. 1, 1895.

Fig. 4.

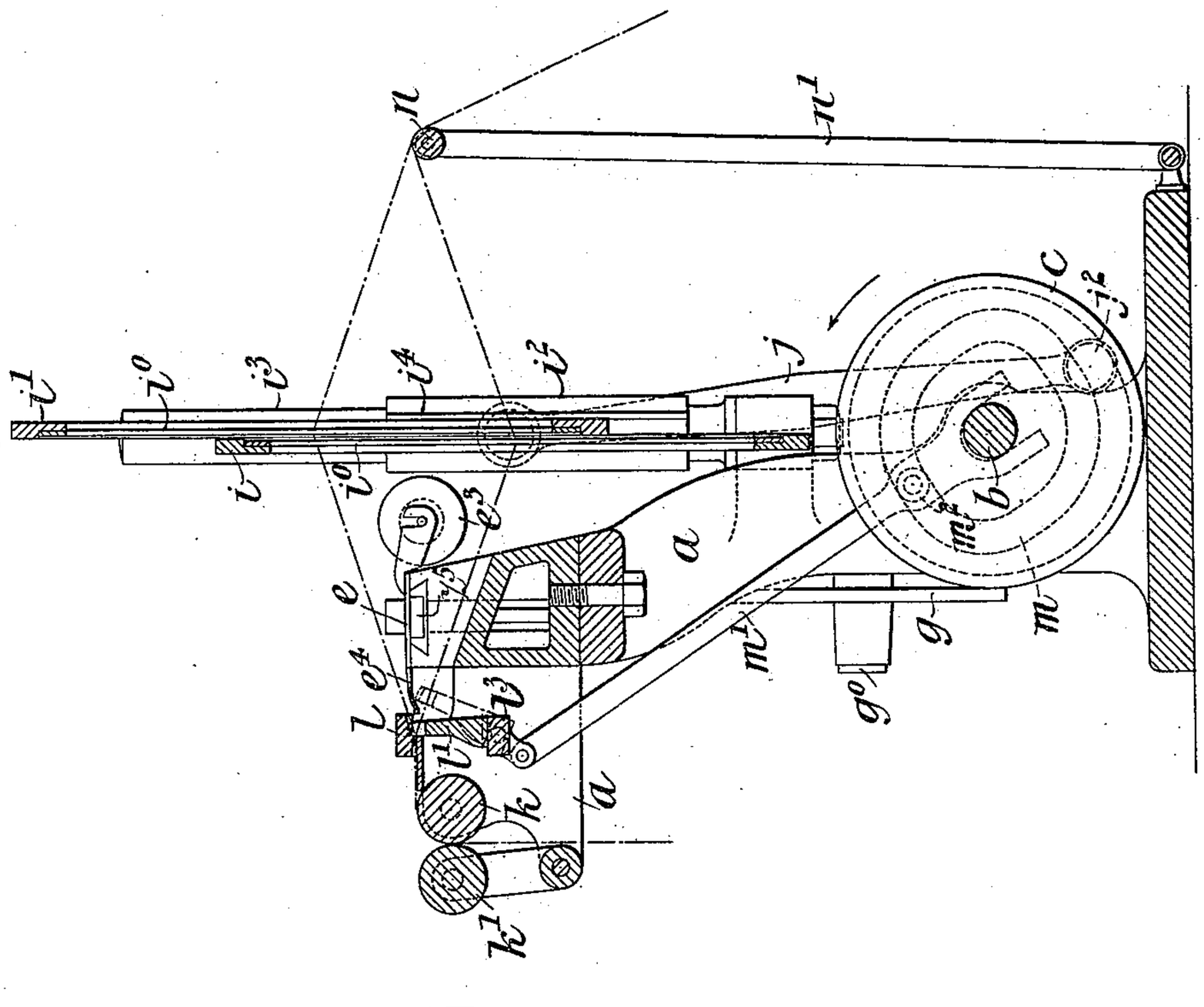
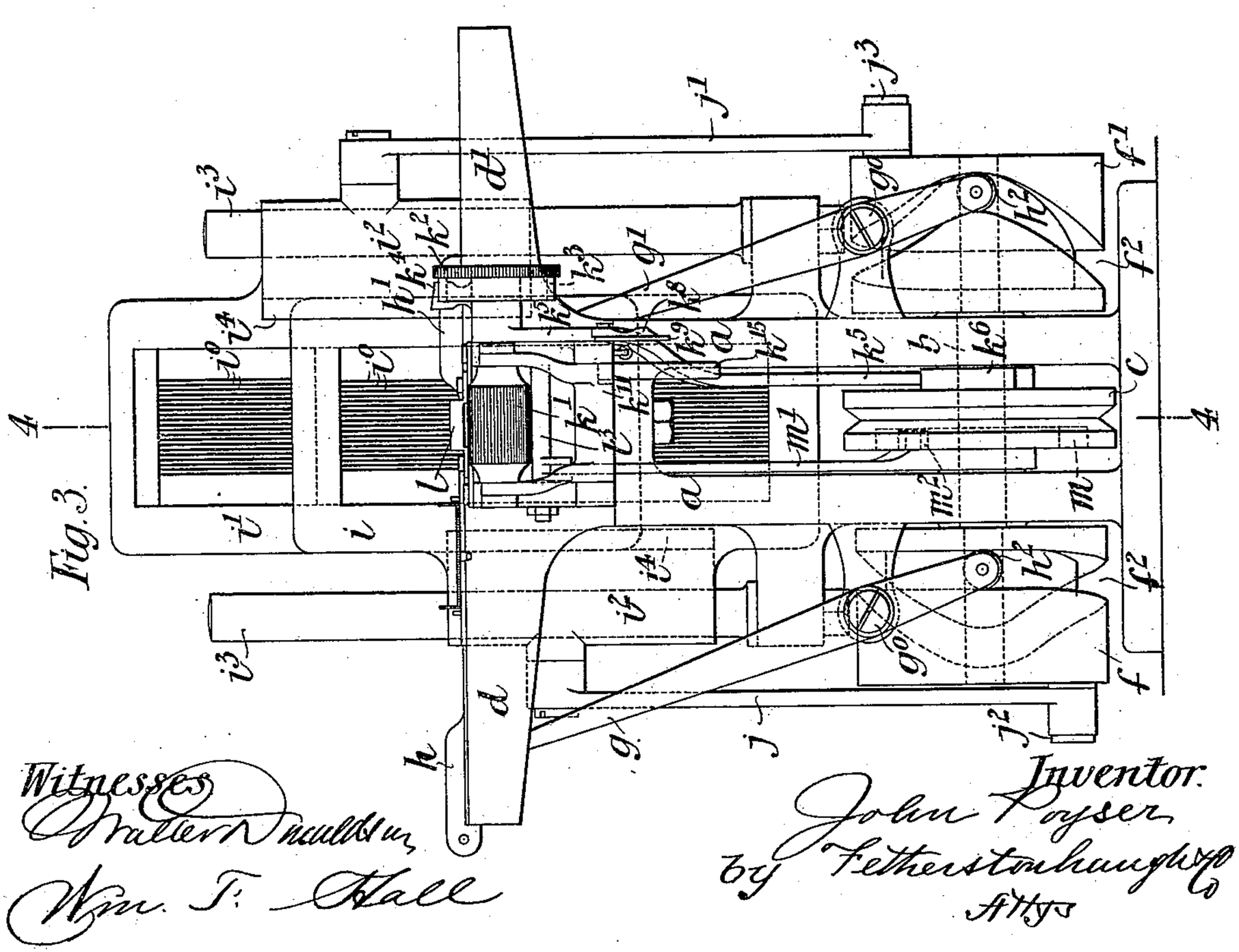


Fig. 3.



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(No Model.) 5 Sheets—Sheet 4.

J. POYSER.

LOOM FOR WEAVING.

No. 547,130. Patented Oct. 1, 1895.

Fig. 5.

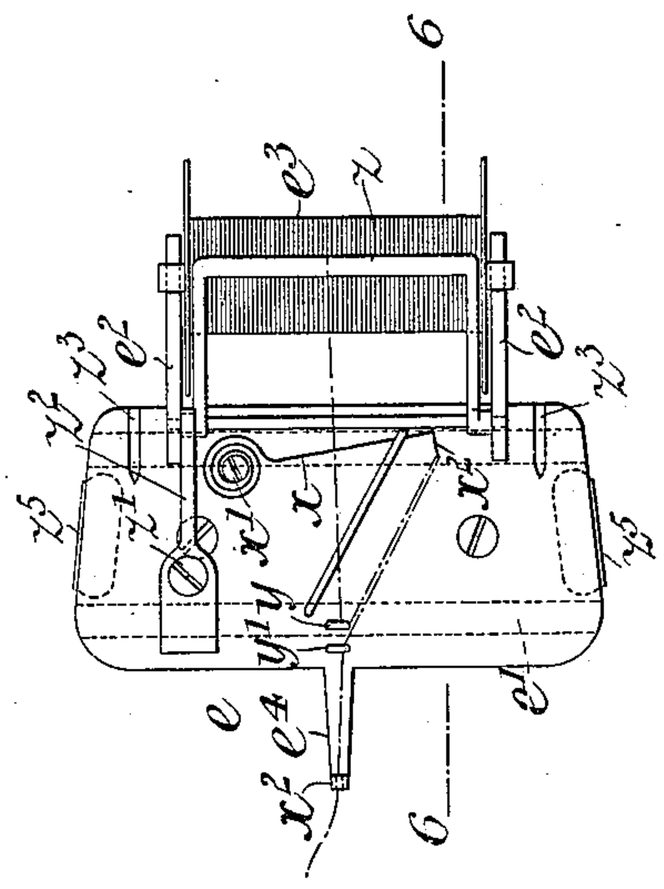


Fig. 6.

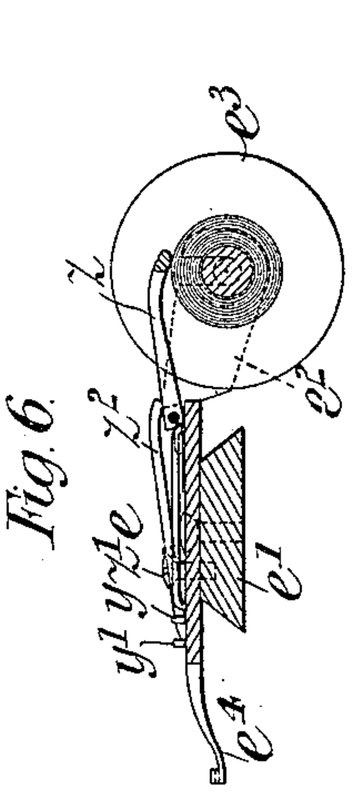


Fig. 13

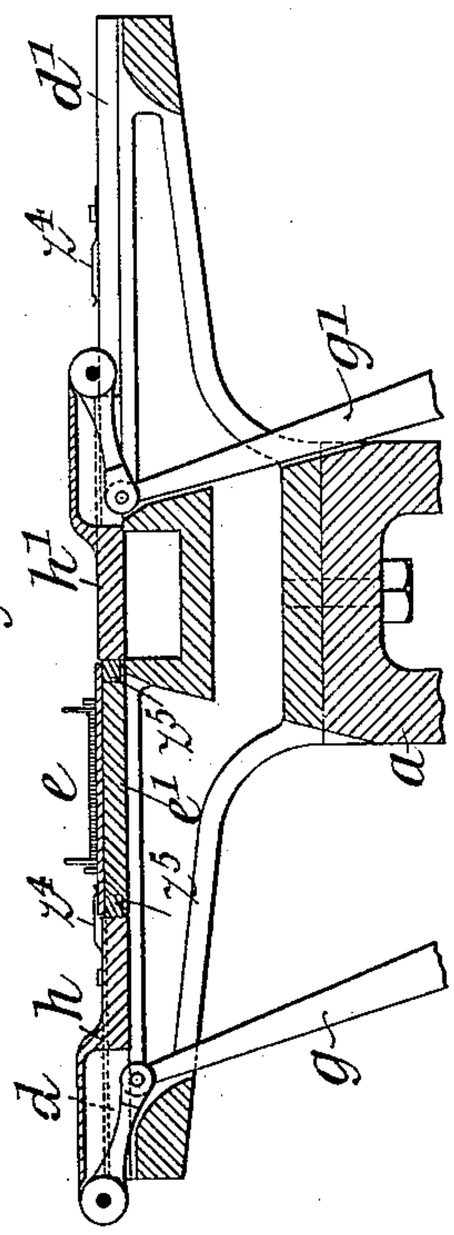


Fig. 14.

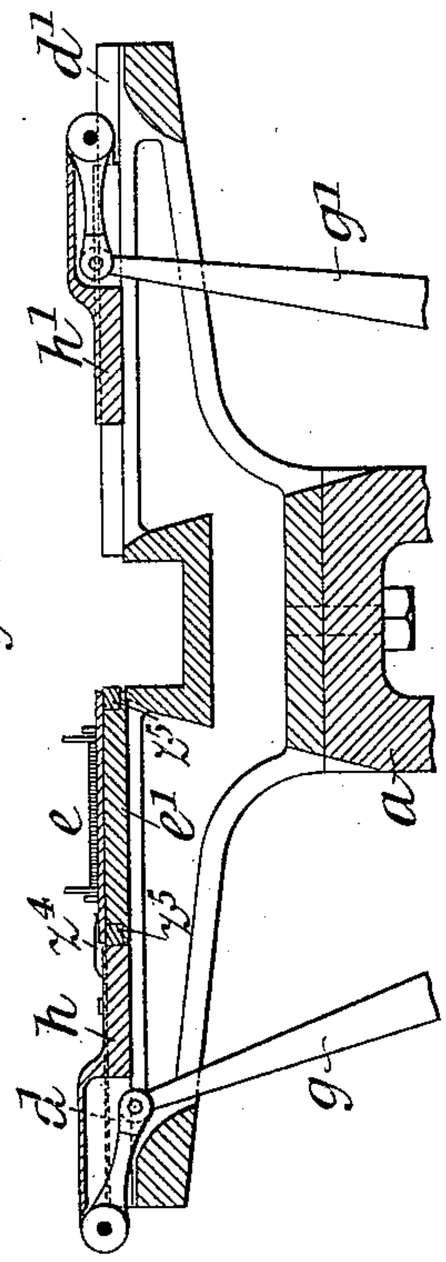


Fig. 8.

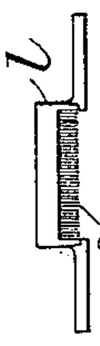


Fig. 9.

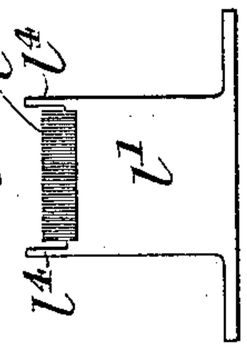


Fig. 10.

Fig. 11.

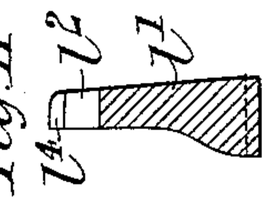
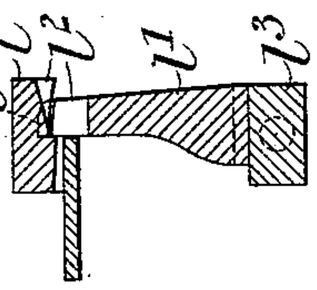


Fig. 12.



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(No Model.)

5 Sheets—Sheet 5.

J. POYSER.

LOOM FOR WEAVING.

No. 547,130. Patented Oct. 1, 1895.

Fig. 7a

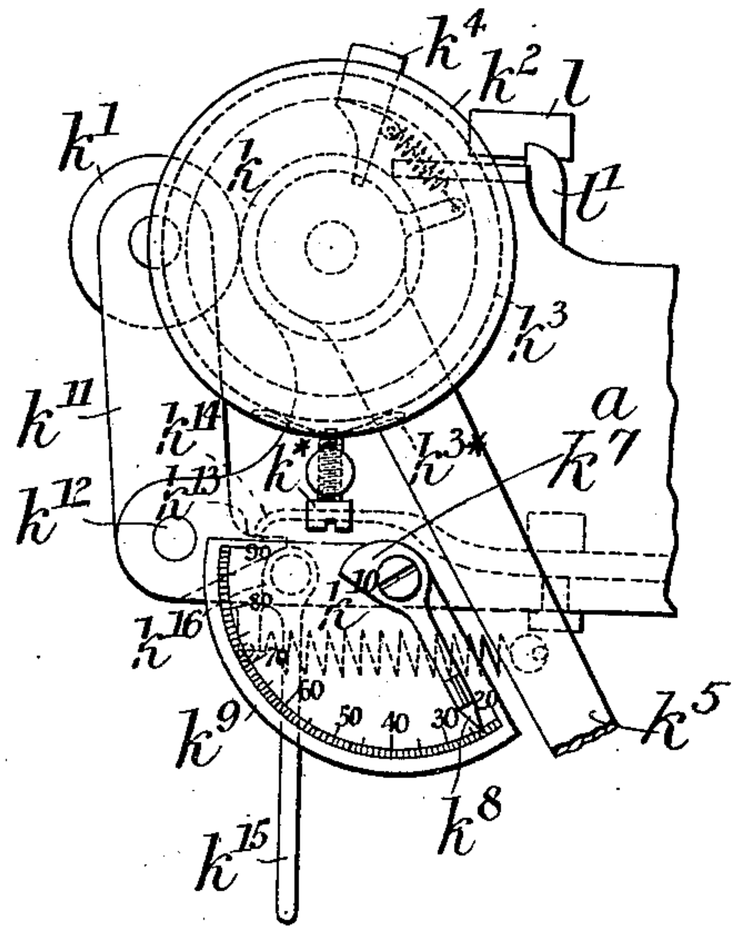
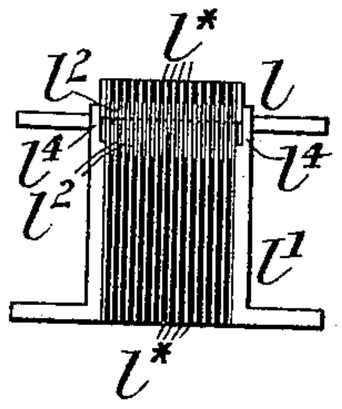


Fig. 12a



Witnesses.
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F. L. Middleton

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John Poyser
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Attys.

UNITED STATES PATENT OFFICE.

JOHN POYSER, OF MANSFIELD, ENGLAND.

LOOM FOR WEAVING.

SPECIFICATION forming part of Letters Patent No. 547,130, dated October 1, 1895.

Application filed February 10, 1894. Serial No. 499,761. (No model.)

To all whom it may concern:

Be it known that I, JOHN POYSER, engineer, a subject of the Queen of Great Britain, residing at Peck's Hill, Sherwood Road, Mansfield, in the county of Nottingham, England, have invented new and useful Improvements in Looms for Weaving, of which the following is a specification.

My invention relates to looms for weaving cloth fabrics, and comprises improvements hereinafter described, whereby the loom is generally improved and can be driven at a very much higher rate of speed than looms as heretofore constructed.

In the accompanying drawings, Figures 1 and 2 are respectively a side elevation and plan of the front portion of my improved loom, and Figs. 1ª and 2ª are similar views of the rear portion of the same. Fig. 3 is a front elevation of the loom; and Fig. 4 is a longitudinal vertical section of the same on the line 4 4, Fig. 3. Fig. 5 is a plan of the shuttle, drawn to an enlarged scale; and Fig. 6 is a section on the line 6 6, Fig. 5. Fig. 7 is a development of one of the cams for operating the shuttle. Fig. 7ª is a side elevation, drawn to an enlarged scale, of the mechanism for operating the feed-rollers. Figs. 8 and 9 are respectively elevations of the two parts of the batten. Figs. 10 and 11 are respectively vertical transverse sections of the same. Fig. 12 is a vertical transverse section showing the said parts of the batten in their relative working position, and Fig. 12ª is an elevation of the same. Figs. 13 and 14 are transverse sections through the guides for the shuttle, but indicating, respectively, different relative positions of the shuttle and pickers.

a is the frame of the head of the loom—that is to say, of that part of the loom in which the weaving proper takes place—the said frame being provided with bearings for a driving-shaft *b* (to which are fixed a driving-pulley *c* and a series of cams for effecting the movements of the different parts of the machine) and with guides *d d'*, constituting a race for the shuttle *e*.

The shuttle *e* (which is shown in plan view in Fig. 5 drawn to an enlarged scale and in section in Fig. 6, the section being taken on the line 6 6, Fig. 5) is provided on its under side with a dovetail block *e'*, which fits in corresponding dovetail grooves in the guides *d d'*, at its rear with arms or brackets e^2 e^2, which carry the shuttle-bobbin e^3, and in front with a projecting finger e^4, having an eye through which the weft thread is passed. The said shuttle is also of such length that it will bridge the gap formed in the raceway for the free movements of the warp-threads, so that before leaving the guide *d'* it will enter the guide *d*, and vice versa. The movement of the shuttle is positively effected through the medium of two cams *f f'*, fixed upon the shaft *b*, each of the said cams being provided with a cam-groove f^2, having the shape shown most clearly in Fig. 7, which is a development of the cam *f'*, the said cams being alike, except that the angle of the cam-groove is in one case to the right of the straight part of the same and in the other to the left. These cams actuate picker-levers *g g'*, pivoted at g^0 upon extensions of the frame *a*, the said two levers being at one end connected to the pickers *h h'*, sliding in the guides *d d'*, respectively, and at the other end provided with rollers h^3, running in the grooves f^2 f^2 of their respective cams. The cams *f f'* are fixed upon the shaft *b* in diametrically-opposite positions, so that when the roller of one picker-lever is at the extreme of the angle of the corresponding cam-groove the roller of the other picker-lever will be in the straight part of its cam-groove, as shown in Fig. 3.

i i' are the shedding-plates, carrying the healds or heddles i^0, which are preferably bars with eyes therein, the said plates being provided with slides or sockets i^2, sliding on guide-rods i^3 i^3, fixed to extensions on the frame *a*. It will be noticed by reference to Figs. 2 and 3 that each plate *i i'* is provided with a lip or flange i^4, which lips serve as guides for the free edges of the two plates. The slides of the shedding-plates *i i'* are respectively connected by means of rods *j j'* to crank-pins j^2 j^3 upon the cams *f f'*, the said crank-pins being arranged diametrically opposite to each other, so that when one shedding-plate is up the other is down and in such positions relatively with the cam-grooves f^2 f^2 that when the shed is open the roller of one picker-lever will be in the straight part of its cam-

groove and the other in the extreme of the angle of its cam-groove, as shown most clearly in Figs. 3 and 4.

$k\,k'$ are taking-up or feed rollers for drawing the work forward at a speed corresponding to the number of weft-threads to be laid per inch. As shown in the drawings, this feed movement is effected by the following means: Upon the spindle of the roller k is fixed a wheel k^2, having a rim or flange k^3, with which a clutch or gripping pawl k^4 engages in a well-known manner. This pawl is carried by a lever k^5, actuated by a cam k^6 on the driving-shaft b, the said cam being of a double heart shape, so that for each revolution of the said driving-shaft the feed mechanism is operated twice—that is to say, once for each movement of the shuttle. A spring k^{3*}, adjusted by a screw k^*, bears upon the rim or flange k^3 to prevent the roller k from moving backward under the tension of the warp-threads during the time that the gripping-pawl k^4 is sliding backward upon the flange k^3 preparatory to gripping the said flange. In order to regulate the speed of the feed-rollers according to the number of weft-threads required per inch, I provide a small cam k^7, having a finger or pointer k^8, working over a graduated dial k^9, the said cam serving to more or less limit the backward movement of the lever k^5 under the action of a spring k^{10} after it has been raised by the cam k^6. The roller k' is held against the roller k by means of spring-pressure, the said roller being mounted in the arms of a bifurcated lever k^{11}, pivoted at k^{12} to the frame a and having an extension k^{13}, against which a spring k^{14} acts, as will be readily understood by reference to Figs. 1 and 7^a. In order to hold the roller k' away from the roller k when required, a lever k^{15}, having a cam-head k^{16}, is arranged in conjunction with the under side of the extension k^{13}, also as shown in Figs. 1 and 7^a.

l' is the batten, and l the warp-thread guide co-operating therewith, which are shown detached in elevation in Figs. 8 and 9, respectively, in vertical transverse section in Figs. 10 and 11, respectively, and in vertical section in their relative working positions in Fig. 12, all of the said figures being drawn to an enlarged scale. Both the batten and the guide are provided with a corresponding series of plates l^2 with intermediate distance-pieces l^*, (shown in black lines in Fig. 12^a,) the said distance-pieces being somewhat shorter than the plates l^2, so as to form spaces between the said plates, serving to receive the warp-threads. The warp-thread guide l is fixed to the framing of the machine in such a manner that the upper warp-threads of the shed will always pass between the plates l^2 thereof, and the batten l' is fixed to a pivoted oscillating block l^3 in such a position that the lower warp-threads of the shed will pass between its plates l^2 and that the batten, after it has beaten up a weft-thread, will occupy the position shown in full lines in Figs. 4 and 12, two projecting arms $l^4\,l^4$ on the sides of the batten l' then embracing the sides of the fixed part l. When the batten is in this position, the two sets of plates $l^2\,l^2$ coincide, so that the warp-threads at the upper and lower sides of the shed can change places—that is to say, those in the batten can pass into the fixed part, and vice versa.

The batten is operated from a cam-groove m, formed in one of the faces of the driving-pulley c, through the medium of a connecting-rod m', carrying near the lower end a roller m^2, running in the groove m, and at the upper end connected to a lug on the pivoted block l^2. The lower end of the rod m' is bifurcated and slides upon the shaft b, which forms a guide for the said rod. The cam-groove m is so shaped that the batten will make two oscillations for each rotation of the driving-shaft b. It will be readily understood that a batten constructed as hereinbefore described can be driven at a very much higher rate of speed than the usual swinging batten by reason of the fact that the batten is comparatively light and has a very short range of oscillation, so that the momentum of the parts is relatively small.

The slack of the warp-threads produced by the closing of the shed is taken up or compensated for by means of a rocking bar or roller n, over which the warp-threads are passed, the said roller being carried between two arms $n'\,n'$, pivoted to the base of the framing a. To one of the said bars n' is fixed a slotted quadrant n^2 and to the heddle-frame shedding-plate i' is fixed an arm n^3, carrying a roller n, projecting into the slot of the said quadrant. With this arrangement it will be understood that as the shedding-plates move up and down the bars $n'\,n'$, carrying the roller n, will be caused to oscillate a distance corresponding to the curve of the quadrant n^2, which in all cases must correspond with the amount of slack produced when the two sets of warp-threads forming the shed are crossing one another.

The warp-threads are carried upon a bobbin or beam o, Figs. 1^a and 2^a, adapted to rotate on a spindle o', fixed to a bracket o^2. The thread after leaving the bobbin passes over a guide-roller p and through a ravel q, Figs. 1 and 2, both of which are carried by a bracket q', thence under a grooved roller r, carried by springs $r'\,r'$, which serve to impart a certain amount of tension to the threads, thence over the slack-take-up roller n, thence through the eyes in the heddles $i^0\,i^0$, and thence between the plates $l^2\,l^2$ of the batten l' and warp-thread guide l to the take-up rollers $k\,k'$.

The requisite resistance to the turning of the warp bobbin or beam o to give the required tension to the warp-threads is advantageously produced by the friction of a cord s, Figs. 1^a and 2^a, fixed at one end and at the other connected to a lever t, pivoted at t' and carrying a weight u, which serves to tighten the cord upon the bobbin. Onto the warp-

threads is hung a weight v by means of a roller w, the said weight being also connected to the end of the lever t in such a manner that when, owing to the gradual using up of the warp-threads, the part thereof between the roller p and the beam o is straightened to a certain extent the weight v is lifted, whereby the lever t will be moved sufficiently to relieve the friction of the cord s on the bobbin o, which will then give off a certain length of warp-thread under the action of the weight v.

The operation of the apparatus is the same as in an ordinary loom—that is to say, the shuttle is moved backward and forward through the shed by means of the pickers h h', Fig. 13, showing in section the position of the shuttle and pickers in the shuttle-race when the picker-lever g' has just moved the shuttle from right to left, and Fig. 14 showing the same parts in the position which they occupy when the picker h is just commencing to return the shuttle from left to right. During the time that the shutle is moving through the shed the batten is open in its rear position, as indicated by the dotted lines in Fig. 4, so that the weft-thread which passes through the eye in the finger e^4 will be laid in the shed. When the shuttle has passed completely through the shed, the batten closes to the position shown in full lines in Figs. 4 and 12 to beat up the thread and remains in this position while the warp-threads are crossed, and then again opens ready for the shuttle to pass through in the opposite direction.

In order that when the shuttle is altering its direction of movement there shall be no slack thread between the salvage of the material being woven and the finger e^4, I provide the spring take-up lever x, which is fixed at x' and provided at its free end with an eye x^2. Upon the shuttle are also fixed two eyes y y'. The weft-thread passing from the spool e^3 is first of all passed through the eye y, thence through the eye x^2 of the take-up lever x, and thence through the eye y' to the eye of the finger e^4. During the time that the shuttle is being moved through the shed in one direction the pull upon the weft-thread will draw forward the lever x, so that its eye x^2 is between the eyes y y'. When, however, on the reverse movement of the shuttle slack is formed, the said lever x under the action of the spring x' moves backward into the position shown in Fig. 5 to take up the slack.

z is a spring frictional device which bears on the surface of the thread of the bobbin and causes the tension with which the weft-thread unwinds therefrom. The pressure of the said device upon the thread may be regulated by means of a screw z', which adjusts the pressure of the spring z^2 upon a surface near the hinge of the said device z.

z^3 z^3, Fig. 5, are notches with which spring-catches z^4 z^4, Fig. 13, upon the guides d d' are adapted to engage in order to prevent the shuttle from recoiling under the force of impact with the pickers, and in order to deaden the force of impact the shuttle is provided at its ends with buffers z^5 z^5, of leather or other suitable material.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a loom for weaving, a batten and a warp thread guide co-operating therewith, each comprising a series of plates or pins having spaces between them through which the upper and lower threads of the warp forming the shed pass, the said batten and guide being adapted to coincide in such a manner that when in contact the lower threads of the shed can pass into the guide and the threads from the guide into the batten under the action of the heddles, substantially as described.

2. In a loom for weaving the combination with the take up rollers, the pawl or clutch mechanism for operating one of the rollers, the lever and cam for operating the clutch, and a second cam for regulating the movement of said lever and consequently the amount of rotation imparted to the take up rollers, of a graduated dial and finger moving over said dial and connected with the regulating cam whereby the number of weft threads per inch laid in the fabric may be regulated at will, substantially as described.

3. In a loom for weaving, the heddle plates, the frame arranged to be moved toward and from the said plates as the shed opens and closes, and the means for moving the frame including a slotted quadrant or sector fixed to the frame and an arm fixed to one of the plates and engaging said quadrant, substantially as described.

4. In a loom for weaving, an oscillating frame carrying a roller to take up the slack in the warp threads, a slotted quadrant carried by said frame, the vertically movable heddle frame, an arm fixed thereto, and carrying a roller working in the slot of the quadrant in combination with a grooved roller under spring tension to maintain the tension of the warp threads, substantially as described.

5. In a loom for weaving the combination with the fixed warp thread guide, and the movable batten, of the shuttle operating behind the said batten and having a projecting finger which lays the weft thread in front of the batten, substantially as described.

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