

No. 769,062.

PATENTED AUG. 30, 1904.

J. R. DENNIS & J. H. FAWTHROP.  
LOOM FOR WEAVING LOOPED OR PILE FABRICS.

APPLICATION FILED MAY 18, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

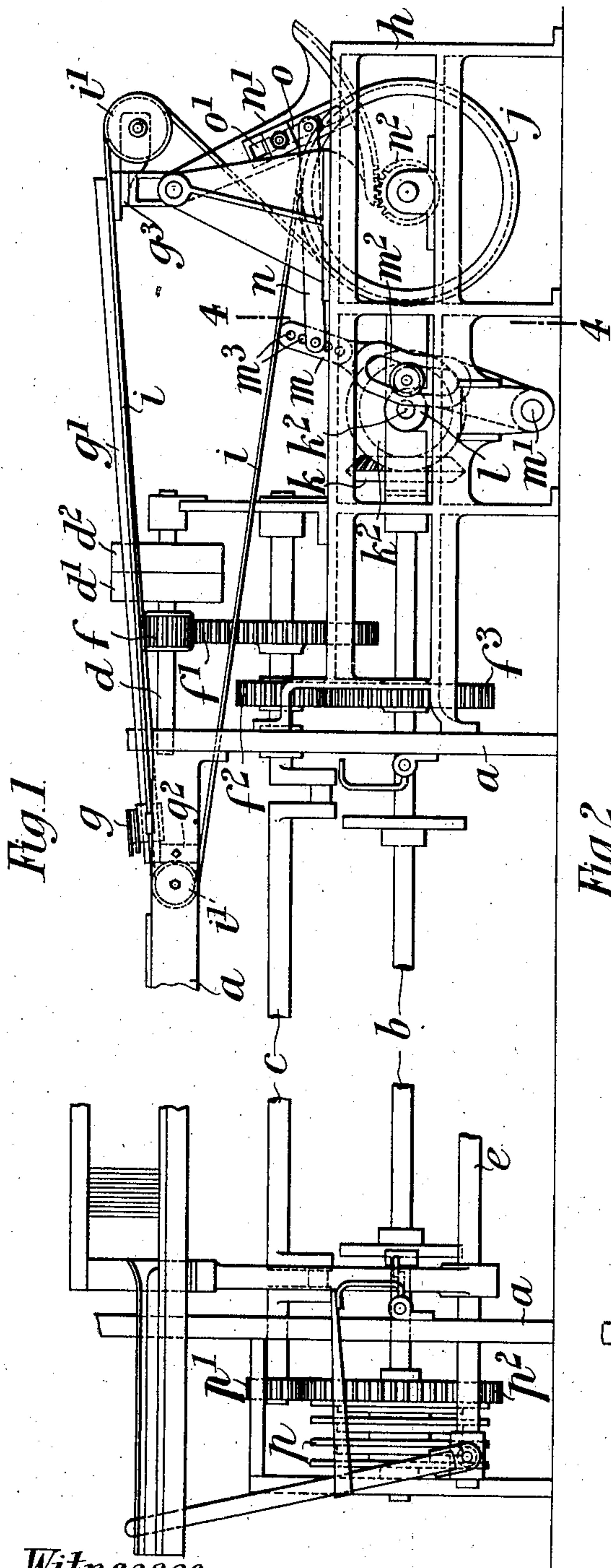


Fig. 1.

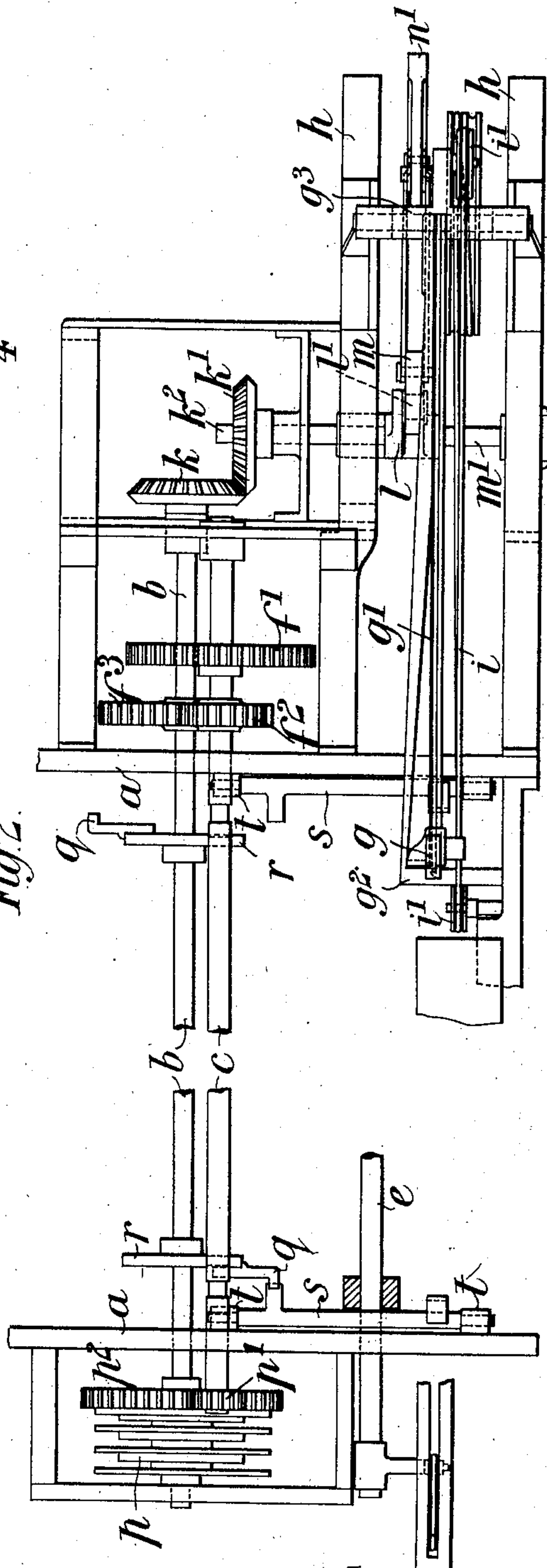


Fig. 2.

Witnesses.

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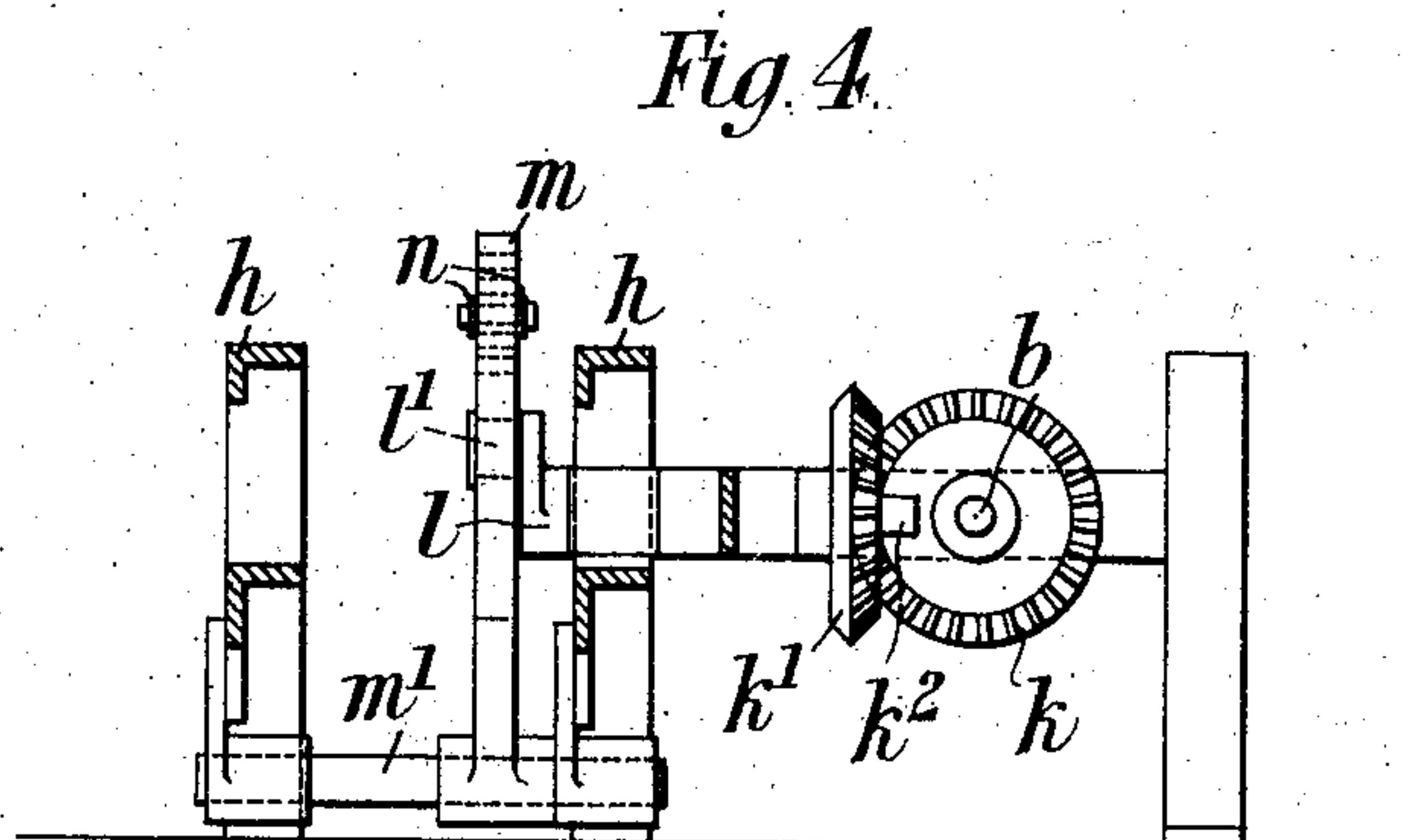
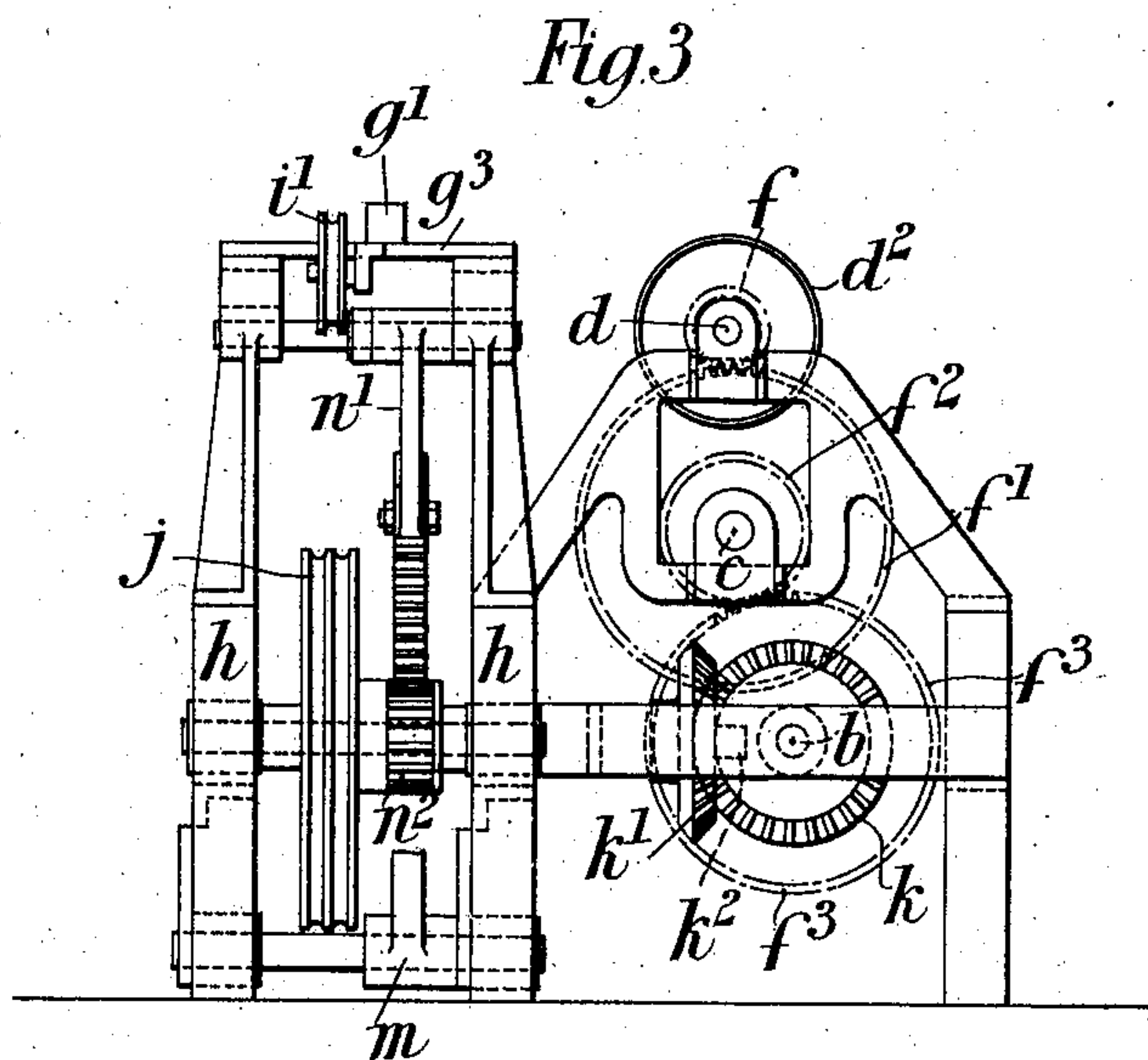
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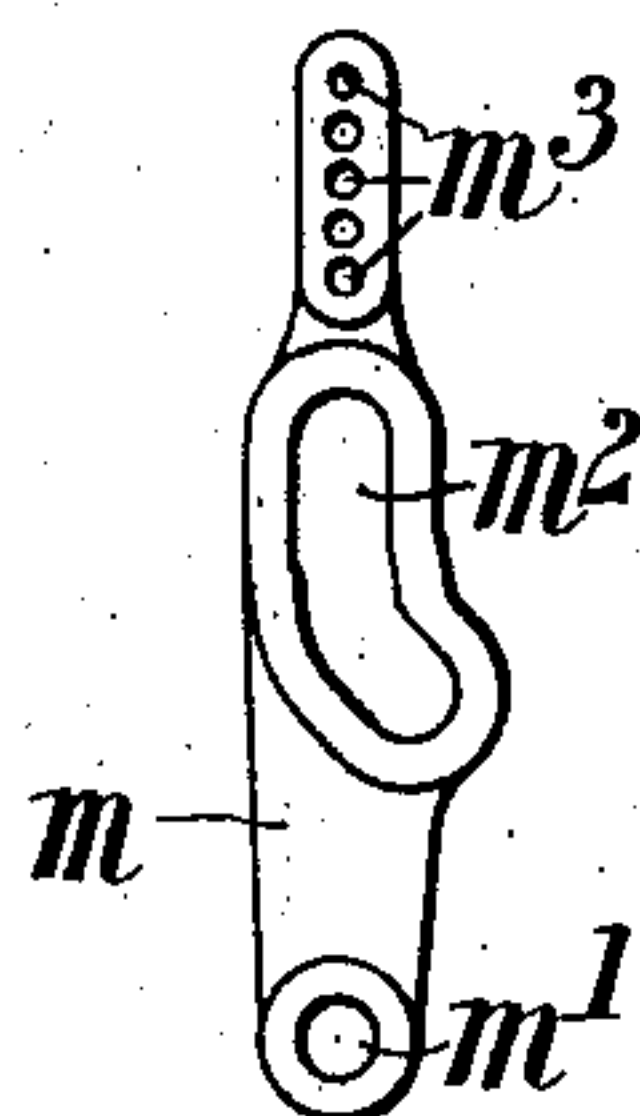
APPLICATION FILED MAY 18, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



*Fig. 5.*



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

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## LOOM FOR WEAVING LOOPED OR PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 769,062, dated August 30, 1904.

Application filed May 18, 1903. Serial No. 157,714. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN RICHARD DENNIS and JAMES HENRY FAWTHROP, subjects of the King of Great Britain, residing at Dean Clough Mills, Halifax, in the county of York, England, have invented new and useful Improvements in Looms for Weaving Looped or Pile Fabrics, of which the following is a specification.

This invention relates to looms for weaving tapestry, tapestry-velvet, Brussels, Wilton, and like carpets, and has for its objects to improve the mechanism for inserting and withdrawing the wires, the means for enabling greater varying lengths of wire (to suit varying widths of fabrics to be woven) in the same loom to be used than has been possible heretofore, and the picking mechanism of the loom, and to dispense with the ordinary mechanisms, such as scrolls, chain gearing, and picking-tappets and their connections. To provide for inserting and withdrawing the wires, we employ an arrangement of miter or bevel wheels working in conjunction with a crank or crank-disk and a slotted lever, the pin of the crank or crank-disk moving in the slot of the lever, which slot is suitably shaped to produce the desired movement of the slotted lever and of the parts connected thereto and driven thereby according to the fabric to be produced. The slotted lever, which is mounted at one end on a shaft or stud, is at the other or free end united by a connecting-rod to an adjustable block on a toothed quadrant engaging with a pinion giving motion to a rope-pulley, which in turn gives a backward-and-forward motion to a rope, to which is secured a slide-box for inserting and withdrawing the wires. By this means a great variation in the travel of the slide-box is provided for—that is to say, for example, in a loom eighty-one inches wide fabrics of any desired width from thirty-six to eighty-one inches can be produced, while in a loom one hundred and forty-four inches wide fabrics of any desired width from eighty-one to one hundred and forty-four

inches can be produced, and in all cases wires of only the length required for the fabric to be woven are used.

To enable our invention to be fully understood, we will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figure 1 is a front elevation of part of a loom having our improvements applied to it, and Fig. 2 is a plan view of the same with the driving-shaft omitted. Fig. 3 is an end view of part of the wiring motion. Fig. 4 is a section on the line 4 4, Fig. 1. Fig. 5 is a front view of a lever hereinafter described.

Similar letters of reference in all the figures indicate similar parts.

*a* is part of the framing of the loom; *b*, the bottom shaft; *c*, the crank-shaft; *d*, the driving-shaft, having fast and loose pulleys *d'* *d''* mounted upon it; *e*, the sword or rocking shaft, and *f* *f'* *f''* *f'''* gear-wheels for communicating motion from the shaft *d* to the shafts *c* and *b*, the wheels *f''* *f'''* being so proportioned that the crank-shaft *c* will make two revolutions to one of the bottom shaft *b*. All the before-mentioned parts are of ordinary construction.

*g* is the slide-box, which operates the wires to be inserted and withdrawn during the weaving operations, which slide-box works freely upon a slide *g'*, which is supported by an angle-bracket *g''* and by a cross-head *g'''* on a supplementary framing *h*. This slide-box is caused to travel along the slide *g'* by means of a rope *i*, which passes over pulleys *i'* *i''* on the frame *a* and head *g'''* and also around a rope-pulley *j*, mounted in suitable bearings on the frame *h* and to which an oscillatory movement to a greater or less extent is imparted in order to cause the corresponding travel of the slide-box *g*. Oscillatory movement is imparted to this rope-pulley *j* from the bottom shaft *b* in the following manner—that is to say, upon the bottom shaft *b* is mounted a miter-wheel *k*, which engages with a second miter-wheel *k'*, secured to a cross-shaft *k''*, working in bearings on the frame *h*. Near one end of the



cross-shaft  $k^2$  is fixed a crank-disk or crank  $l$ , the pin  $l'$  of which carries an antifriction-roller.

$m$  is our slotted lever, which is mounted on a shaft  $m'$ , working in bearings on the frame  $h$ , (or the said shaft may be secured in the bearings and the lever  $m$  rock upon the said shaft,) and in the slot  $m^2$  of which the pin  $l'$  of the crank projects in such a manner that as the said crank rotates an oscillatory movement will be imparted to the said lever. The upper end of this lever  $m$  is connected by a rod  $n$  to a toothed quadrant  $n'$ , pivoted in the head  $g^3$  and engaging with a pinion  $n^2$  upon the shaft of the rope-pulley  $j$ , whereby as the lever  $m$  oscillates oscillation will also be imparted to the quadrant  $n'$ , and consequently to the rope-pulley  $j$ . In order to provide for varying the extent of oscillation which the quadrant  $n'$  receives, the point of connection between the rod  $n$  and the said quadrant is upon a slide-block  $o$ , which is adapted to be adjusted in a slot  $o'$  in the said quadrant, so that the said point of connection may be moved toward or away from the axis of oscillation of the said quadrant. Also the upper end of the slotted lever  $m$  is provided with a series of holes  $m^3$  or is otherwise suitably constructed, so that the point of connection between the said rod  $n$  and the said lever may be adjusted toward and away from the pivot of the latter. It will be obvious that by varying the points of connection between the slotted lever  $m$  and the rod  $n$  or between the latter and the quadrant  $n'$  the amount of oscillation or rotation imparted to the rope-pulley  $j$ , and consequently also the amount of movement imparted to the slide-box  $g$ , can be varied to suit the width of the particular fabric being woven.

The slot  $m^2$  in the lever  $m$  is so shaped that as the said lever is operated by the rotation of the crank a varying movement will be imparted to the said lever, and consequently also to the slide-box—that is to say, slowly at the beginning and finishing of the insertion of the wires and slowly at the beginning and finishing of the withdrawal of the wires and quickly during the intermediate stages of the two operations. The form of lever shown in Fig. 1 is the form of lever which we use when weaving tapestry or two-shot fabrics, while when we make velvet or three-shot fabrics the slot in the lever is shaped as shown in Fig. 5.

When making two-shot tapestry or Brussels carpet and like fabrics, the bevel-wheels  $k$   $k'$  on the bottom shaft  $b$  and cross-shaft  $k^2$  are so proportioned that the said two shafts run at uniform speed—that is to say, that the cross-shaft  $k^2$  makes one revolution to two revolutions of the crank-shaft.

In order to adapt the loom for weaving three-shot velvet or Wilton carpet and like fabrics, it is only necessary to substitute for the equal size bevel-wheels wheels bearing

the proportion of one to one and one-half upon the bottom shaft  $b$  and cross-shaft  $k^2$ , respectively, so that the cross-shaft shall only make one revolution while the crank-shaft is making three revolutions. In this case also the slotted lever shown in Fig. 1 is removed and replaced by the lever shown in Fig. 5, the shape of the slot in which is varied to suit the variation in the speed.

In producing tapestry or two-shot fabrics we employ the ordinary tapestry treadle-box  $p$ , (for operating the healds,) which is driven by a spur-wheel  $p'$  on the crank-shaft  $c$ , Figs. 1 and 2, and spur-wheel  $p^2$ , which works freely on the bottom shaft  $b$ , the spur-wheel  $p^2$  making one revolution to the spur-wheel  $p'$  four revolutions. The picking motion is operated by strikers  $q$   $q$ , secured to the disks  $r$   $r$ , coming in contact with the picking-shafts  $s$   $s$  in the ordinary manner, one striker being employed on each disk.

In producing velvet or three-shot fabrics the method now in use is to change the spur-wheels  $f^2$   $f^3$ , which are geared at two to one for a pair of spur-wheels geared at three to one and change the tapestry treadle-box for a velvet treadle-box, to which is attached one or more picking-tappets used with other connections for moving the picking-shafts  $s$   $s$  longitudinally to miss alternately the strikers fixed to the disks  $r$   $r$ , of which there are three strikers to each disk. By our improved method we do not change the spur-wheels  $f^2$   $f^3$ , but keep the crank-shaft  $c$  and bottom shaft  $b$  at one relative speed, (two to one,) as hereinbefore described; but we employ the ordinary velvet treadle-box now in use for operating the healds and which is geared to run at one revolution to six of the crank-shaft  $c$ , and we dispense with the picking tappet or tappets and all connections therewith which have hitherto been used in connection with the velvet treadle-box, and we also employ only a single striker on each disk, as is described with reference to weaving two-shot fabrics.

The picking-shafts  $s$   $s$  oscillate in bearings  $t$   $t$  and do not move longitudinally. We thereby obtain one uniform picking motion for both tapestry (two shot) and velvet (three shot) fabrics and a quicker, better, and more reliable picking for velvet (three shot) fabrics than has hitherto been obtained.

By our improved method of wiring and picking mechanism we dispense with all chains, chain-gearing, scrolls, picking-tappets, and all connections heretofore used for the same, thus reducing the labor necessary in changing the loom to weave different kinds of fabrics, thereby simplifying the construction of the loom and reducing the wearing and frictional parts and at the same time obtaining more uniform and reliable wiring and picking motions.

Having now particularly described and as-



certained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a loom for weaving looped and piled fabric, the combination of a wire-box, a rope for imparting motion to the said box, a drum and pulley upon which the rope is mounted, a pinion on the axis of the said drum, a toothed quadrant engaging with the said pinion, an oscillating slotted lever receiving its motion from the driving mechanism of the loom and a rod adjustably connected to the said lever and quadrant and communicating motion from one to the other, substantially as described.

2. In a loom for weaving looped and piled fabrics the combination of a slide-box for inserting and withdrawing the wires, a guide upon which the said slide-box travels, rope-and-pulley mechanism for reciprocating the said slide-box upon the guide, a pinion upon the axis of one of the rope-pulleys, a toothed quadrant engaging with the said pinion, a slotted lever, a crank, the pin of which engages with the said slotted lever, a rod for connecting the slotted lever with the quadrant and means for adjusting the point of connection between said rod and one of the parts to which it is connected, the slot in the said lever, with which the crank-pin engages, being formed partly in the longitudinal direction of the lever and partly at an inclination thereto, so that at the beginning and finishing of the insertion and withdrawal of the wires by the slide-box the latter will be moved slowly, and quickly during the intermediate portion of the movement, substantially as, and for the purposes, described.

3. In a loom for weaving looped or piled fabrics the combination of a crank-shaft, a bottom shaft, gearing for transmitting motion from the crank-shaft to the bottom shaft so that the latter makes one revolution to two of the former, a cross-shaft at right angles to the bottom shaft, bevel-gearing for transmitting motion from the bottom shaft to the said cross-shaft so that the latter will make one revolution to two of the crank-shaft for two-shot fabrics or one revolution to three of the crank-shaft for three-shot fabrics, a slotted lever with which the crank or crank-disk of the cross-shaft, at right angles to the bottom shaft, engages, a slide-box for inserting and withdrawing the wires, a rope, pulleys over

which the said rope runs, a pinion upon the axis of one of the said rope-pulleys, a toothed quadrant engaging with the said pinion, a slotted lever, a crank engaging with the slot in the same lever and a rod adjustably connected with the quadrant and with the slotted lever, substantially as described.

4. In a loom for weaving looped and piled fabrics and wherein the slide-box is traversed by means of a rope running over pulleys, the combination with one of the said pulleys, of a pinion mounted upon the axis of the said pulley, a quadrant engaging with the said pinion and a lever and rod for transmitting motion to the quadrant, the said quadrant being slotted so as to permit the point at which the rod is connected to the quadrant to be moved toward or away from the axis of the said quadrant, substantially as, and for the purpose, described.

5. In a loom for weaving looped or piled fabrics the combination with a bottom shaft, a crank-shaft, gearing for connecting the said two shafts so that the latter makes two revolutions to one of the former, a slide-box for inserting and withdrawing the wires and mechanism for varying the traverse of the said slide-box, and comprising a rope, pulleys upon which the said rope runs, a pinion mounted upon one of the said pulleys, a quadrant engaging with the said pinion and a lever and connecting-rod for transmitting motion to the said quadrant, of a treadle-box mounted loosely upon the bottom shaft and having a gear-wheel engaging with a gear-wheel fixed on the crank-shaft, two disks on the bottom shaft each provided with a single striker the said two strikers being arranged diametrically opposite to one another and two picking-shafts adapted to be alternately operated by the strikers, the gearing between the treadle-box on the bottom shaft and the crank-shaft being so proportioned that when weaving two-shot fabrics the treadle-box makes one revolution to four of the crank-shaft and for three-shot fabrics one revolution to six of the crank-shaft, substantially as described.

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