

(No Model.)

4 Sheets—Sheet 1.

R. BROWNRIDGE & P. BOND.

LOOM.

No. 353,201.

Patented Nov. 23, 1886.

FIG:1.

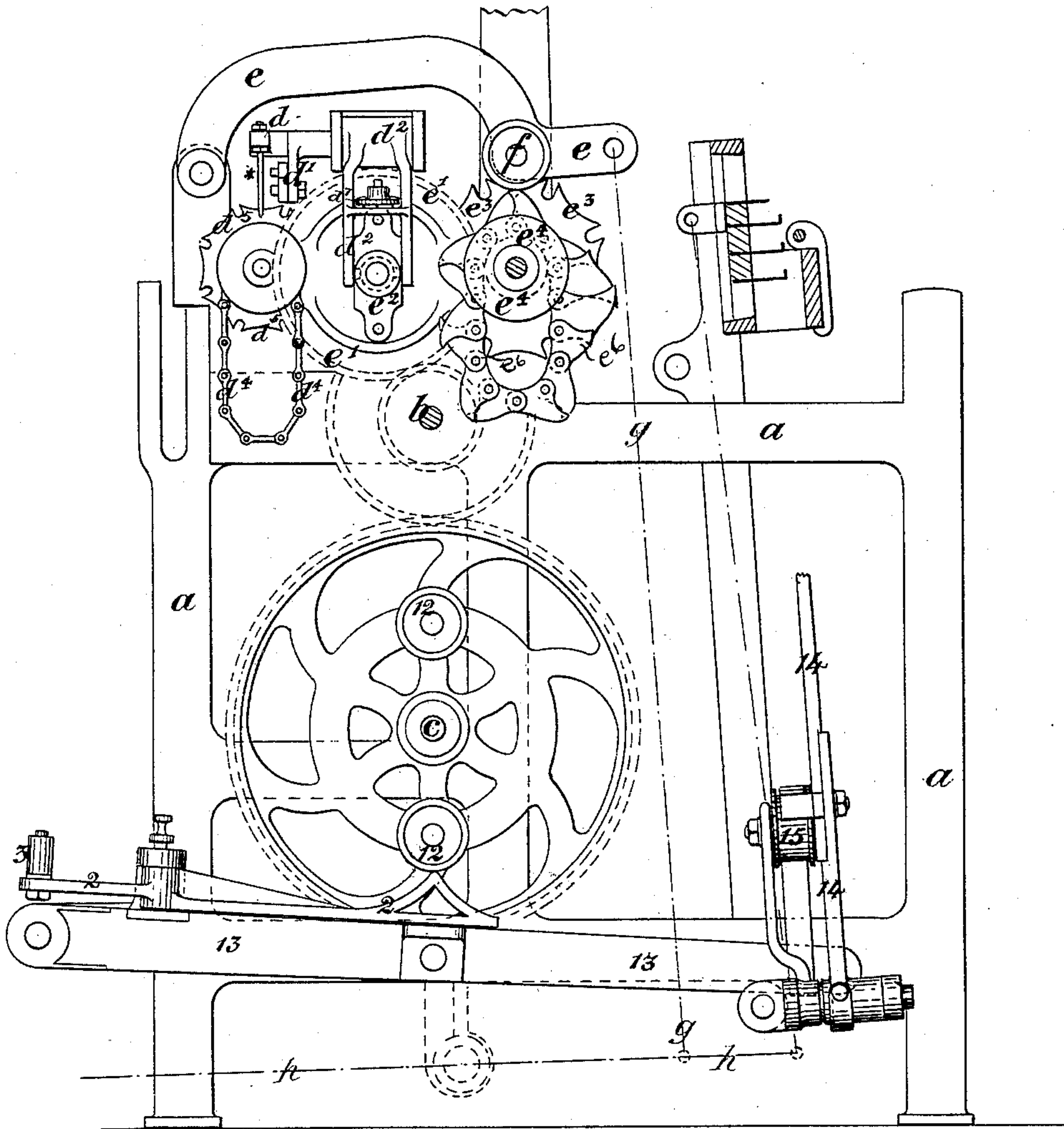
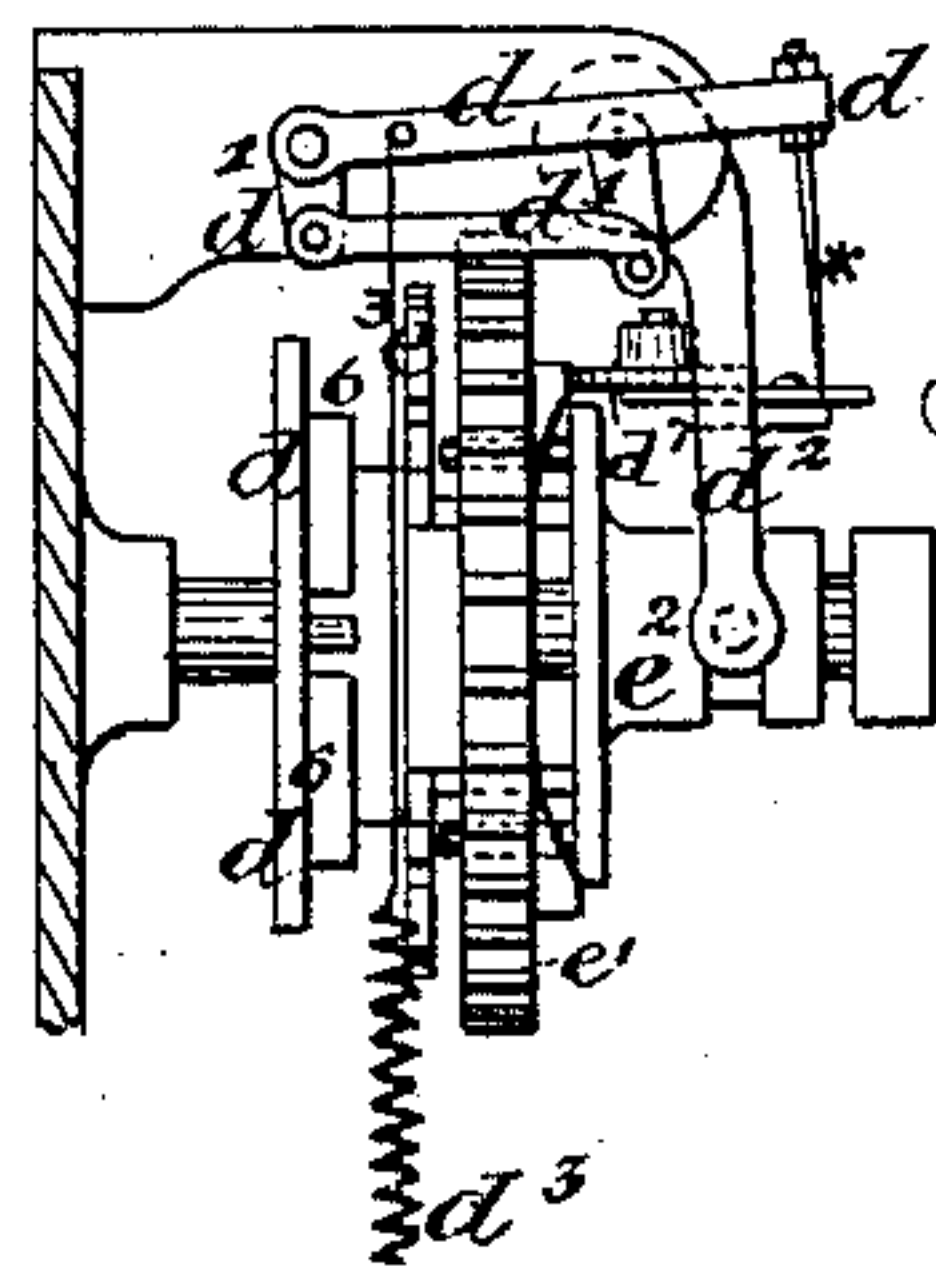


FIG:2.

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Howson & Sons

(No Model.)

4 Sheets—Sheet 2.

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FIG: 1 a

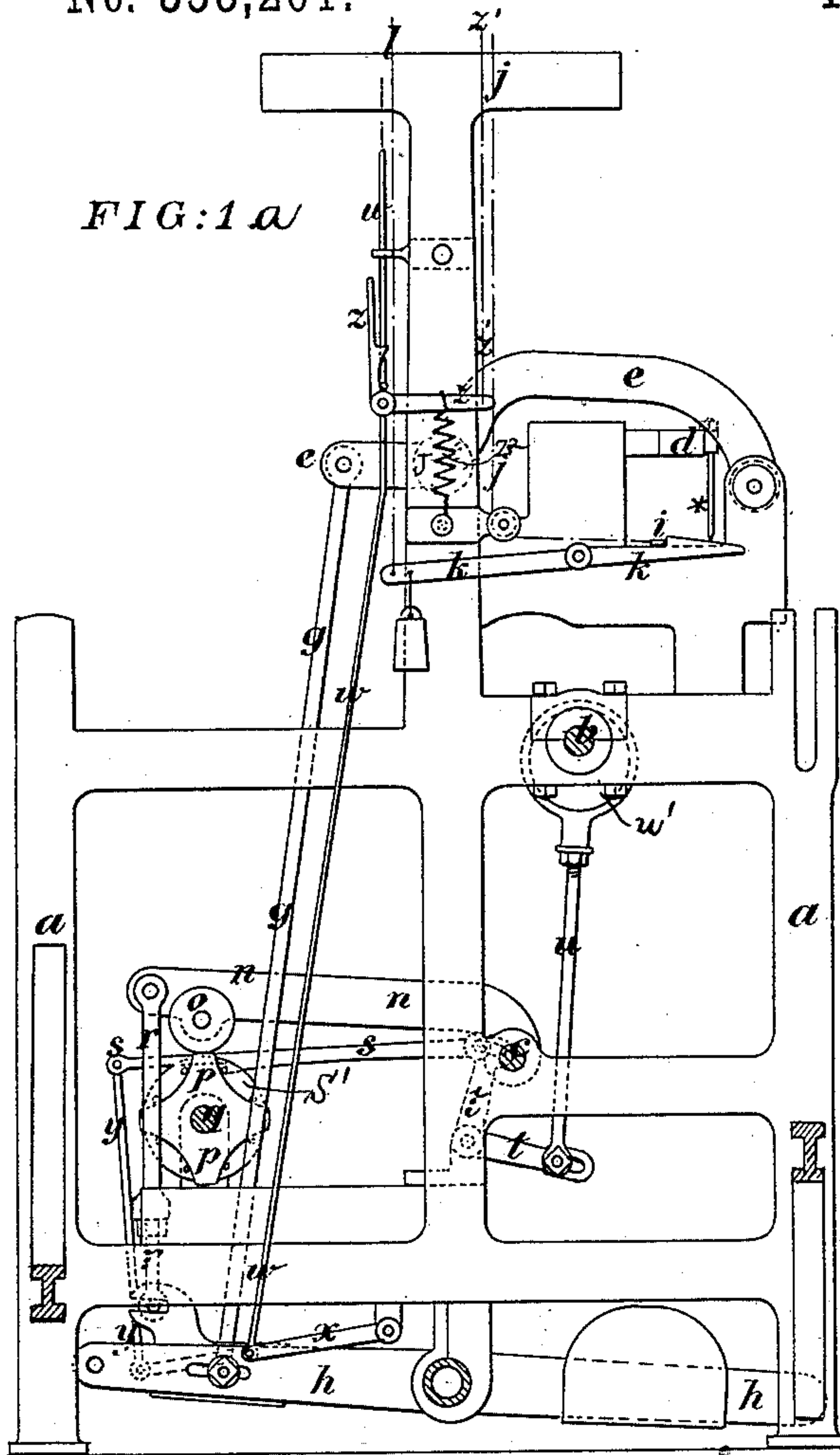


FIG: 2 a

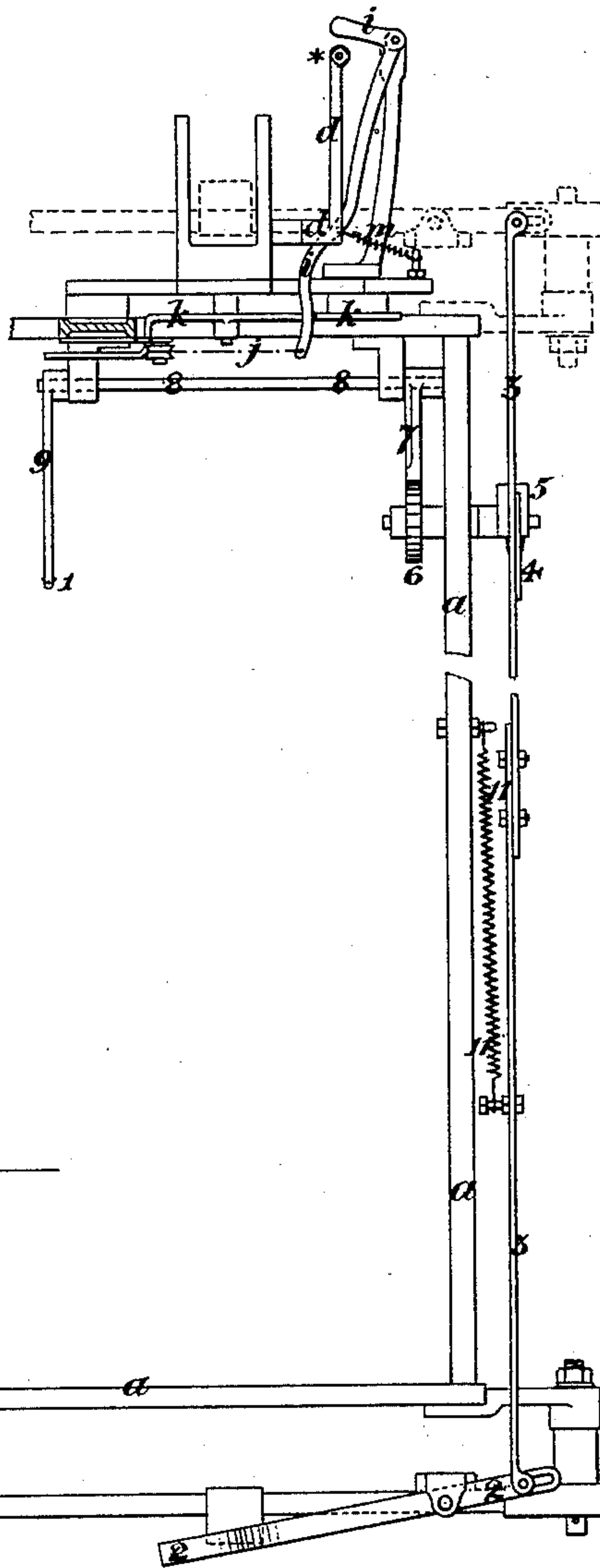
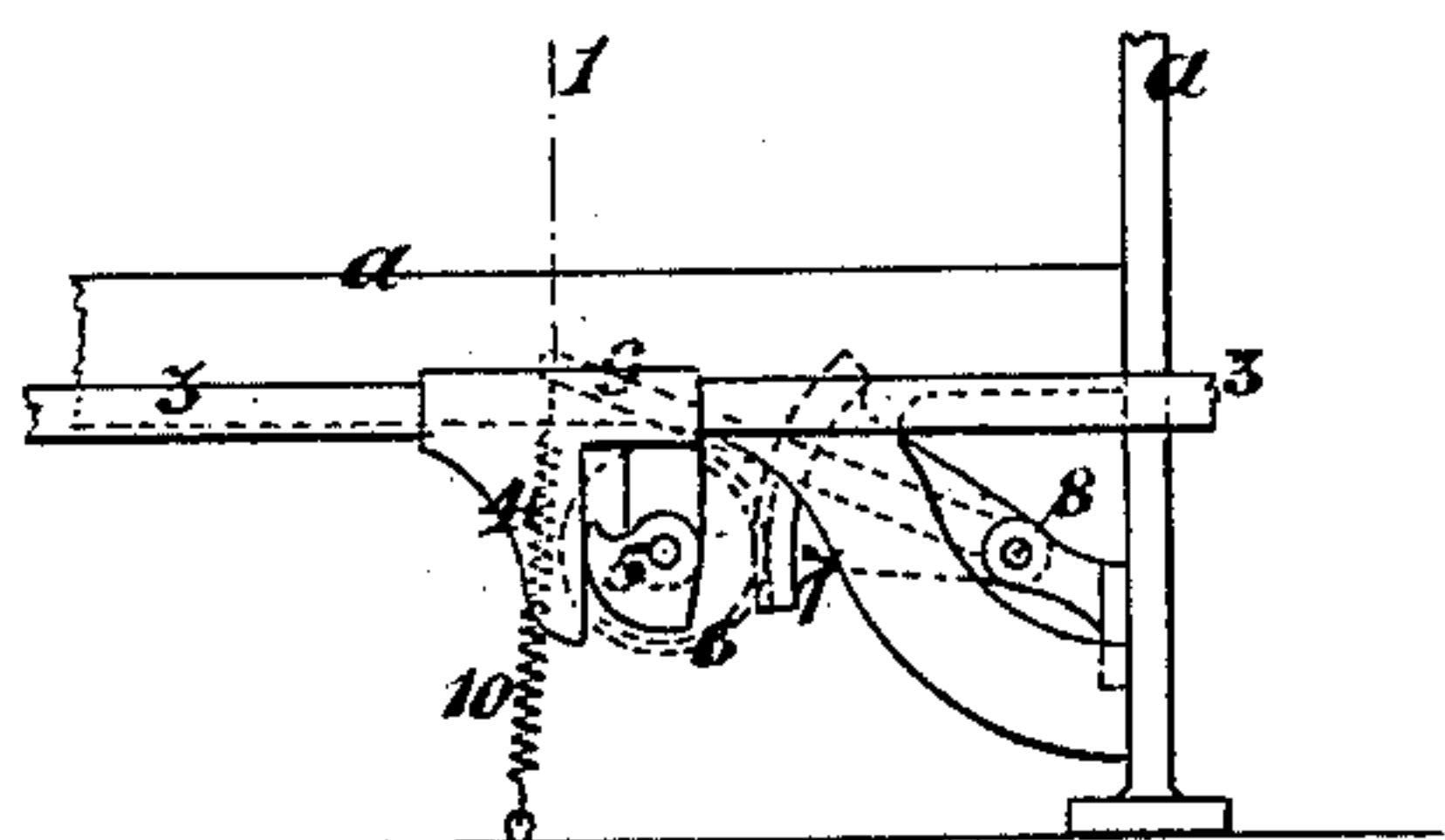


FIG: 3.



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(No Model.)

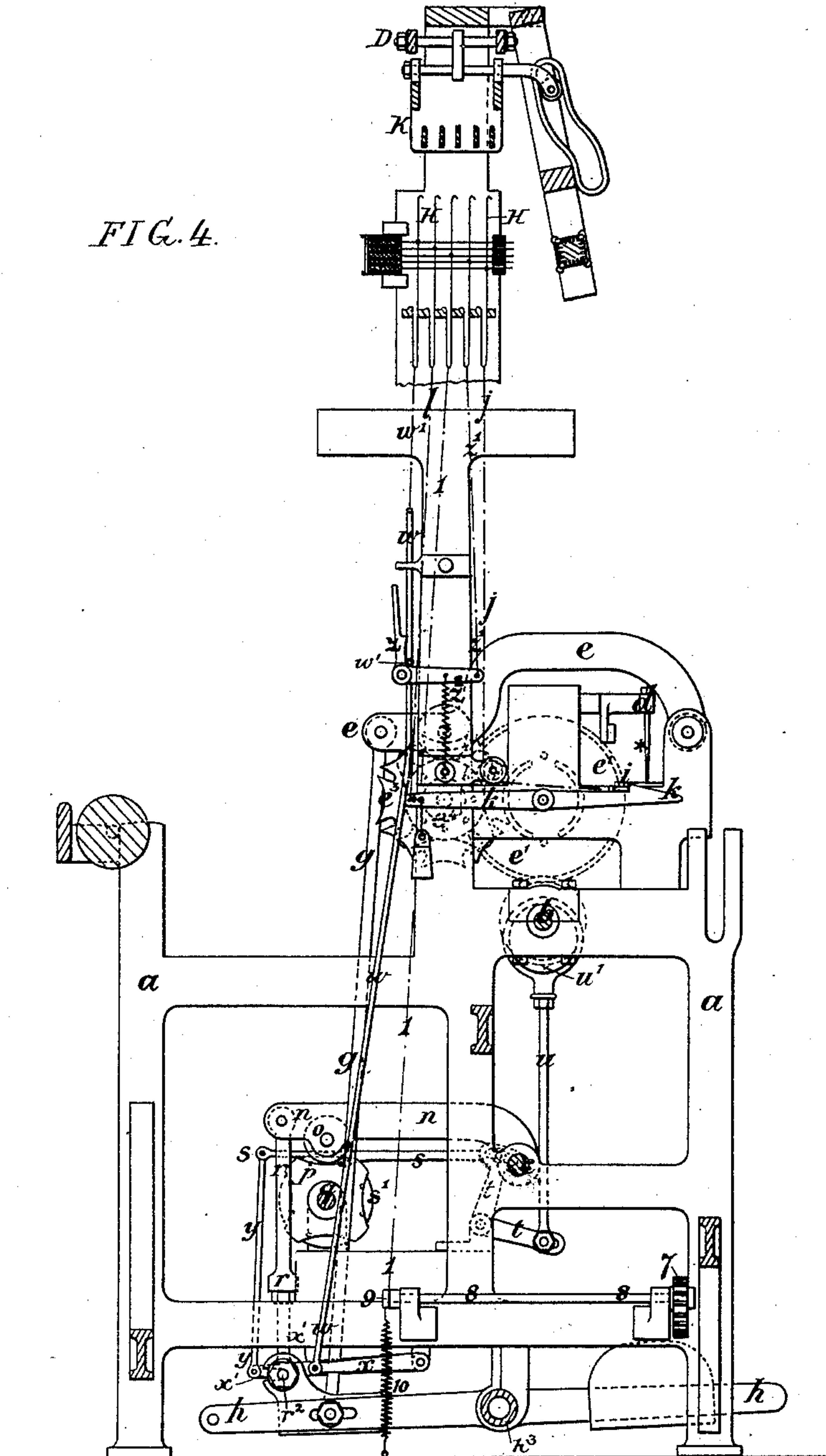
4 Sheets—Sheet 3.

R. BROWNRIDGE & P. BOND.

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Witnesses
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4 Sheets—Sheet 4.

R. BROWNRIDGE & P. BOND.
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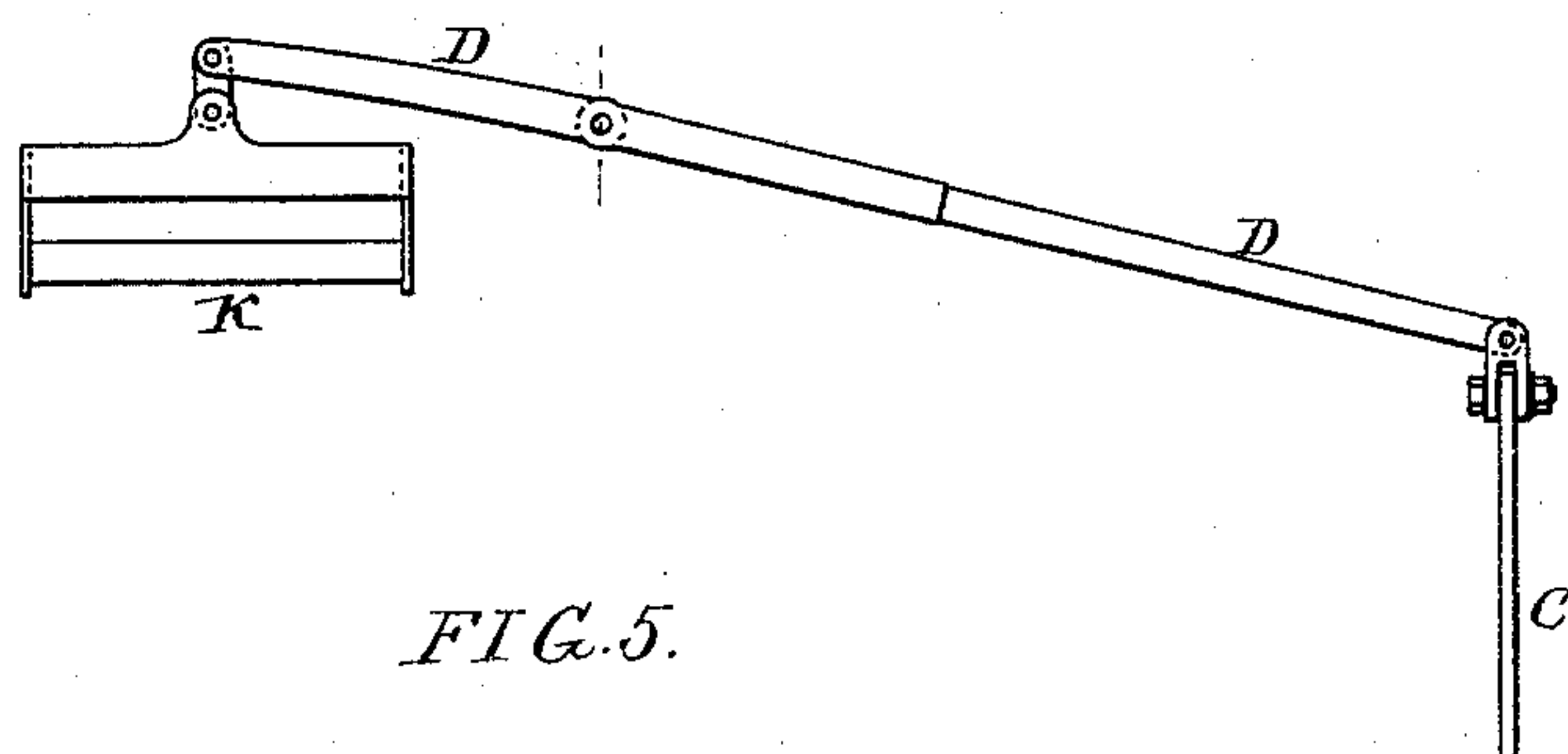
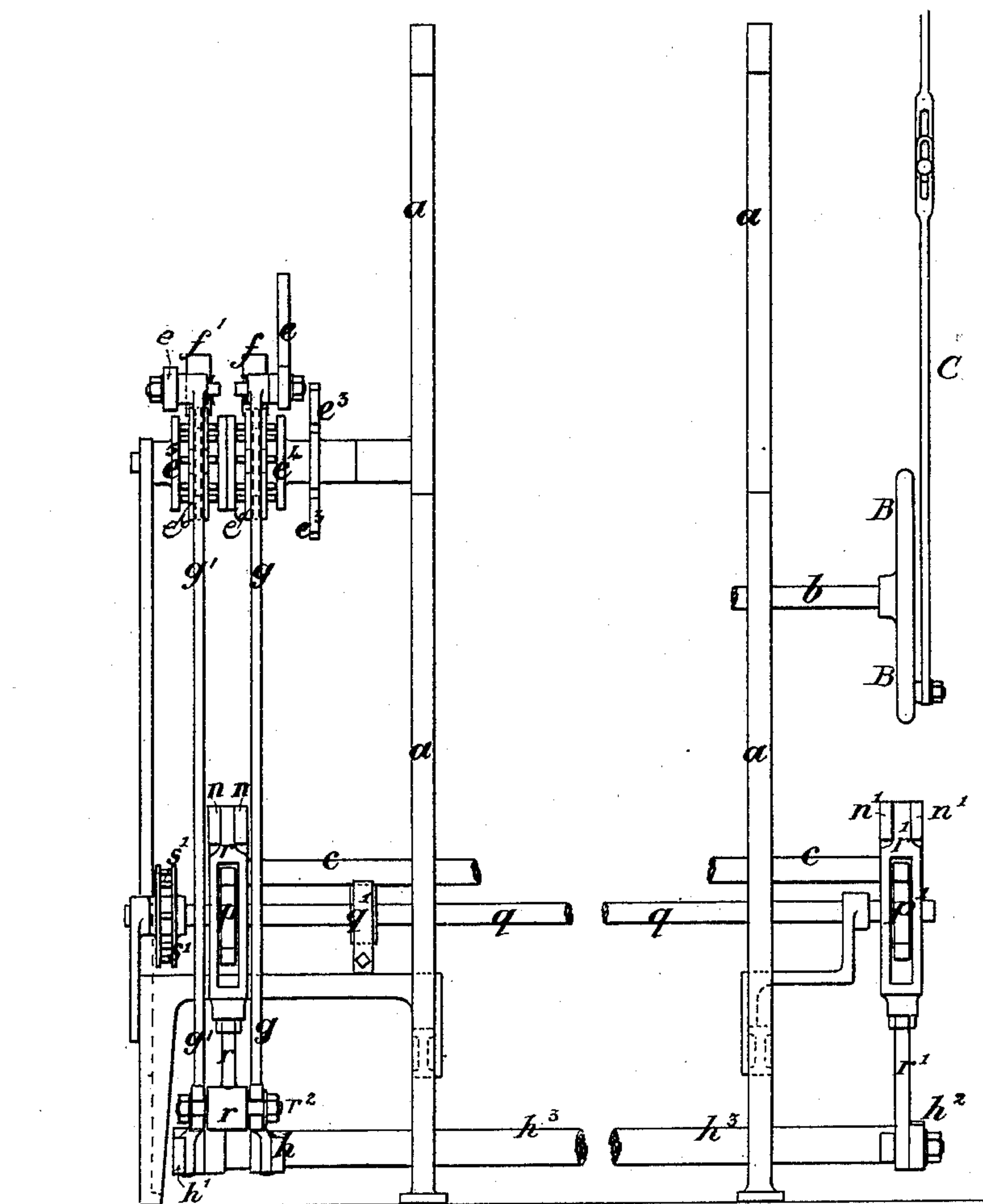


FIG. 5.



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UNITED STATES PATENT OFFICE.

ROBERT BROWNRIDGE AND PETER BOND, OF MACCLESFIELD, COUNTY OF
CHESTER, ENGLAND.

LOOM.

SPECIFICATION forming part of Letters Patent No. 353,201, dated November 23, 1886.

Application filed March 28, 1884. Serial No. 125,878. (No model.) Patented in England September 12, 1883, No. 4,364.

To all whom it may concern:

Be it known that we, ROBERT BROWNRIDGE and PETER BOND, subjects of the Queen of Great Britain, and both residing at Macclesfield, in the county of Chester, England, have invented Improvements in the Construction of Looms for Weaving, (for which we have obtained a patent in Great Britain, No. 4,364, dated September 12, 1883,) of which the following is a specification.

This invention relates to a certain class of looms employed for weaving checks, cross-stripes, and other designs by means of "drop-boxes" with several shuttles, the object of the invention being to dispense with the cylinder and pattern-chain usually employed in connection with the "peg" for working the drop-boxes, and to work both the drop-boxes and the picking motion from the Jacquard machine.

The invention is designed, principally, for looms for weaving silk; but it is also applicable for weaving woolen checks, ginghams, and other similar fabrics, and in order that our invention may be clearly understood we have annexed hereunto four sheets of drawings illustrative thereof, in which—

Figure 1 is an end elevation, partly in section, of the apparatus which is now in use and on which our improvements are based. Fig. 2 is a sectional side view of part of the same. Fig. 1^a is a side elevation of part of our improved apparatus as seen from the inside of the loom. Fig. 2^a is a sectional plan view of part of our improvements. Fig. 3 is a view of part of the devices for controlling the picking mechanism. Fig. 4 is a vertical section of the loom, showing in elevation the various devices for controlling the shuttle-box mechanism and a portion of the picking mechanism; and Fig. 5 is a detached front view of part of the devices.

a a is the frame of the loom. *bb* is the crank-shaft, and *c c* the tappet-shaft. *dd* is the lever which carries the peg, as usual. *ee* represent one of the ordinary levers, carrying a bowl, *f f*, and connected at one end, as usual, by a link, *g*, to the lever *h h*, Figs. 1 and 1^a, which works the drop-box, as in the looms now in use.

In the apparatus at present employed the

peg and lever *d* are raised and lowered by means of the short levers and links *d' d'*, (see Figs. 1 and 2,) actuated by a bowl, *d'*, on the forked lever *d² d²*, which bowl runs upon the inclines shown on the toothed wheel *e' e'*. As the bowl runs up the incline the lever *d d* is raised, and the spring *d³ d³* pulls it down as the bowl follows the opposite slope of the said incline. Should the peg, however, meet an unperforated card in the chain *d⁴ d⁴*, the spring *d³ d³* cannot pull it down, and the lever *d² d²* consequently is held in its position. This lever *d² d²* at its extremity takes into a groove on a sliding boss, *e² e²*, carrying pegs, which are moved into or out of gear with the star-wheel *e³ e³*, which drives the pattern-barrel *e⁴ e⁴*. The chain *e⁶*, passing over this pattern-barrel, actuates the bowls *f f* and moves the lever *e e* into the position required for changing the shuttle. Should the peg meet with a perforated card in the chain *d⁴ d⁴*, the sliding boss *e² e²* will be moved by the lever *d² d²*, so that the pegs thereon come into gear with the star-wheel *e³ e³*, and the shuttle will be changed.

By our improvements we dispense with the ordinary cylinder and pattern-chain *d⁴ d⁴*, together with its star-wheel *d⁵ d⁵* and pegged disk *d⁶*, (see Fig. 2,) and instead thereof we place beneath the peg the shorter arm of a bell-crank lever, *i i*, (see Figs. 1^a and 2^a,) the other end of which is connected by a cord, *j j*, Fig. 4, to a hook, *H*, in the Jacquard machine. Whenever this hook is lifted, the cord *j j* pulls on the longer arm of the bell-crank lever *i i* and draws the shorter arm of the same away from under the peg, and a catch-lever, *k k*, holds it in position. A cord, *l l*, attached to another hook in the Jacquard machine pulls the catch-lever *k k* and releases the bell-crank lever *i i*, which, on being released, is then caused, by means of a retracting-spring, *m*, Fig. 2^a, to bring its shorter arm beneath the peg, and the shuttle is not changed. Thus it will be seen that the mechanism for operating the drop boxes is governed by two additional hooks in the Jacquard machine and additional holes in the pattern-cards thereof whenever changes are required to take place.

In working a pattern with four or five shuttles the lever *e* and a similar lever, *e*, Fig. 5,

which works the drop-box at the other side of the loom, are actuated in the usual manner by a pair of pattern-chains, e^6 , on barrels $e^4 e^5$, Figs. 1 and 5, as required; but for a pattern with three shuttles, especially for weaving pick and pick, we prefer to employ the apparatus as illustrated by Fig. 1^a in conjunction with the said barrels $e^4 e^5$, the chains of which are composed of links which lift and lower the levers $e e$ to the top and bottom positions. These links may be only sufficiently numerous to complete the circuit of the barrel over which they pass, instead of being very numerous and composed of links governing three positions of the shuttle-box in varying order of succession, as hitherto, somewhat after the manner shown (exaggerated) at Fig. 1.

In a suitable position (preferably at each end of the tappet-shaft) we mount a lever, n or n' , provided with a bowl, o , the lever n at the left-hand side of the loom working upon a cam, $p p$, on a shaft, q , the cam being formed with four projections and four depressions, so that as it is caused to revolve an eighth part of a revolution by a lantern-wheel, s' , Figs. 4 and 5, at one side of the loom, the lever n rises and falls alternately, and being connected by a link, r , in any convenient manner to the lever h , which works the box, alternately lifts or lowers the same.

The box at the right-hand end of the loom is worked by a lever, h^2 , at that end, as usual, Fig. 5, and this lever h^2 is connected by a detachable link, r' , to a lever, n' , acted on by a cam, p' , on the shaft q , in the same way as is the lever h . This lever h^2 is secured to a tubular shaft, h^3 , on which the lever h is free to turn, while another lever, h' , which is connected by a link, g' , to the second lever, e , controlled by the chain on the barrel e^5 , is fixed on the shaft h^3 , and serves, therefore, to transmit motion to the lever h^2 . These two levers h and h' , which are both connected to the link r by the pin r^2 , rise and fall together, and therefore both pattern-chains, which work the levers $e e$, are alike. When more than three shuttles are required, the link r can readily be disengaged from the levers $h h'$ by withdrawing the connecting-pin r^2 , Fig. 4, from the open-ended slots in the levers. The projections and depressions on the cam $p p$ are such that the lever $n n$ is raised into its middle position and lowered to the lowest thereby. The lantern-wheel s' is actuated by a pawl, $s s$, worked by a bell-crank lever, $t t$, and link $u u$, from an eccentric, w' , on the crank-shaft of the loom, and thus, as there are eight pegs on the lantern-wheel, the same will be moved round an eighth of a revolution at each revolution of the crank-shaft by the catch or pawl, when permitted to remain in engagement therewith. A cord from the Jacquard machine is attached to a wire, $w w$, passing down to a lever, x , on a short shaft, at the other end of which is a second lever, x' , connected by a link, $y y$, to the pawl $s s$. A projection, w' , on the wire w , is held, when the said wire is lifted by the

Jacquard machine, by a latch, $z z$, acted on by a spring, z^2 , which latch releases the wire again when the cord $z' z'$ is lifted by the Jacquard machine. Thus, if the pattern requires the top and middle shuttle to be changed alternately (pick and pick) for some time, the wire $w w$ is lifted, and with it the lever $x x$, thereby raising the pawl $s s$, so that it does not actuate the cam $p p$, but leaves it in the position shown in Fig. 4 of the drawings. The change is effected by the ordinary pattern-chain working against the bowl $f f$ of the lever e . If the bottom and top shuttles are required to work alternately, then the cam $p p$ is turned an eighth of a revolution by dropping the wire $w w$, Fig. 1^a, for one pick of the loom, and then raising it again. The pattern-chain works the lever $e e$, which can then drop to its lowest position. If the bottom and middle shuttles are required to work alternately, then the lever $i i$ is caused to come beneath the peg and thus stop the action of the ordinary pattern-barrel $e^4 e^5$, and the wire $w w$ being lowered, the cam p alone works the levers $h h'$.

We prefer to put a constant brake, q' , Fig. 5, of any suitable construction, on the shaft which carries the cam $p p$, to insure steadiness of action. The picking motion is also controlled by a cord, 11, connected to a hook in the Jacquard machine. (See Figs. 1, 2^a, and 3.)

The ends of the slide-tappets 2 2, against which the picking-bowls act, are connected together by the usual sliding bar, 3 3, near the center of which is a projecting bracket or finger, 4. Against this bracket or finger acts a cam, 5, worked by a spur-pinion, 6, and in gear with this spur-pinion is a toothed quadrant, 7, keyed on a short shaft, 8. On this same shaft 3 is fixed a lever, 9, to the end of which the machine-cord 11 is attached, so that whenever the corresponding hook in the Jacquard machine is raised, the cord 1, acting on the quadrant 7 through the lever 9, causes the spur-wheel 6 to revolve the cam 5, and the latter, acting against the bracket or finger 4, pushes the sliding bar 3 in one direction, and thus brings one of the slide-tappets 2 into action, as seen at Fig. 3. These slide-tappets 2 2 are acted upon by the usual picking-bowls, 12 12, (see Fig. 1,) which revolve the tappet-shaft. Fig. 1 shows the picking-lever 13 in its lowest position. This lever is attached to the ordinary picking-stick 14 by a strap passing over a pulley, 15, and thus, when it is pushed down by one of the bowls 12, this strap pulls the picking-stick quickly with it and shoots the shuttle across the race. As soon as the hook in the Jacquard machine falls and allows the cord to become slack, a spring, 10 10, (see Fig. 3,) pulls down the lever 9, and a spring, 11 11, attached to the sliding bar 3 3, Fig. 2^a, draws the latter in the reverse direction, and so puts the other slide-tappet into action. Thus the picking (as well as the changing of the boxes) is effected by additional hooks in the Jacquard machine.

In the Jacquard machine, illustrated in Figs.

4 and 5, we have shown the hooks *H* as adapted to be raised by a griffe, *K*, operated by a lever, *D*, connected by a link, *C*, to a crank-wheel, *B*, on the shaft *b*; but any other construction of jacquard may be used. This arrangement, it will be seen, is very simple, as only one card or link in each of the chains on the barrels *e*⁴ and *e*⁵ is required to every stripe in the pattern, even when the colors are arranged in the most irregular order.

We are aware that other devices have been invented and used for actuating the picking motion and the shuttle-boxes from the Jacquard machine; but

15 We claim as our invention—

1. The combination of the drop-box motion of a loom, a peg, ***, and devices, substantially as set forth, whereby the said peg controls the drop-box motion, with a lever, *i*, and the hook of a Jacquard mechanism connected to said lever to move it out of the way of the peg, and a retracting-spring for the lever *i*, substantially as described.

2. The combination of the operating-lever *h* of the drop-box motion of a loom, cam *p*, and

devices, substantially as described, whereby said cam controls the lever, with a pawl, *s*, devices, substantially as set forth, for reciprocating the pawl to turn the cam, Jacquard mechanism, and a link, *y*, levers *x x'*, shaft carrying said levers, and a wire, *w*, connecting a hook of the Jacquard mechanism with the said lever *x* to throw it into and out of action, all substantially as specified.

3. The combination of the picker-staff and strap, an operating-lever, 13, the tappet-shaft, picking-bowls, slide-tappet 2, and bar 3, carrying a finger, 4, with a cam, 5, Jacquard mechanism, and devices, substantially as described, connecting the hook of the jacquard with the cam to operate said bar 3, all substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ROBERT BROWNRIDGE.

PETER BOND.

Witnesses:

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JNO. HUGHES.