

(No Model.)

3 Sheets—Sheet 1.

G. CROMPTON & H. WYMAN.

M. C. CROMPTON, Administratrix of G. CROMPTON, Dec'd.

LET-OFF MECHANISM FOR LOOMS.

No. 364,807.

Patented June 14, 1887.

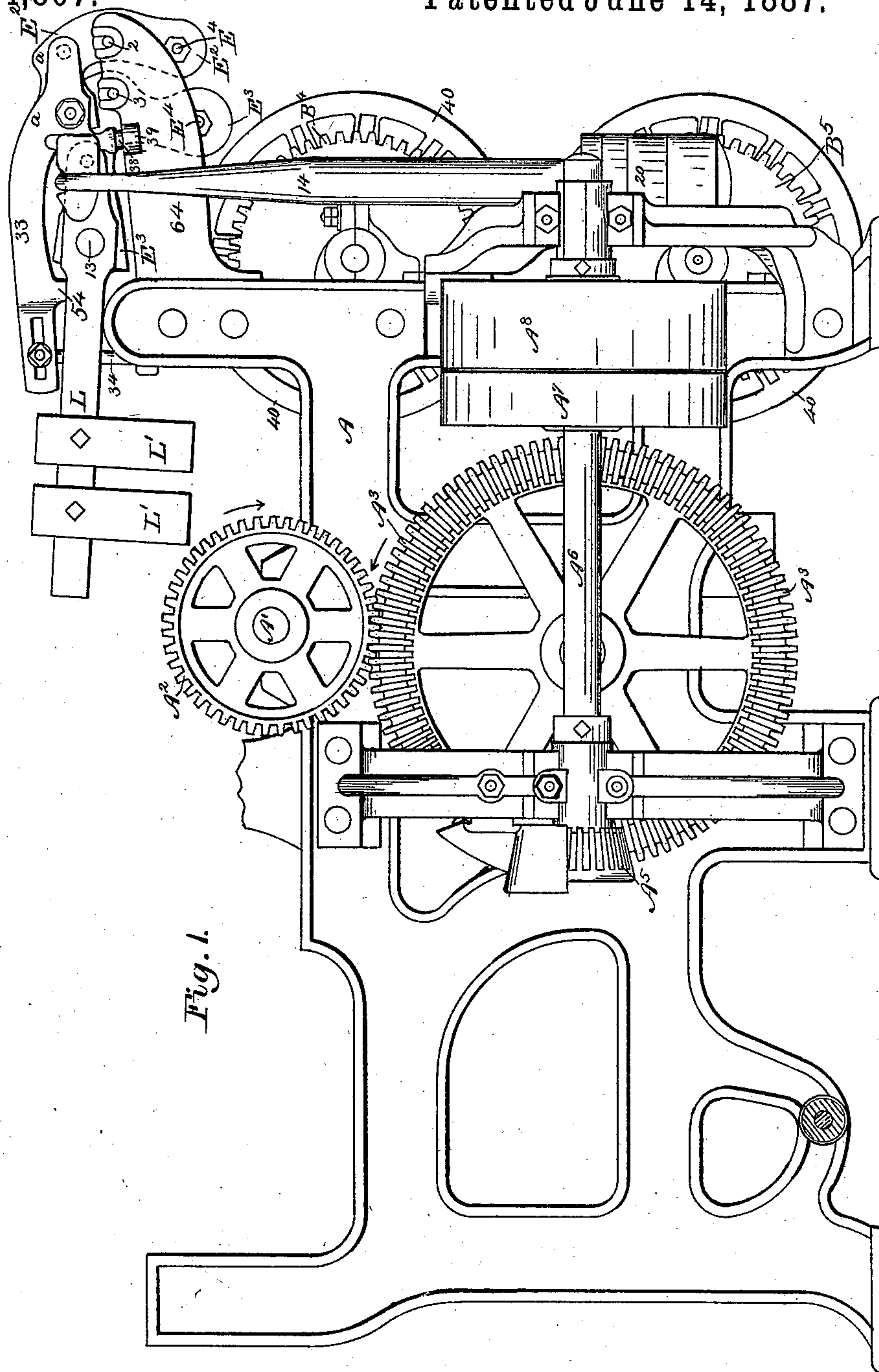


Fig. 1.

Witnesses
A. O. Ome

John F. C. Prinkert

Inventors

George Crompton and Horace Wyman.

by Crosby Gregory

Attys.

(No Model.)

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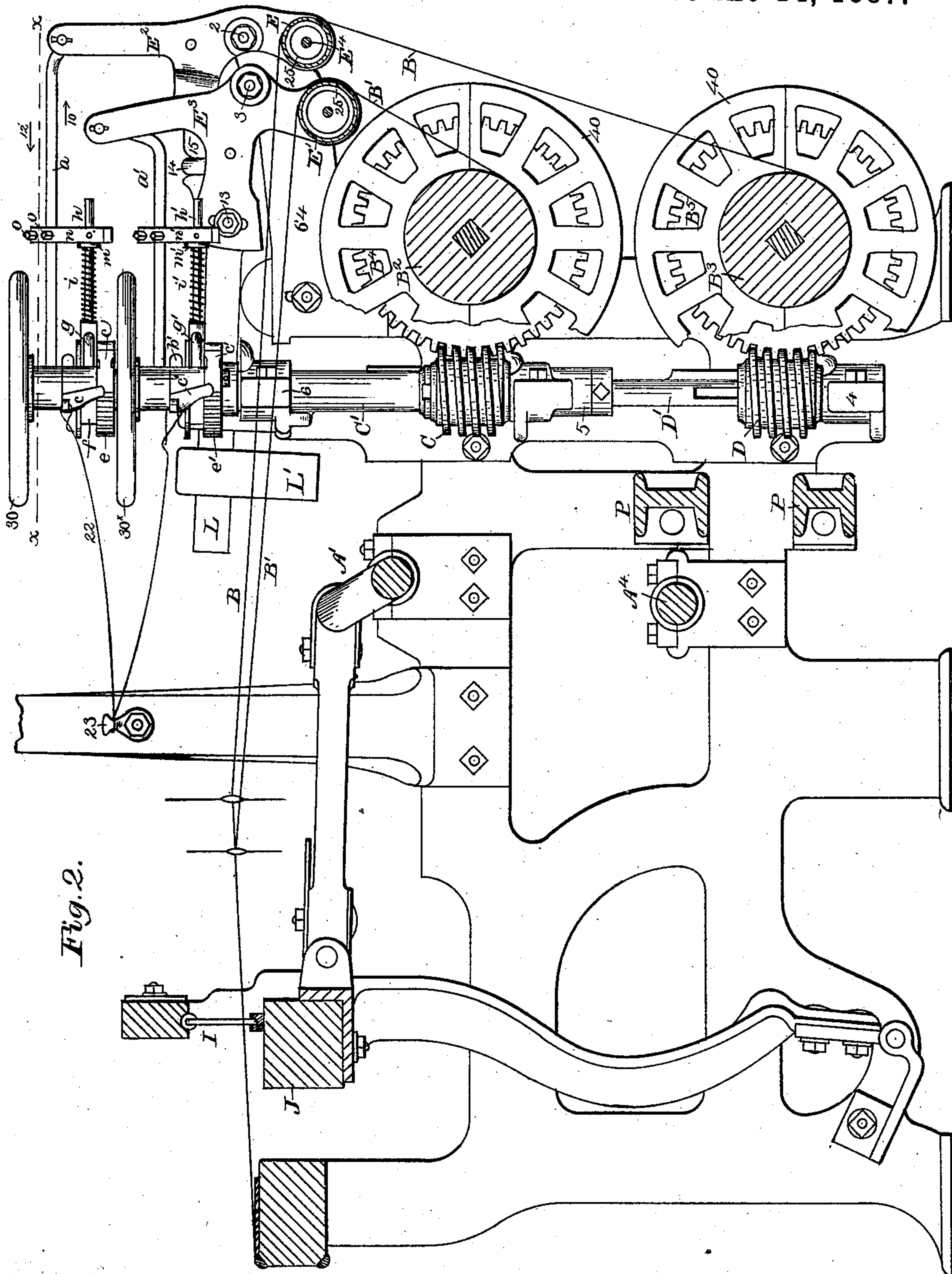


Fig. 2.

Witnesses,
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(No Model.)

3 Sheets—Sheet 3.

G. CROMPTON & H. WYMAN.

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Fig. 7.

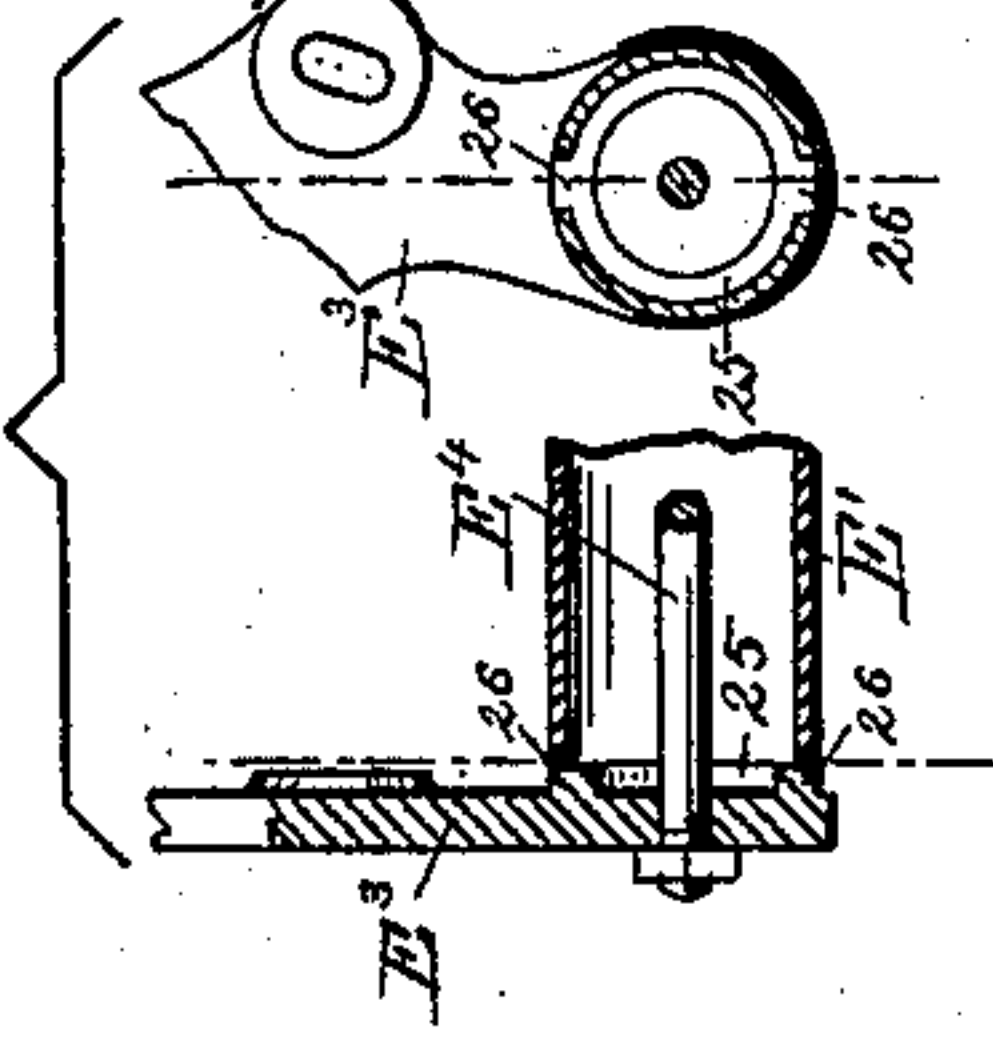


Fig. 5.

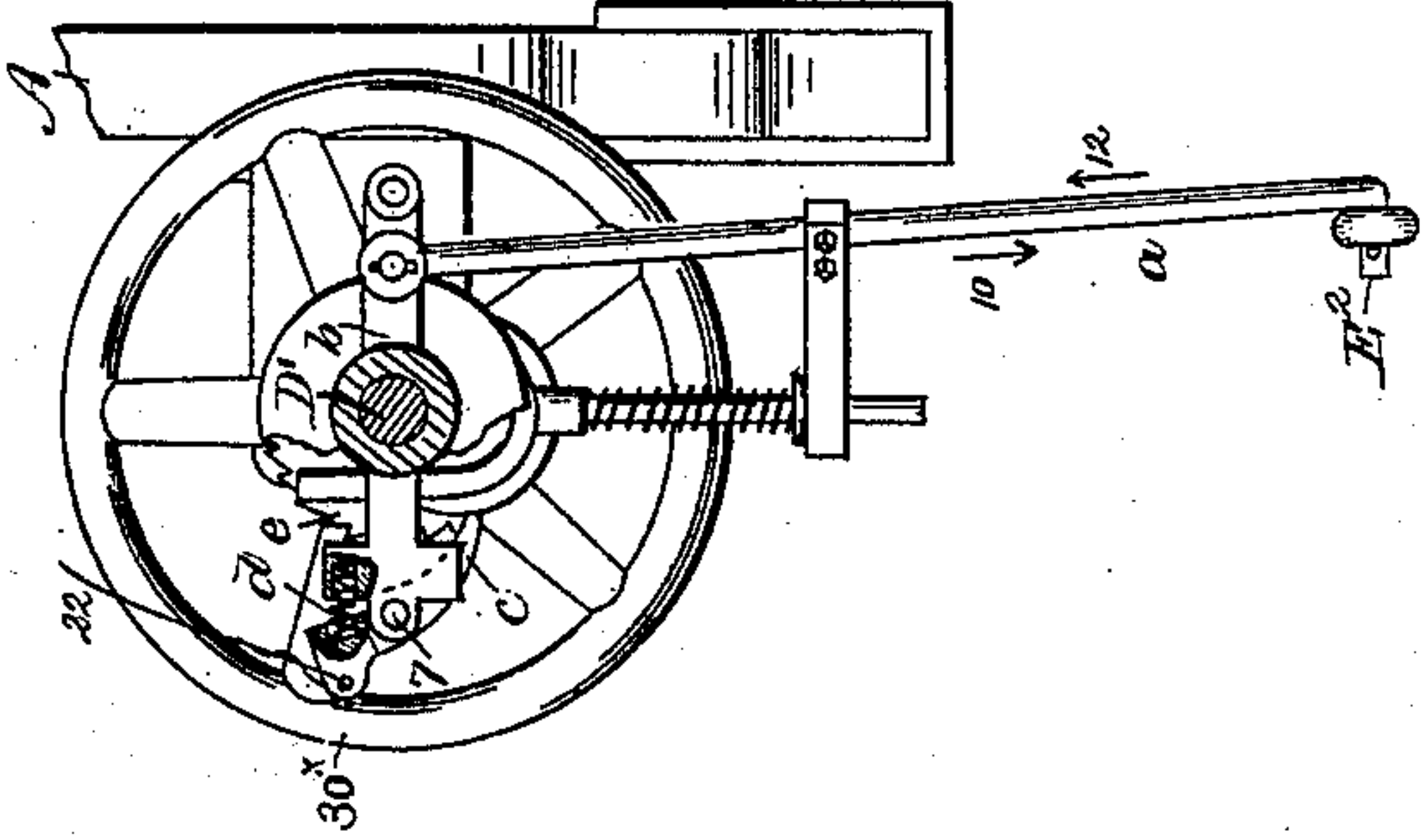


Fig. 6.

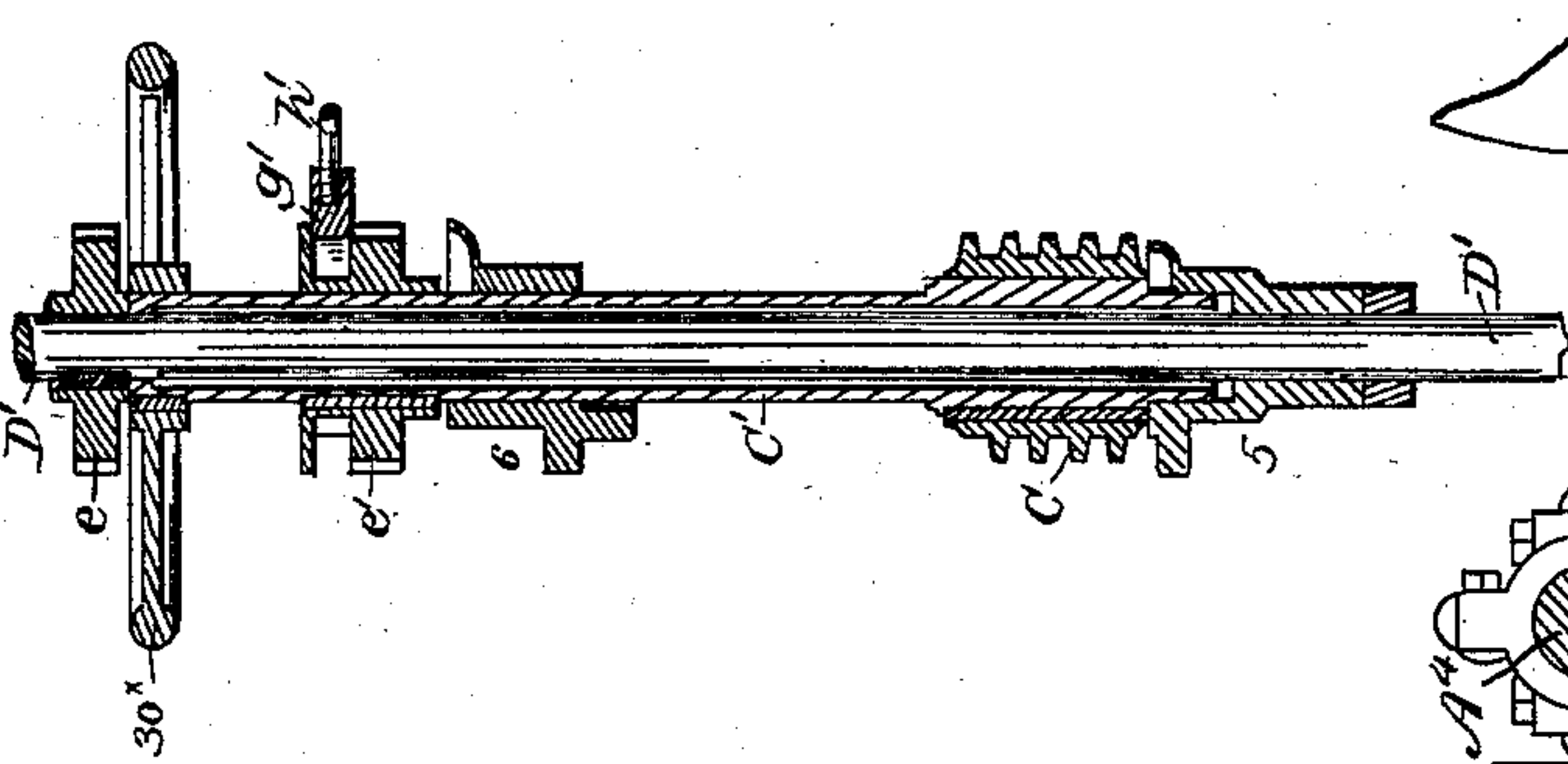


Fig. 4.

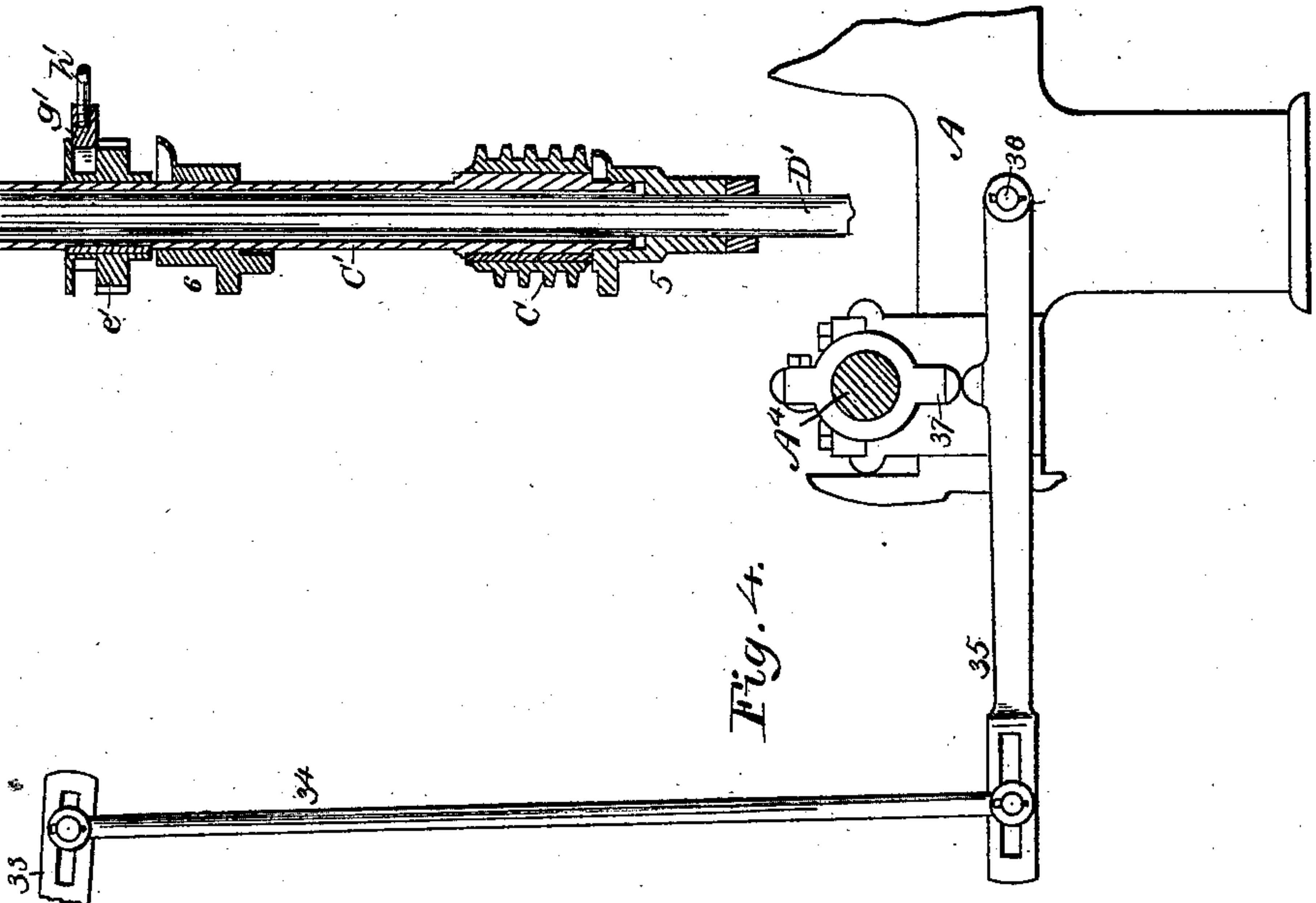
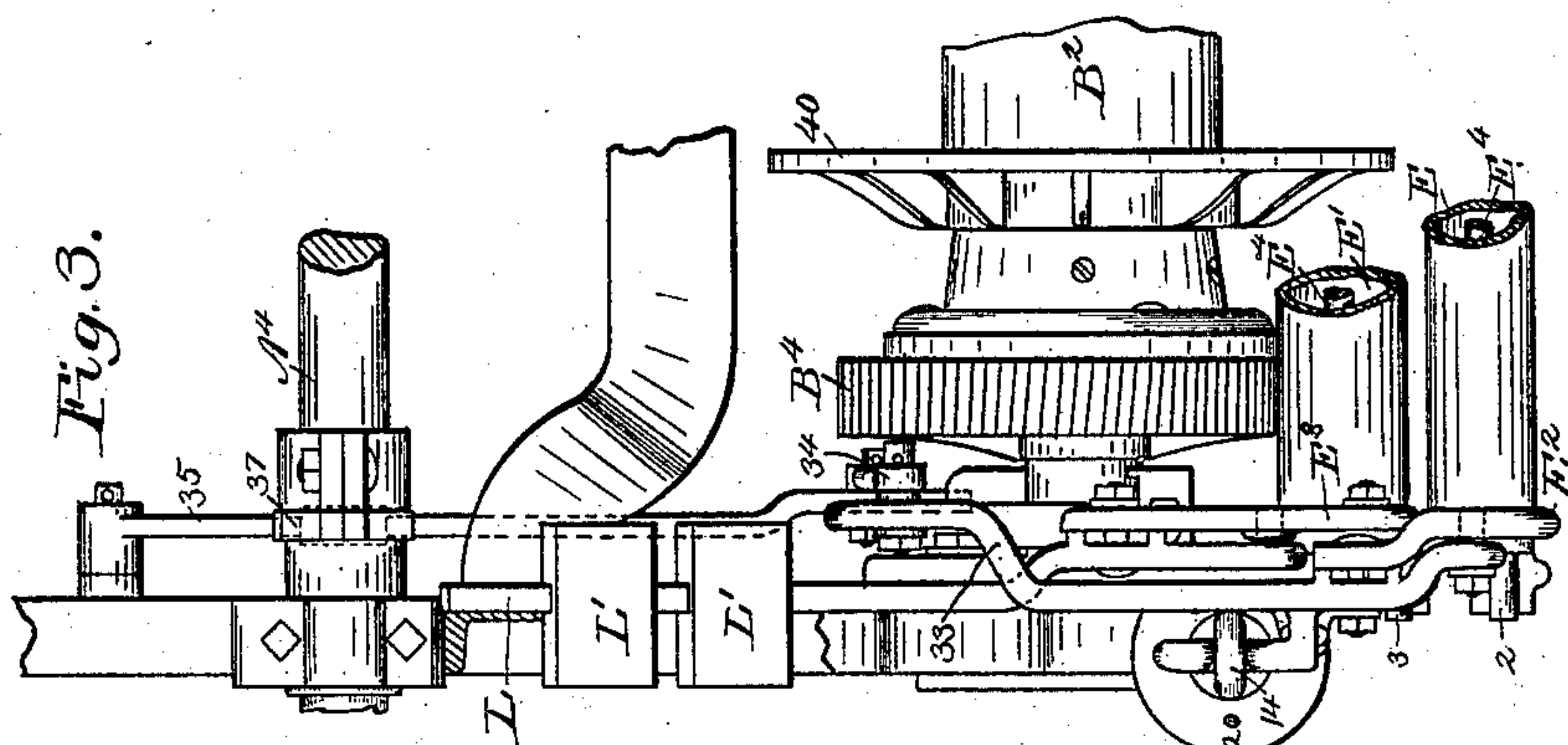


Fig. 3.



Witnesses.

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John F. C. Perkins

Inventor

George Crompton and Horace Wyman

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UNITED STATES PATENT OFFICE.

GEORGE CROMPTON AND HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO SAID GEORGE CROMPTON; MARY C. CROMPTON ADMINISTRATRIX OF SAID GEORGE CROMPTON, DECEASED.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 364,807, dated June 14, 1887.

Application filed May 7, 1883. Serial No. 94,152. (No model.)

To all whom it may concern:

Be it known that we, GEORGE CROMPTON and HORACE WYMAN, both of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Let-Off Mechanisms for Looms, of which the following description in connection with the accompanying drawings is a specification, like letters on the drawings representing like parts.

This invention in looms has especial reference to let-off mechanism, whereby two warp-beams may be operated at one end of the loom.

Our invention consists, essentially, in two warp-beams, their gears, and two worms to engage and move them, combined with two concentric shafts, to which the said worms are attached, and with suitable means to engage and rotate the said shafts.

In connection with the parts just referred to we have arranged two independent whip-rolls to regulate the movement of the pawls and ratchets which give movement to the said shafts.

Other features of invention, to be hereinafter described, will be specifically designated and pointed out in the claims at the end of this specification.

Figure 1 is a right-hand side elevation of a loom embodying our invention, viewing the loom in front of the breast-beam, the lay being, however, omitted; Fig. 2, a vertical section of the same just within the frame-work at the left-hand side of the loom, the said figure showing, however, the lay; Fig. 3, a top view of part of the right-hand end of the loom; Fig. 4, a detail just within the inner side of the right-hand end of the loom; Fig. 5, a sectional detail just below the dotted line *x x*, Fig. 2, but partly broken out, of one of the pawl-and-ratchet wheels and brake; Fig. 6, a partial longitudinal section of the two shafts which actuate the two worms and some of their attached parts, to be described; and Fig. 7 shows details of one of the whip-rolls.

The frame-work *A* has bearings to support its crank-shaft *A'*, having a gear, *A²*, which is engaged by a gear, *A³*, on the cam or picker-operating shaft *A⁴*, the latter gear being driven by a bevel-gear, *A⁵*, on a shaft, *A⁶*, having

usual fast and loose pulleys, *A⁷ A⁸*, which will be driven by a belt.

The loom herein described is to control two sets, *B B'*, of warp coming from two warp-beams, *B² B³*, having usual heads or flanges, 40, and provided, respectively, with worm-gears *B⁴ B⁵*, which are engaged, respectively, by worms *C D*. The warp *B* is passed over a whip-roller, *E*, and the warp *B'* over a whip-roller *E'*, the said whip-rollers being composed of tubes held between pendent arms *E² E²* and *E³ E³*, respectively, one arm at each end of a whip-roll. Instead of extending the fulcra of the said arms across the loom, as usual, the said arms are each supported by short journals 2 3, extended from but one side thereof between their upper ends and their pendent lower ends which support the whip-roll, such manner of supporting the said arms enabling the rod which is usually extended across the loom above the warp-threads to be dispensed with, such being commonly used when the journals for the arms are part of the rod which is employed to connect the said arms together.

In order that both ends of the whip-rolls *E E'* may vibrate through equal distances at each end, notwithstanding inequality of the weights or inequality in the pressure of the warp-threads thereon at either end, it is necessary that the said whip-rolls be rigidly or fixedly attached to the said arms between their ends.

For convenience of construction and lightness we have shown the whip-rolls as composed of tubes which are rigidly secured to the pendent arms by means of long bolts *E⁴*, they being extended through the said tubes and arms, while the tubes are fitted upon annular hubs 25, provided, preferably, with lugs 26, as in Fig. 2, said lugs 26 entering slots at the ends of the tubes and preventing them from turning on the arms. The whip-rolls thus held between the lower ends of the arms *E²* and *E³* by the long bolts *E⁴* constitute a rigid structure suitable to withstand and resist any unequal strain which may be exerted upon the whip-rolls at either end and leave the warps without rods or shafts extended across their

upper portions. The tubes move in the arc of a circle about the centers or journals 2 3 of the arms $E^2 E^3$.

The arm E^2 , at the left-hand side of the loom, has pivoted upon it a connecting-rod, a , which is attached to a pawl-carrier, b , (see Fig. 5,) the hub of which is made to surround the shaft D' , carrying the worm D , the said shaft having its bearings at 4 and 5, and having its upper end extended through the tubular shaft C' , carrying the worm C , the shaft C' having its bearings at 5 6. The pawl-carrier b has pivoted to it at 7 a pawl, c , acted upon by a spring, d , the said pawl engaging a ratchet, e , fast on the shaft D' . The hub of the ratchet e has an annular groove, f , which receives a forked brake, g , the stem of which is extended through a spiral spring, i , and then through a washer, m , resting against an arm, n , adjustably secured to the connecting-rod a by bolts o .

Strain on the whip-roll by the warp, as the reed I of the lay J , actuated by the cranks of the shaft A' through usual connecting-rods, J^2 , strikes the fell of the cloth, carries the whip-rolls forward, and at the same time causes the connecting-rod a to be moved backward; and when the strain is sufficient to move the connecting-rod far enough in the direction of the arrow 10, Figs. 2 and 5, to place the pawl of the pawl-carrier back of another tooth (one or more) of the ratchet e , as the demands of the filling may require, then the said pawl, as the lay retires from the fell of the cloth, will turn the ratchet and shaft D' the distance of one or more teeth, the pawl-carrier and arms E^2 being then turned in the direction of the arrow 12 by suitable weights, 20. The weights 20 are shown as placed on rods 14, one for each arm E^2 , only one of the said rods being fully shown, and that in Fig. 1. These weights constitute means for returning the whip-roll to its normal position. The extent of backward movement of the said whip-rolls is limited by the foot 38 acting on the ear 39 of the bracket 64, the said foot and ear constituting a back-stop. The pawl c has a cord, 22, attached to it, which is also joined with the pawl c' , hereinafter referred to, and extended over a hook, 23, near the front of the loom. The shaft D' has a hand-wheel, 30, by which to turn it by hand. The brake g bears continually upon the hub of the ratchet and prevents the rotation of the shaft D' farther than it is intended that the pawl should turn it, and as the pawl operates to carry the ratchet around the spring i is compressed, thus increasing the pressure of the brake and preventing any over-running.

In our Patent No. 264,864 the brake is actuated by the same devices which move the pawl that turns the ratchet, and is not connected in a yielding manner with the arm therein marked c^2 , and the said brake comes to a bearing against the hub of the ratchet only as the pawl completes the movement of the same. In that patent the pressure of the brake is not

increased gradually from the commencement to the completion of the movement of the ratchet, as in this our present invention.

The arm E^3 , also at the left-hand side of the loom, has a connecting-rod, a' , which engages a pawl-carrier, b' , it having a pawl, c' , which acts on a ratchet, e' , fast on the tubular shaft, C' , having the worm C . The hub of the ratchet e' is acted upon by a friction-brake, g' , and a rod, h' , which rod is surrounded by a spring, i' , and washer m' , and is extended through an arm, n' , attached to the rod a' , all substantially as the parts before described, and having like letters of reference, except the designating "primes." The arms E^3 have extensions L , bolted thereto at 13, and are acted upon by the weights L' .

The warp B for the face of the fabric which is to be wrought in raised figures needs to be held under less strain and to have a greater movement, and consequently each whip-roll operates independently of the other in controlling the warp extended over it.

The arm E^2 at the right-hand end of the loom is provided with an extension, 33, having a foot, 54, which rests upon the extension L of the arm E^3 , and the extension 33 has attached to it a rod, 34, joined at its lower end to a lever, 35, pivoted at 36 and acted upon by the tappets 37 on shaft A^4 to positively move the said arms $E^2 E^3$ and the whip-rolls into their extreme backward positions after each beat of the lay should the weights provided for such purpose be for any reason insufficient.

By extending one of the worm-carrying shafts through the other, thus making their axes concentric, or giving them the same center of motion, it is possible to greatly economize space and simplify the construction of the parts and enable the operator to readily adjust or alter the let-off at one end of the loom. To enable us to yet further compact the loom and economize space, the cross-girders P are carried in close to the shaft A^4 .

The weights 20 on rods 14, hung on arms E^2 , and the weights L' on the extensions L of the arm E^3 constitute means for pressing the whip-rollers against the warp in a yielding manner to follow up any slack therein or to permit the warp to yield to strain thereon.

The hand-wheel on the shaft c' is marked 30^x.

We claim—

1. The two warp-beams and their gears and the two worms CD to engage and move them, combined with the two concentric shafts $C' D'$ and means to engage and turn the said shafts, substantially as described.

2. The two whip-rolls, their supporting-arms, and the two concentric shafts $C' D'$, their worms, and the warp-beams and their gears, combined with means for operating the whip-rolls and means intermediate the said whip-rolls and the said shafts to turn the latter as the whip-rolls are moved about their journals 2 3, substantially as described.

3. The loom-frame, the arms E^2 , pivoted at opposite sides thereof and provided with hubs 25, and a tube fitted upon the said hubs between the said arms, combined with a bolt extended through the said tube and connecting the said arms, all substantially as shown and described.

4. The shaft D' , its connected ratchet and pawl and pawl-carrier, the rod a , and the arms 10 E^2 and whip-roll, and means to operate it, combined with the brake and connecting devices between it and the rod a , whereby the pressure of the brake to check the rotation of the

shaft D' is gradually increased between the commencement and ending of the effective 15 stroke of the said pawl, thereby preventing excessive rotation of the said shaft by the said pawl, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of 20 two subscribing witnesses.

GEORGE CROMPTON.
HORACE WYMAN.

Witnesses:

J. B. SYME,
J. A. WARE.