

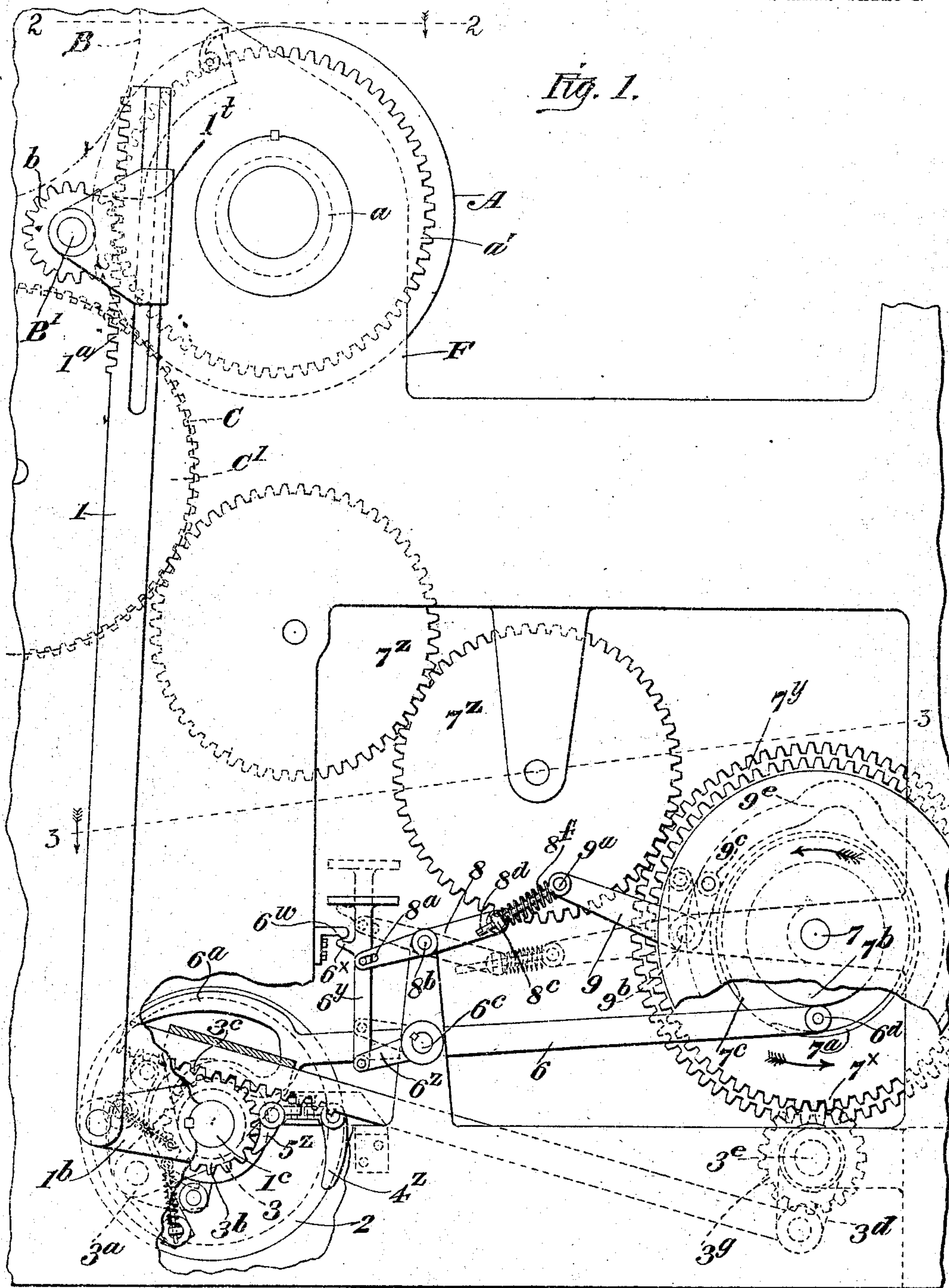
THROW-OFF MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED AUG. 3, 1909.

Patented Apr. 26, 1910.

4 SHEETS--SHEET 1.

956,315.



Witnesses:  
James T. Mansfield.  
L. E. Witham.

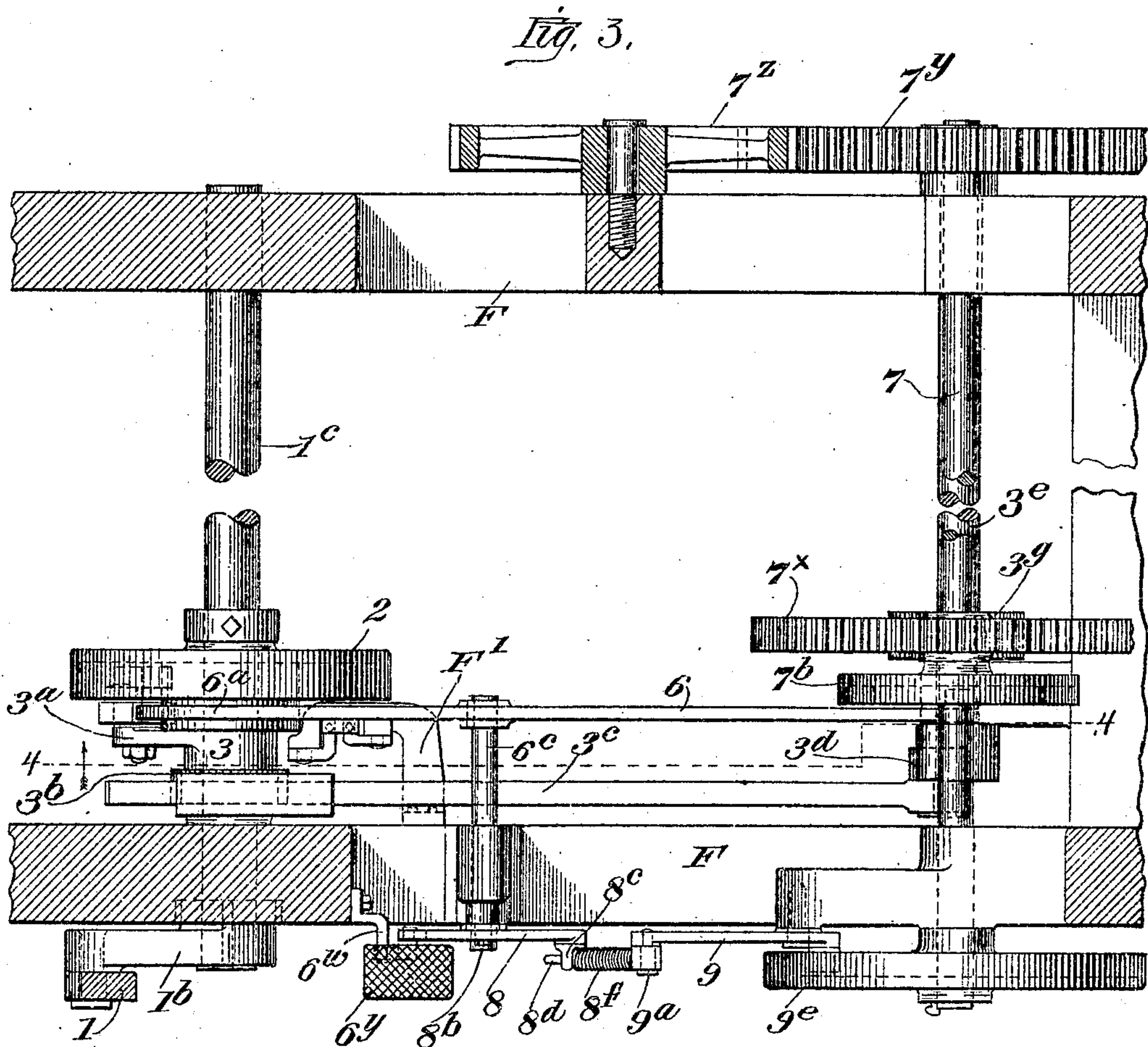
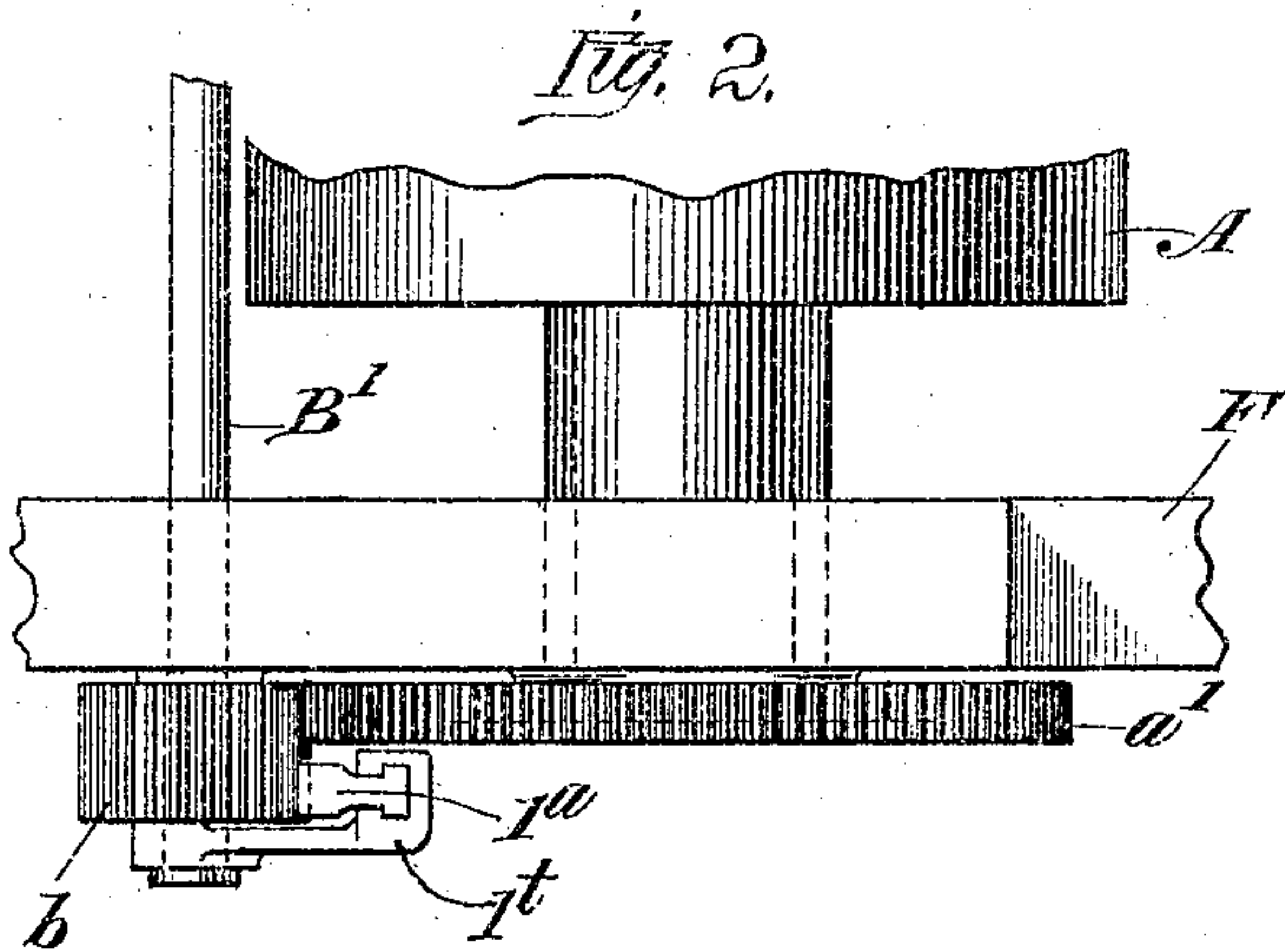
Inventor:  
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4 SHEETS—SHEET 2.



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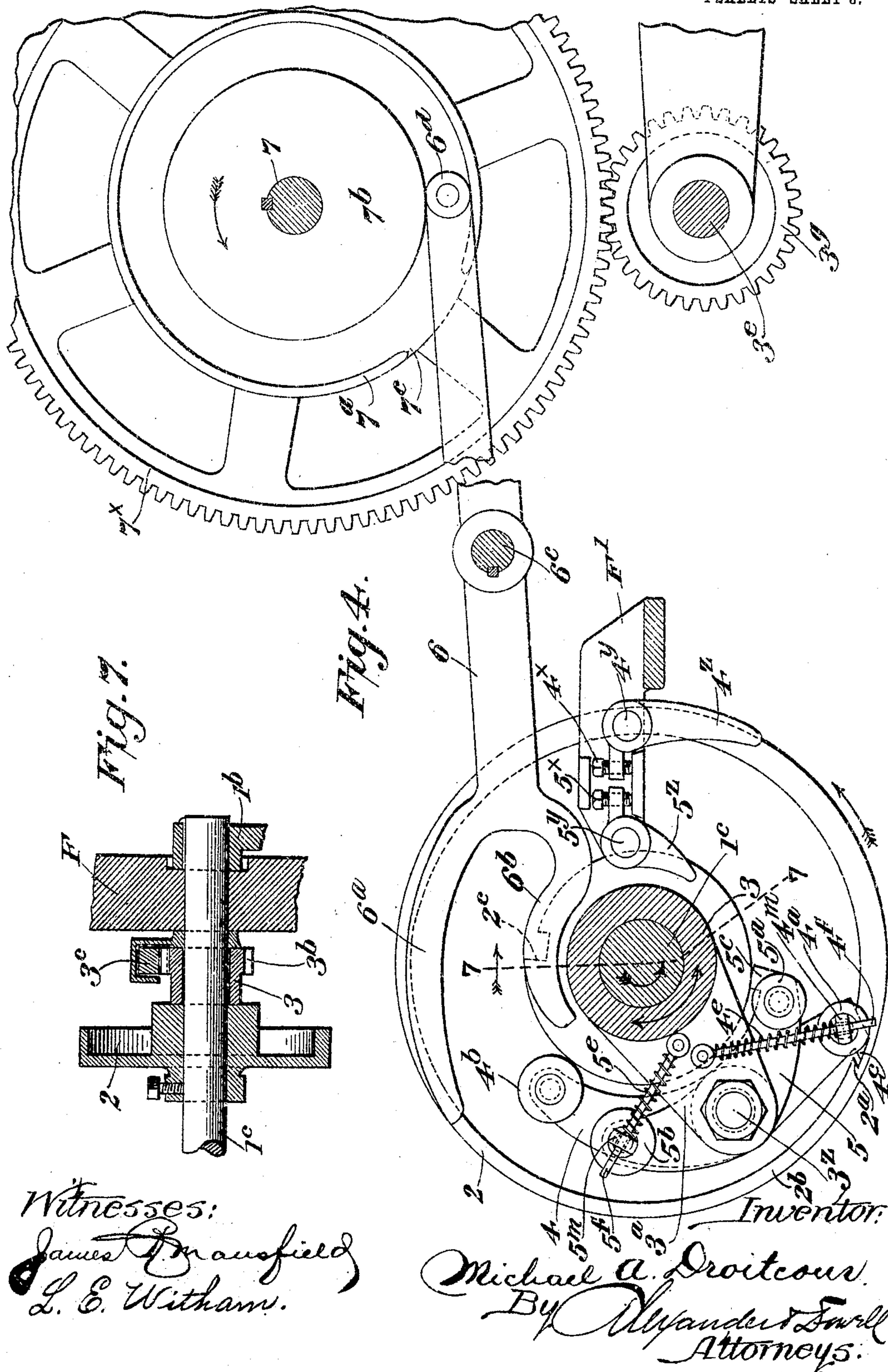
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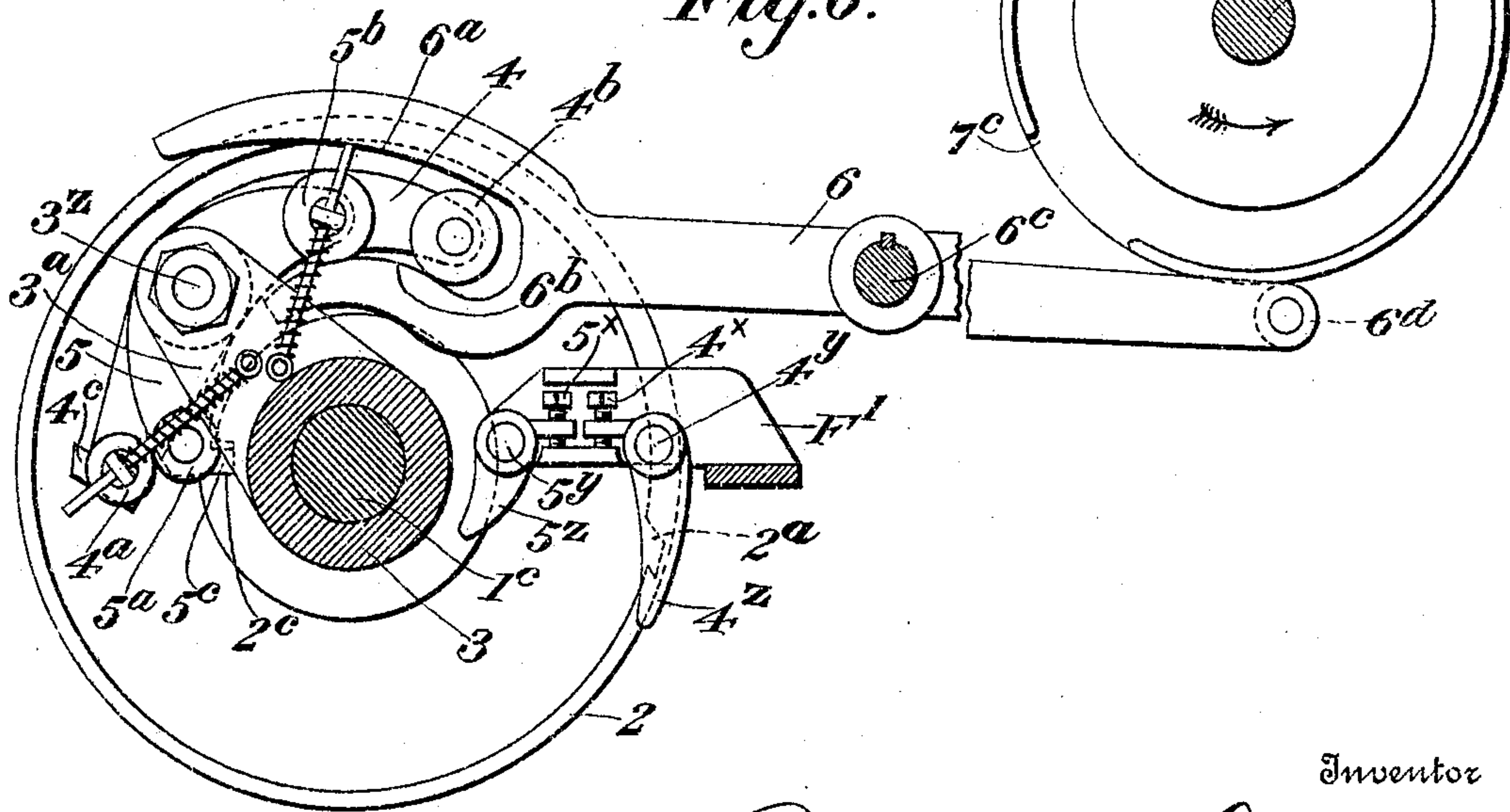
Inventor:  
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**956,315.**

4 SHEETS--SHEET 4.

*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

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## THROW-OFF MECHANISM FOR PRINTING-PRESSES.

956,315.

Specification of Letters Patent.

Patented Apr. 26, 1910.

Application filed August 3, 1909. Serial No. 511,034.

*To all whom it may concern:*

Be it known that I, MICHAEL A. DROITCOUR, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Throw-Off Mechanism for Printing-Presses; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel throw-off mechanism for printing presses especially designed for sheet printing machines; and the object of the present invention is to provide such machines with a throw-off mechanism capable of operating efficiently and certainly at very high speed, and by which the operator, or automatic feeders, will be prevented from operating the throw-off at the wrong moment.

The invention will be explained in connection with the accompanying drawings which illustrate the present preferred embodiment thereof; but I do not consider the invention restricted to the specific features of construction shown in the drawings; and have set forth in the claims, following the description, the parts and combinations of parts wherein the invention resides and for which protection is desired.

In the said drawings—Figure 1 is a detail side elevation of part of a press, showing the throw-off mechanism partly broken away. Fig. 2 is a detail top view of the cylinder throw-off gearing. Fig. 3 is a horizontal section on line 3—3, Fig. 1, looking downward, and partly broken away. Fig. 4 is an enlarged detail sectional view on line 4—4, Fig. 3. Fig. 5 is a detail view showing the position of parts at the ending of a throw-off impression operation. Fig. 6 is a similar view showing the parts at the beginning of a throw-on impression position. Fig. 7 is a detail section on line 7—7, Fig. 4.

In the drawings I have illustrated the invention as applied to a rotary cylinder sheet press, and A designates the impression cylinder which coöperates with a plate cylinder B, and delivery cylinder C. These printing couples may be of any desired construction, and further explanation thereof is unnecessary herein. The shaft of cylinder A is journaled in eccentric boxes *a* suitably

mounted in the frame F of the machine, and each of these boxes is provided with a gear or segment *a'* which meshes with a pinion *b* on a shaft B', that is journaled in the frame F of the press and extends across the machine so that by turning shaft B' the eccentric boxes *a* in which the cylinder A is journaled may be simultaneously shifted. By shifting the boxes in one direction, the cylinder A will be "thrown on impression", that is, its periphery will be brought into contact with the printing surface of the plate cylinder B; and by shifting the eccentrics in the reverse direction cylinder A will be "thrown off impression", that is, shifted to such position that its surface will not contact with the printing surface on the plate cylinder. My invention resides principally in the novel means for operating the shaft B' to throw this cylinder A on or off impression at the will of the operator, without stopping the machine; and these devices are as follows:

One of the pinions *b* meshes with a rack 1<sup>a</sup> on the upper end of a bar 1 slidably guided in a casting 1<sup>t</sup> hung on shaft B'. The lower end of rack 1<sup>a</sup> is pivotally connected to a crank 1<sup>b</sup> on a shaft 1<sup>c</sup> journaled in the side frame of the press. On the shaft 1<sup>c</sup> is keyed an annularly flanged disk 2, and on the shaft, beside this disk, is loosely mounted a sleeve 3 to which is attached an arm 3<sup>a</sup> and a pinion 3<sup>b</sup>, which pinion meshes with a rack-bar 3<sup>c</sup> pivotally connected to a crank 3<sup>d</sup> on a shaft 3<sup>e</sup>, journaled in the frame of the press and driven by means of a pinion 3<sup>f</sup> from a gear 7<sup>x</sup> on a shaft 7 which latter may be driven by a gear 7<sup>y</sup> and a train of gears 7<sup>z</sup> from a gear C' on the delivery cylinder. By this means the sleeve 3 and its crank 3<sup>a</sup> are oscillated rapidly back and forth through an arc of about 180 degrees for each rotation of the shaft 3<sup>e</sup> and with a true crank motion. The sleeve oscillates idly on shaft 1<sup>c</sup>, unless it is locked thereto, by devices hereinafter explained and whereby semi-rotary movements may be imparted to disk 2 and shaft 1<sup>c</sup>.

On the arm 3<sup>a</sup> is a crank pin 3<sup>z</sup>, and on this pin are pivoted two rocking levers, 4 and 5. The lever 4 is provided with rollers 4<sup>a</sup>, 4<sup>b</sup>, on its opposite ends, for a purpose hereinafter stated. The lever 4 is also provided on one end with a tooth 4<sup>c</sup> which is adapted, at cer-



tain times, to be engaged with a notch 2<sup>a</sup> in the outer flange 2<sup>b</sup> of the disk 2, see Fig. 4; and when tooth 4<sup>c</sup> is engaged with notch 2<sup>a</sup> the disk 2 and shaft 1<sup>c</sup> will be moved, with the sleeve 3, in the direction indicated by the arrow, Fig. 4. Tooth 4<sup>c</sup> is disengaged from notch 2<sup>a</sup> at the end of its stroke (see Fig. 5) by means of a cam 4<sup>z</sup> pivoted on a pin 4<sup>y</sup> attached to a bracket F' on the main frame; this cam being adjustable by means of a tap-bolt 4<sup>x</sup> tapped through an arm on its upper end as shown in Fig. 4; or it may be made adjustable in any other convenient manner. When lever 4 is rocked by roller 4<sup>a</sup> engaging cam 4<sup>z</sup>, the opposite end of the lever 4 is thrown outward and roller 4<sup>b</sup> is brought into position to contact with cam fingers 6<sup>a</sup>, 6<sup>b</sup>, on the end of an oscillating controlling lever 6 which is fulcrumed and keyed on a rock-shaft 6<sup>c</sup>, mounted in the main frame, and its other end extends toward shaft 7 and carries a roller 6<sup>d</sup>, engaging a circular flange 7<sup>a</sup> on a disk 7<sup>b</sup> keyed to shaft 7. This flange 7<sup>a</sup> is provided with a gap 7<sup>c</sup> sufficiently wide to permit the roller 6<sup>d</sup> to pass above or below the flange, when the lever 6 is operated, as hereinafter described. When the roller 6<sup>d</sup> rides on the inner side of the flange 7<sup>a</sup>, as indicated in Figs. 4 and 5, the cam fingers 6<sup>a</sup>, 6<sup>b</sup>, are lowered into position to be engaged by roller 4<sup>b</sup> and finger 6<sup>a</sup> will permit lever 4 to oscillate so as to positively engage tooth 4<sup>c</sup> with notch 2<sup>a</sup>. When the roller 6<sup>d</sup> bears against the outer side of the flange 7<sup>a</sup>, as indicated in Fig. 6, the cam finger 6<sup>a</sup> is held raised out of position to effectively engage the roller 4<sup>b</sup>, while cam finger 6<sup>b</sup> is in position to engage roller 4<sup>b</sup>, and will prevent tooth 4<sup>c</sup> engaging notch 2<sup>a</sup>. A spring 4<sup>e</sup> may be strung on a rod 4<sup>f</sup> pivoted to arm 3<sup>a</sup> and passing through the eye of the pin 4<sup>m</sup> upon which roller 4<sup>a</sup> is mounted. This spring 4<sup>e</sup> normally tends to press roller 4<sup>a</sup> outward and thus move roller 4<sup>b</sup> inward; and it prevents casual oscillation of lever 4 during the oscillation of the sleeve. The lever 5 is also a double-arm lever, and is pivoted on pin 3<sup>z</sup>, and is provided with rollers 5<sup>a</sup> and 5<sup>b</sup> on its opposite ends, and with a tooth 5<sup>c</sup> on one end which is adapted at certain times,—when permitted by the controlling devices,—to engage a notch 2<sup>c</sup> on the hub of disk 2, see Figs. 4 and 6. The tooth 5<sup>c</sup> is normally pressed toward the hub by means of a spring 5<sup>e</sup> strung on a rod 5<sup>f</sup> pivoted to arm 3<sup>a</sup> and passing through the bolt or pin 5<sup>m</sup> on which the roller 5<sup>b</sup> is journaled, see Fig. 4. Roller 5<sup>a</sup> is adapted to contact with a cam 5<sup>z</sup> pivoted on a pin 5<sup>y</sup>, attached to bracket F', see Fig. 4 and 6,—this cam being adjustable by means of a bolt 5<sup>x</sup>, or other suitable means, so as to regulate the throw of the lever 5. The roller 5<sup>b</sup> is adapted to engage the cam fingers 6<sup>a</sup>, 6<sup>b</sup>, of the controlling lever 6.

When the controlling lever 6 is in the position shown in Fig. 4, the cam finger 6<sup>a</sup> will be engaged by roller 5<sup>b</sup> and will oscillate lever 5 and prevent tooth 5<sup>c</sup> engaging notch 2<sup>c</sup>. But when the controlling lever is in the position shown in Fig. 6 roller 5<sup>b</sup> will engage cam finger 6<sup>b</sup> and oscillate lever 5 and permit tooth 5<sup>c</sup> to positively engage notch 2<sup>c</sup>, so that disk 2 and shaft 1<sup>c</sup> will be moved a half revolution until the tooth 5<sup>c</sup> is disengaged by cam 5<sup>z</sup>.

The lever 6 is tripped by mechanism controlled by the operator, when he desires to throw the cylinder on or off impression, by the following devices: On the rock-shaft 6<sup>c</sup> is keyed an arm 6<sup>z</sup> to which is pivoted the lower end of a foot-lever 6<sup>y</sup> that is provided with a catch 6<sup>x</sup> by which it can be engaged with a catch 6<sup>w</sup> on the side of the main frame, so as to hold the arm 6<sup>z</sup> in depressed position as indicated in Fig. 1, in which position the cylinder is off impression. The push-lever 6<sup>y</sup> is pivotally connected by a pin-and-slot 8<sup>a</sup> to one end of an oscillating lever 8, pivoted on a stud 8<sup>b</sup> attached to the main frame. To the other end of lever 8 is pivoted an eye-bolt 8<sup>c</sup> through which passes a rod 8<sup>d</sup> which is pivoted to a pin 9<sup>a</sup> on a bell-crank lever 9, which is in turn pivoted at its angle on a stud 9<sup>b</sup> attached to the main frame, as indicated in the drawings; and the short arm of the lever 9 is provided with a stud or roller 9<sup>c</sup> which engages a race-cam 9<sup>e</sup> attached to the outer end of shaft 7, see Figs. 1 and 3. A stout helical expansion spring 8<sup>f</sup> is strung on rod 8<sup>d</sup> between levers 8 and 9 and always tends to force the adjacent ends of these levers apart and to hold lever 6 in "off impression position" when the parts are in the position shown in Figs. 1, 4 and 5.

*Operation.*—The shaft 7 should be driven by suitable gearing so as to rotate turn for turn with the impression cylinder A; the shaft 3<sup>e</sup> is perfectly geared to rotate three to one with said impression cylinder. On presses to which the invention is usually applied the gripper gap in the impression cylinder ordinarily extends about one-fifth of the circumference of the cylinder, or 72 degrees approximately; it is therefore necessary that the throw-off mechanism should operate in something less than one-fifth of a revolution of the said cylinder; and my mechanism is designed to operate in approximately one-sixth of a revolution of the impression cylinder; it is also designed to operate the throw-off mechanism by a crank motion so that the movement of the impression cylinder will be accomplished in an easy and gradual manner instead of being jerked quickly and jarred. During the operation of the press the sleeve 3, with levers 4 and 5, is continually vibrated, back and forth, very rapidly on shaft 1<sup>c</sup>, but the lat-



ter remains at rest so long as the levers 4 and 5 are disengaged from the disk 2; and said levers are normally kept disengaged from said disk by means of the controlling lever 6 and cams 4<sup>z</sup> and 5<sup>z</sup>. The cylinder and parts normally remain in on impression position. But assuming, for the purpose of explanation, that the cylinder A is off impression, as indicated in Fig. 1, and it is desired to throw said cylinder on impression; the foot lever 6<sup>v</sup> is disengaged by the foot of the operator from catch 6<sup>w</sup>, thereupon the pressure of spring 8<sup>f</sup> tends to oscillate lever 8 and raise the foot lever 6<sup>v</sup>, and through its connections oscillate rock-shaft 6<sup>c</sup>, so as to depress roller 6<sup>d</sup>; but such rocking of shaft 6<sup>c</sup> is prevented until roller 6<sup>d</sup> reaches the gap 7<sup>c</sup> in flange 7<sup>a</sup>; but the instant said roller 6<sup>d</sup> finds such gap it drops through the gap, under the pressure of spring 8<sup>f</sup>, and lever 6 is thereupon oscillated to the position shown in Fig. 6. The gap 7<sup>c</sup> is so located that the lever 6 cannot be shifted until the gap on the impression cylinder reaches the plate cylinder; then the lever 6 is positively shifted by means of the spring 8<sup>f</sup>, which at the moment roller 6<sup>d</sup> finds gap 7<sup>c</sup>, will rock lever 8, thereby throwing the foot lever 6<sup>v</sup> upward and oscillating controlling lever 6 to the position shown in full lines Fig. 6. At the moment roller 6<sup>d</sup> finds gap 7<sup>c</sup>, lever 9 is oscillated by engagement of the swell 9<sup>x</sup> on race cam 9<sup>e</sup> engaging pin 9<sup>c</sup>, which swell imparts a quick vibration to lever 9 at the moment the gap is passing the roller. This vibration will assist lever 8 in rocking shaft 6<sup>c</sup> and insure the passage of the roller 6<sup>d</sup> through the gap. The parts then assume the position shown in full lines in Fig. 6, and the lever 8 is oscillated to the approximate position shown in dotted lines in Fig. 1, and remains in that position so long as controlling lever 6 is held in the position shown in Fig. 6. When lever 6 reaches this position the finger 6<sup>b</sup> is raised so that it will engage roller 4<sup>b</sup> on lever 4 and positively prevent engagement of tooth 4<sup>c</sup> with the notch 2<sup>a</sup> when the arm 3<sup>z</sup> reaches the limit of its return movement, as indicated in Fig. 6; but on the return movement of arm 3<sup>a</sup> tooth 5<sup>c</sup> on lever 5 is caused to engage notch 2<sup>c</sup> and lock disk 2 to sleeve 3, and on the next forward swing of arm 3<sup>a</sup> it draws disk 2 around a half revolution until roller 5<sup>a</sup> engages cam 5<sup>z</sup> and disengages tooth 5<sup>c</sup> from the rear edge of notch 2<sup>c</sup>. The half revolution thus imparted to shaft 1<sup>c</sup> by tooth 5<sup>c</sup> imparts a half rotation to the crank 1<sup>b</sup>, and consequently moves rack bar 1 and operates shaft B' sufficiently to cause the eccentric bearings  $\alpha$  to turn and throw the cylinder A on impression and it remains on impression so long as the lever 6 remains in the position shown in Fig. 6; the roller 4<sup>b</sup> and finger 6<sup>b</sup>

preventing the lever 4 engaging notch 2<sup>a</sup>; and the cam 5<sup>z</sup> and roller 5<sup>a</sup> keep the tooth 5<sup>c</sup> out of engagement with notch 2<sup>c</sup>; consequently the levers 4 and 5 will simply oscillate idly back and forth in the disk.

*Off-impression.*—When the operator desires to throw the cylinder off-impression, he forcibly depresses foot lever 6<sup>v</sup> until roller 6<sup>d</sup> finds gap 7<sup>c</sup> and lever 6 is oscillated, and he can then lock lever 6<sup>v</sup> to the catch 6<sup>w</sup> to keep the parts off impression. When the operator attempts to depress the foot lever 6<sup>v</sup> however the roller 6<sup>d</sup> will be bearing against the outer side of flange 7<sup>a</sup> and will lock lever 6 until the roller 6<sup>d</sup> comes into register with the gap 7<sup>c</sup>. When the operator places his foot on lever 6<sup>v</sup> he depresses lever 8 until the roller 6<sup>d</sup> on lever 6 presses hard against the flange 7<sup>a</sup>; this will bring the pin 8<sup>c</sup> on the lever 8 to a position (not shown) which will be above the pin 9<sup>a</sup> when lever 9 is thrown to its lowermost position by cam 9<sup>e</sup>, and therefore when roller 6<sup>d</sup> finds the gap 7<sup>c</sup> the pressure of the foot of the operator is tending to raise this roller 6<sup>d</sup> through the gap, and at this moment cam 9<sup>x</sup> oscillates lever 9 so as to throw pin 9<sup>a</sup> to lowest position and the spring 8<sup>f</sup> then snaps the lever 8 upward to the position shown in full lines Fig. 1, entering the roller 6<sup>d</sup> through the gap above the flange 7<sup>a</sup> and shifting lever 6 to the position shown in Figs. 1, 4 and 5; the roller 6<sup>d</sup> passing through the gap to the inner side of flange 7<sup>a</sup> lowers the cam fingers 6<sup>a</sup>, 6<sup>b</sup>, and cam finger 6<sup>a</sup> engages roller 4<sup>b</sup>, and oscillates lever 4, and causes tooth 4<sup>c</sup> to engage notch 2<sup>a</sup> (see Fig. 4), and consequently on the next forward swing of the arm 3<sup>a</sup>, disk 2 will be given another half rotation, and shaft 1<sup>c</sup> will be correspondingly moved, and rack 1<sup>a</sup> will be moved so as to shift shaft B', and through the gearing turn the eccentric bearings of the impression cylinder A and throw it off impression, or away from the plate cylinder. At the end of said forward stroke of arm 3<sup>a</sup> the tooth 4<sup>c</sup> is disengaged from the rear edge of notch 2<sup>a</sup> by means of cam 4<sup>z</sup> but so long as lever 6 remains in the position shown in Figs. 4 and 5 the roller 5<sup>b</sup> will also engage cam finger 6<sup>a</sup> and thereby prevent tooth 5<sup>c</sup> engaging notch 2<sup>c</sup>, and consequently the parts will remain off-impression until the controlling lever is again shifted as above described.

It will be observed that the notches 2<sup>a</sup> and 2<sup>c</sup> in the disk 2 are shallow on their following sides or rear edges and high on their pushing sides or front edges, this is to insure the disk 2 being given its full movement by each tooth. The cams 5<sup>z</sup> and 4<sup>z</sup> only shift the levers 4 and 5 sufficiently inward to move the teeth out of engagement with, or clear of, the rear or following sides of the notches at the end of the forward strokes of the levers. The notches are pur-



posedly made with shallow following sides or rear edges so that the momentum of the parts will be positively controlled by the teeth and the disk 2 will be arrested at the end of each semi-rotary movement without the need of using any braking devices; and so that the notches will always be stopped at the correct point for reengagement by the respective teeth when the controlling lever 6 is shifted. There will be no excess movement of the disk 2 at any time,—but it will always have the exact necessary extent of movement imparted thereto. The cams 5<sup>2</sup> and 4<sup>2</sup> are employed to insure that the teeth shall be moved clear, and kept clear, of the shallow rear sides of the notches, during the idle strokes of the levers.

The lever 9 is oscillated once for each rotation of the cylinder, and rod 8<sup>a</sup> will be vibrated with said lever, but the idle vibrations will not affect the lever 8 after it is shifted to either of its extreme positions.

Having described my invention what I claim as new and desire to secure by Letters Patent thereon is:

1. In a printing press the combination of an impression member, means for moving said member on or off impression, a rotatable shaft, means connected with said shaft for actuating the throw-off devices, oscillating devices mounted on said shaft and adapted to be alternately locked thereto to impart an intermittent step by step rotary movement thereto in one direction, and means for keeping the devices normally out of operative engagement with the shaft.

2. The combination in a printing press, of an impression cylinder, crank-actuated means for shifting the cylinder bearing to throw it on or off impression, an intermittently rotatable shaft carrying said crank, an oscillating arm loosely mounted on said shaft, a pair of devices carried by said arm, means whereby said devices may be alternately locked to said shaft to impart an intermittent step by step movement thereto in one direction, and means for normally holding the devices out of operative position.

3. In a printing press the combination of an impression member, means for moving said member on or off impression, a rotatable shaft, means connected with said shaft for actuating the throw-off devices, an oscillating arm on said shaft, a pair of levers pivotally mounted on said arm and adapted to be alternately locked to the shaft to impart intermittent rotary movement thereto, and means for keeping said levers normally out of operative engagement with the shaft.

4. In combination an impression cylinder, crank-actuated means for shifting the cylinder bearings to throw it on or off impression, an intermittently rotatable shaft carrying

said crank, an oscillating arm loosely mounted on said shaft, a pair of levers carried by said arm, and means whereby said levers may be alternately locked to said shaft to impart a half rotation thereto, means for normally holding the levers out of engagement with the shaft, and cam controlled means for timing the operation of the throw-off mechanism.

5. In a printing press the combination of an impression member, means for moving said member on or off impression, a rotatable shaft, means connected with said shaft for actuating the throw-off means, a pair of oscillating devices adapted to be alternately locked to the shaft to impart intermittent rotary movement thereto in one direction, and a cam lever for controlling the engagement of said devices with said shaft; with a foot lever and connection for setting the controlling lever, and cam-actuated means for timing the shifting of the controlling lever.

6. In combination a shaft rotatable in one direction, an impression throw-off means operable from said shaft, an oscillating arm on said shaft, a device on said arm adapted to lock it to the shaft and impart rotation thereto in one direction only, and means for disengaging the device; with a controlling lever for regulating the action of said locking device, a rotatable disk having an annular gapped flange engaging said controlling lever so as to keep the same in either extreme position, and means whereby the controlling lever may be shifted only when it finds the gap in the flange.

7. In combination a shaft, an impression throw-off means operable from said shaft, an oscillating arm on said shaft, a device on said arm adapted to lock it to the shaft, means for disengaging said device at the end of its forward movement, a controlling lever adapted to hold the locking device out of engaging position on its return stroke, a rotatable disk having an annular gapped flange engaging said controlling lever so as to keep the same in either extreme position, and prevent its being shifted until it finds the gap in the flange, means for tripping said controlling lever at the will of the operator, and a cam-actuated device insuring the timely shifting of the controlling lever.

8. In a throw-off mechanism for printing presses the combination of a printing couple; a shaft rotatable in one direction, an oscillating arm loosely mounted on said shaft, a pair of devices on said arm, and means for locking the devices alternately to the shaft to impart a step by step rotary movement thereto; with a shiftable controlling lever whereby said devices are thrown into or out of engagement, and means actuated by said shaft for moving a member of the printing couple into or out of impression position.



9. In a throw-off mechanism for printing presses, the combination of a printing couple, means for shifting one member of the printing couple to and from the other, 5 and a controlling lever for said mechanism, a rotatable disk having an annular gapped flange adapted to hold said lever in either shifted position, cam actuated means whereby the lever may be caused to shift when it 10 finds the gap in the flange, a manually operable trip controlling the lever shifting devices, and spring-actuated means whereby after the operator has tripped the mechanism the lever is shifted only when it finds 15 the gap in the flange.

10. In a throw-off mechanism, the combination of a printing couple, crank-actuated means for throwing one member of the couple on or off impression, a shaft rotatable 20 in one direction carrying the crank for actuating said means, an oscillating arm on said shaft, means for oscillating said arm, a pair of devices on said arm for alternately engaging the shaft to impart a step by step 25 intermittent rotary movement thereto in one direction, and means whereby said devices may be alternately brought into operation.

11. In a throw-off mechanism for printing presses the combination of a printing couple, 30 a rotary shaft, a crank thereon, an oscillating arm loosely mounted on said shaft, devices on said arm adapted to alternately lock it to the shaft to impart a step by step rotary movement thereto in one direction, and means 35 for oscillating said arm; with means whereby said locking devices are thrown into operative engagement, means for disengaging said devices at the end of an operative stroke, and means actuated by said shaft 40 for moving a member of the printing couple into or out of impression position.

12. In a throw-off mechanism, the combination of an impression cylinder, a crank-actuated bar and connections for moving the 45 cylinder into or out of impression position, a shaft carrying the crank for actuating the said bar; an oscillating arm on said shaft, devices on said arm for alternately engaging the shaft to impart movements thereto, manually 50 controlled means whereby said devices may be brought into operation at the will of the operator, and cam-actuated devices for timing the operation of the controlling means.

13. In a throw-off mechanism, the combination of an impression cylinder, a crank-actuated bar and connections for throwing 55 the cylinder on or off impression, a rotary shaft carrying the crank for actuating the said bar, an oscillating arm on said shaft, crank-actuated means for oscillating said arm, devices on said arm for alternately en- 60 gaging the shaft to impart a step by step rotary movement thereto in one direction, and means whereby said devices may be

alternately brought into operation at the will of the operator.

14. In a throw-off mechanism for printing presses, the combination of a printing couple, a rotary shaft, a crank thereon, and 70 means operable by said crank to move one member of the printing couple into or out of operative position; with an oscillating arm loosely mounted on said shaft, a pair of devices on said arm, means for locking the 75 devices alternately to the shaft to impart a step by step rotary movement thereto in one direction, crank-actuated means for oscillating said arm and a shiftable controlling lever whereby said locking levers 80 are thrown into or out of operative engagement.

15. In a throw-off mechanism for printing presses, the combination of a printing couple, a shaft, a crank thereon, and means 85 operable by said crank to move one member of the printing couple into or out of operative position; with an oscillating arm loosely mounted on said shaft, a pair of oscillating 90 levers pivoted on said arm, means for locking the levers alternately to the shaft, a shiftable controlling lever whereby said locking levers are thrown into or out of operative engagement, and means for disengag- 95 ing said levers at the end of their operative strokes.

16. In a throw-off mechanism, the combination of an impression cylinder, and a crank-actuated bar and connections for 100 throwing the cylinder into or out of impression position; with a shaft carrying the crank for actuating the said bar, an oscillating arm on said shaft, devices on said arm for alternately engaging the shaft, a 105 controlling lever whereby said devices may be alternately brought into operation at the will of the operator, a foot treadle and connections for shifting the controlling lever, and cam-actuated means for timing the 110 shifting of the controlling lever.

17. In a throw-off mechanism for printing presses, the combination of a shaft, a crank thereon, an oscillating arm loosely 115 mounted on said shaft, a pair of oscillating levers pivoted on said arm, means for locking the levers alternately to the shaft, crank-actuated means for oscillating said arm, a shiftable controlling lever whereby said locking levers are thrown into or out of 120 operative engagement, cams for disengaging said levers at the end of their operative strokes, a foot lever and connections for shifting the controlling lever, and a cam-actuated lever for timing the operation of 125 the parts.

18. In combination, a printing couple, a crank and connections for throwing one member of the couple on or off impression, a shaft carrying said crank, an oscillating 130 arm on the crank shaft, means for oscillat-



ing said arm, devices on said arm for locking it to said shaft, means for disengaging the devices from the shaft at the end of each half revolution thereof, and an oscillating  
 5 controlling lever for regulating the engagement of said devices with the shaft; with a rotatable gapped cam for timing the shift of said controlling lever, and means for shifting said controlling lever when the  
 10 latter finds the gap in the cam.

19. In combination, a printing couple, a crank and connections for throwing one member of the couple on or off impression, a shaft carrying said crank, an oscillating  
 15 arm on the crank shaft, means for oscillating said arm, devices on said arm for locking it to said shaft, means for disengaging the devices from the shaft at the end of a half revolution thereof, and an oscillating  
 20 controlling lever for regulating the engagement of said devices with the shaft; a rotatable gapped cam for regulating the shift of said controlling lever, and a vibrating cam-actuated lever and connections whereby  
 25 the shifting of the controlling lever is permitted only when the roller finds the gap.

20. In a printing press, the combination of a printing member, means for throwing said member on or off impression, a rotatable shaft, means connected with said shaft  
 30 for actuating the throw-off means, an oscillating arm on said shaft, a pair of devices mounted on said arm and adapted to be alternately locked to the shaft to impart intermittent rotary movement thereto in one  
 35 direction, and a controlling lever for keeping the devices normally out of operative engagement with the shaft; with a foot lever and connections for setting the controlling lever, and a cam-actuated lever for  
 40 timing the shift of the controlling lever.

21. In combination a shaft, a disk thereon, an impression throw-off device operable from said shaft, an oscillating arm on said  
 45 shaft, a locking lever pivoted on said arm and adapted to engage the disk and impart rotation thereto, means for disengaging the lever from the disk at the end of its forward stroke, and a controlling lever adapted to  
 50 regulate the engagement of said locking lever with the disk; with a rotatable disk having an annular gapped flange engaging said controlling lever so as to keep the same in either extreme position, and means where-  
 55 by the controlling lever may be shifted only when it finds the gap in the flange.

22. In combination a shaft, a disk thereon, an impression throw-off device operable from said shaft, an oscillating arm on said  
 60 shaft, a lever pivoted on said arm and adapted to engage the disk and impart rotation thereto, means for disengaging the lever from the disk at the end of its forward movement, a controlling lever adapted  
 65 to throw said lever into or hold it out of

engaging position on its return stroke, a rotatable disk having an annular gapped flange engaging said controlling lever so as to keep the same in either extreme position, means whereby the lever may be shifted  
 70 only when it finds the gap in the flange, and a cam-actuated controlling lever for insuring the timely shifting of the controlling lever.

23. In combination, a printing cylinder, a  
 75 crank-actuated rack-bar and connections for throwing the cylinder on or off impression, a shaft carrying said crank, an oscillating arm on the crank shaft, crank-actuated means for oscillating said arm, a pair of devices on  
 80 said arm for alternately locking it to said shaft, and means for disengaging the devices from the shaft at the end of each half revolution thereof; with an oscillating controlling lever for regulating the engagement  
 85 of said devices with the shaft, a rotatable gapped cam for regulating the shift of said controlling lever, a vibrating cam-actuated lever and connections whereby the shifting of the controlling lever is permitted  
 90 only when the roller finds the gap, and means operable at the will of the operator for partly shifting said controlling lever until the latter finds the gap in the cam.

24. In combination a shaft, an oscillating  
 95 arm hung on said shaft, means for oscillating said arm, a pair of devices on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate, means for disengaging said devices from the shaft  
 100 at the end of the forward stroke of the arm, a controlling lever adapted to engage the said devices at the end of the return stroke, and a disk having an annular gapped flange adapted to be engaged by said controlling  
 105 lever, said flange retaining the lever in either position.

25. In combination a shaft, an oscillating arm hung on said shaft, means for oscillat-  
 110 ing said arm, a pair of devices on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate, means for disengaging said devices from the shaft at the end of the forward stroke of the arm, a controlling lever adapted to engage  
 115 the said devices at the end of the return stroke, an oscillating lever and connections for shifting the controlling lever, and a cam-actuated timing lever adapted to insure the shifting of the controlling lever at the  
 120 proper moment.

26. In combination a shaft, an oscillating arm hung on said shaft, means for oscillat-  
 125 ing said arm, a pair of devices on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate, means for disengaging said devices from the shaft at the end of the forward stroke of the arm, a controlling lever adapted to engage the  
 130 said devices at the end of the return stroke,



a disk having an annular gapped flange adapted to time the moment of said controlling lever, an oscillating lever and connections for shifting the controlling lever, 5 and a cam-actuated lever adapted to insure the shifting of the controlling lever only when the roller finds the gap in the flange.

27. In combination a rotary shaft, an oscillating arm hung on said shaft, means for 10 oscillating said arm, a pair of devices on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate step by step in one direction, means for disengaging said devices from the shaft at the 15 end of the forward stroke of the arm, a controlling lever adapted to engage the said devices on their return stroke, and means for shifting the controlling lever; with an impression cylinder having eccentric adjustable bearings, a bar and connections for shifting said bearings, and a crank arm on 20 said shaft for operating said bar.

28. In combination a shaft, an oscillating arm hung on said shaft, means for oscillat- 25 ing said arm, a pair of devices on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate, means for disengaging said devices from the shaft at the end of the forward stroke of the arm, 30 a controlling lever adapted to engage the said devices at the end of the return stroke, an oscillating lever and connections for shifting the controlling lever, and a cam-actuated lever adapted to time the shifting 35 of the controlling lever; with an impression cylinder having eccentric adjustable bearings, a reciprocating bar and connections for shifting said bearings, and a crank arm on said shaft for operating said bar, said shaft 40 only turning in one direction.

29. In combination a shaft, a disk thereon, an oscillating arm hung on said shaft, crank-actuated means for oscillating said arm, a pair of levers on said arm adapted to lock

the arm to the shaft in alternation and cause 45 same to rotate one-half revolution, cams for disengaging said levers from the shaft at the end of the forward stroke of the arm, a controlling lever adapted to engage the said levers at the end of the return stroke, 50 and a disk having an annular gapped flange adapted to be engaged by said controlling lever; with an impression cylinder having eccentric adjustable bearings, a rack bar and pinions for shifting said bearings, and 55 a crank arm on said shaft for operating said rack bar.

30. In combination a shaft, a disk thereon, an oscillating arm hung on said shaft, crank-actuated means for oscillating said arm, a 60 pair of levers on said arm adapted to lock the arm to the shaft in alternation and cause same to rotate one-half revolution, cams for disengaging said levers from the shaft at the end of the forward stroke of the arm, 65 a controlling lever adapted to engage the said levers at the end of the return stroke, a disk having an annular gapped flange adapted to be engaged by said controlling lever, said flange holding the lever in either 70 shifted position, an oscillating lever and connections for shifting the controlling lever at the will of the operator, and a cam-actuated lever adapted to insure the shifting of the controlling lever only when the roller finds 75 the gap in the flange; with an impression cylinder having eccentric adjustable bearings, a rack bar and pinions for shifting said bearings, and a crank arm on said shaft for operating said rack. 80

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

MICHAEL A. DROITCOUR.

Witnesses:

JAMES R. MANSFIELD,  
L. E. WITHAM.