

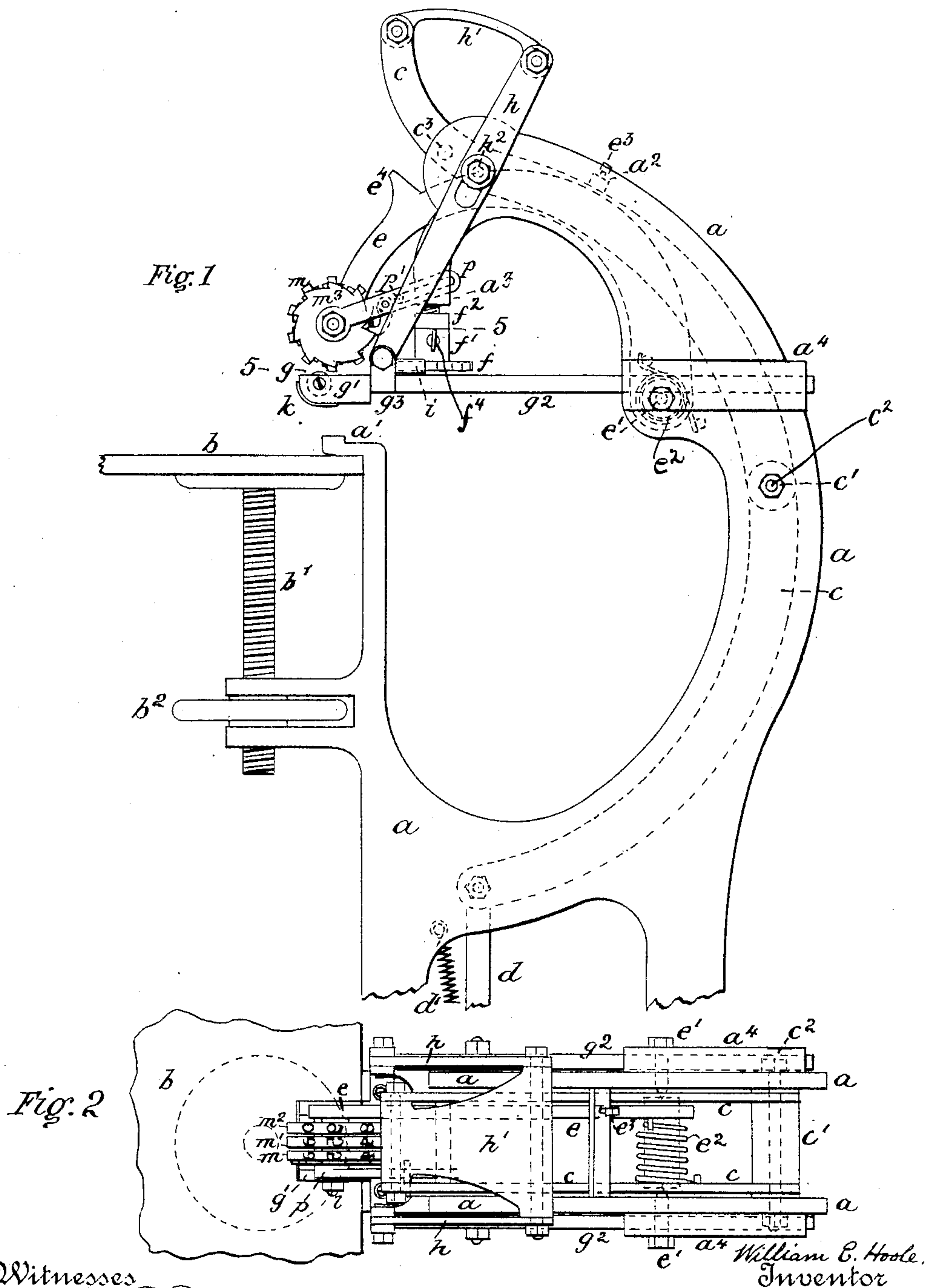
(No Model.)

3 Sheets—Sheet 1.

W. E. HOOLE.
NUMBERING AND PAGING MACHINE.

No. 535,498.

Patented Mar. 12, 1895.



Witnesses
Arthur C. Dees
John B. Bailey

By his Attorney Alfred Shudlock,

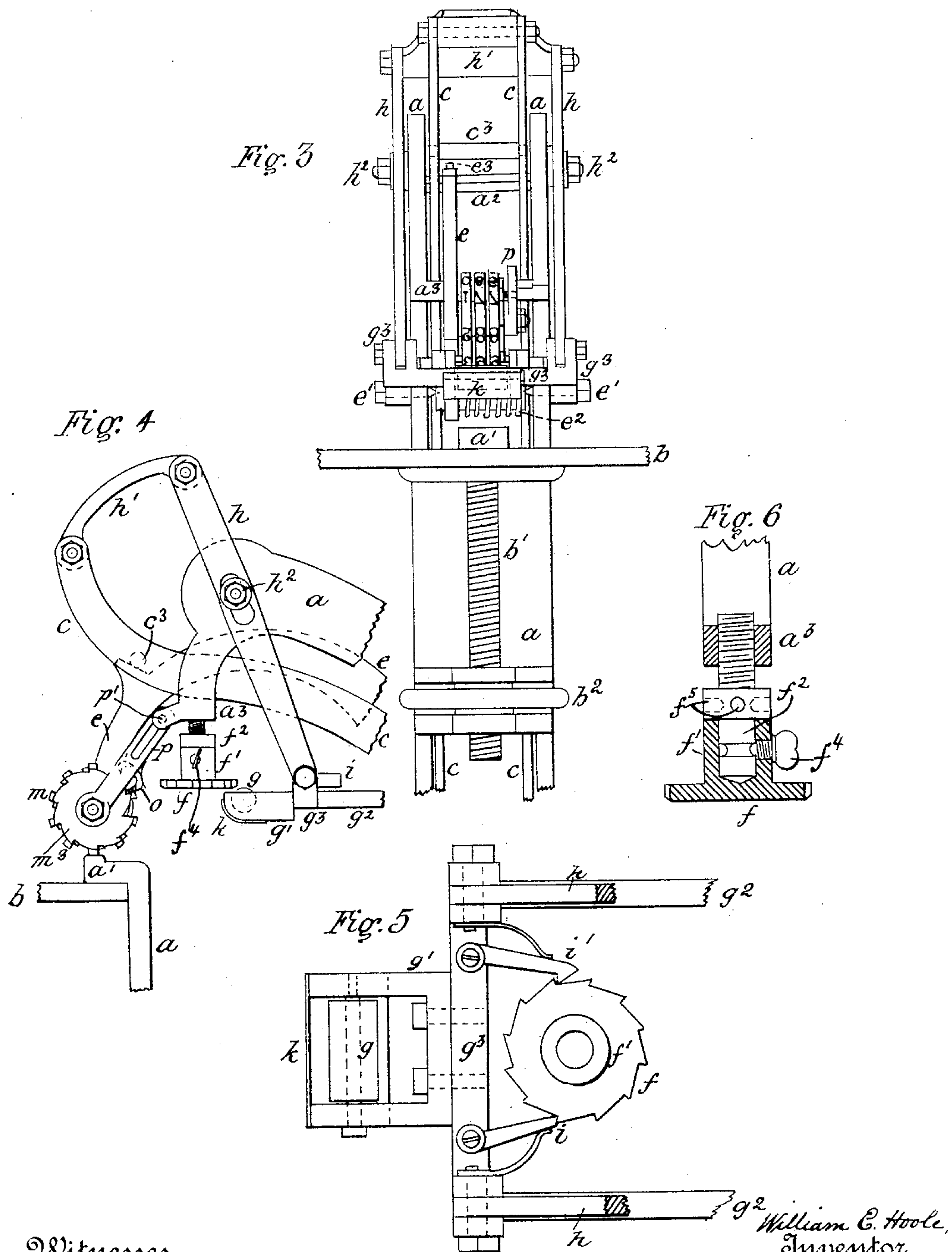
(No Model.)

3 Sheets—Sheet 2.

W. E. HOOLE.
NUMBERING AND PAGING MACHINE.

No. 535,498.

Patented Mar. 12, 1895.



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Inventor

(No Model.)

3 Sheets—Sheet 3.

W. E. HOOLE.
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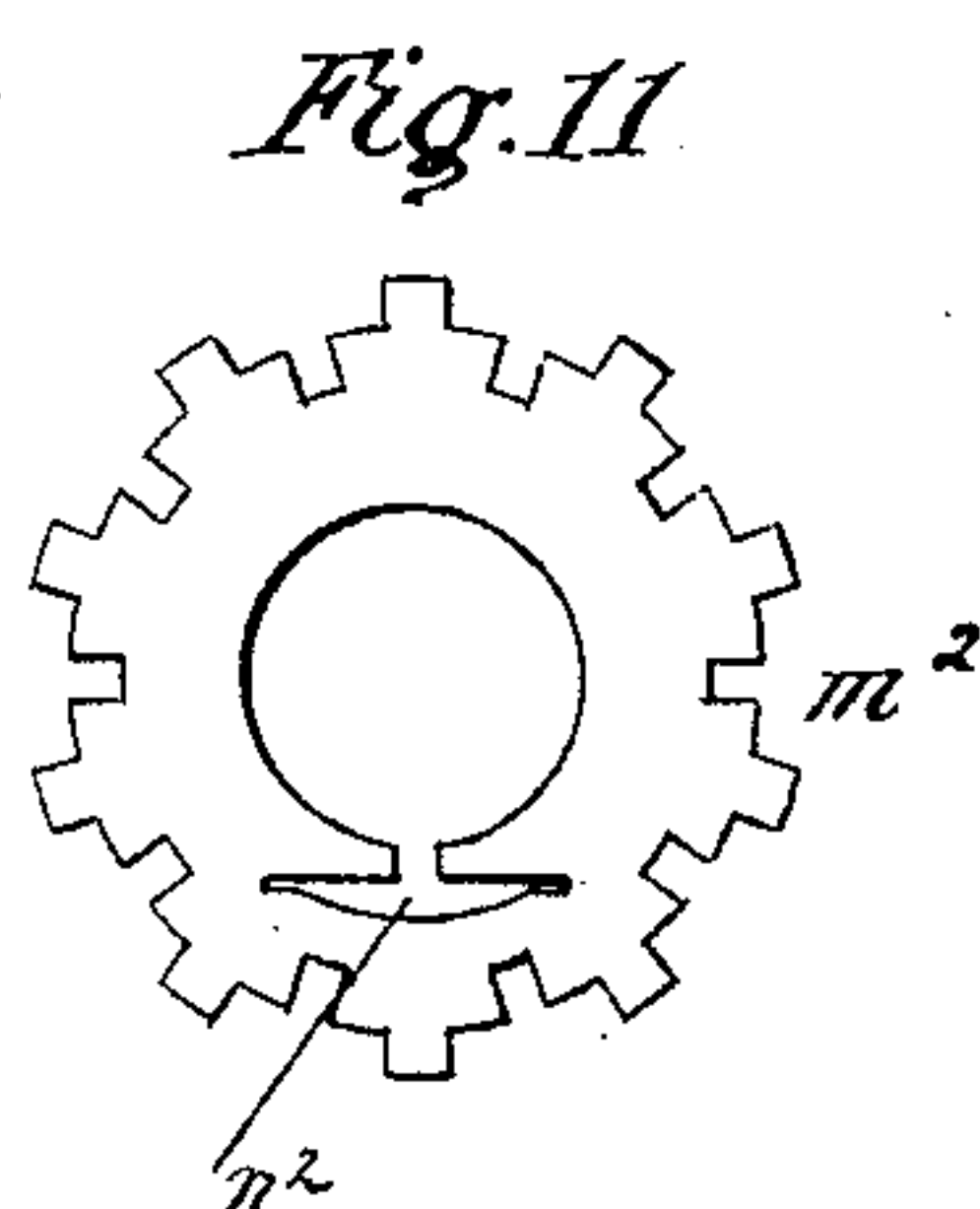
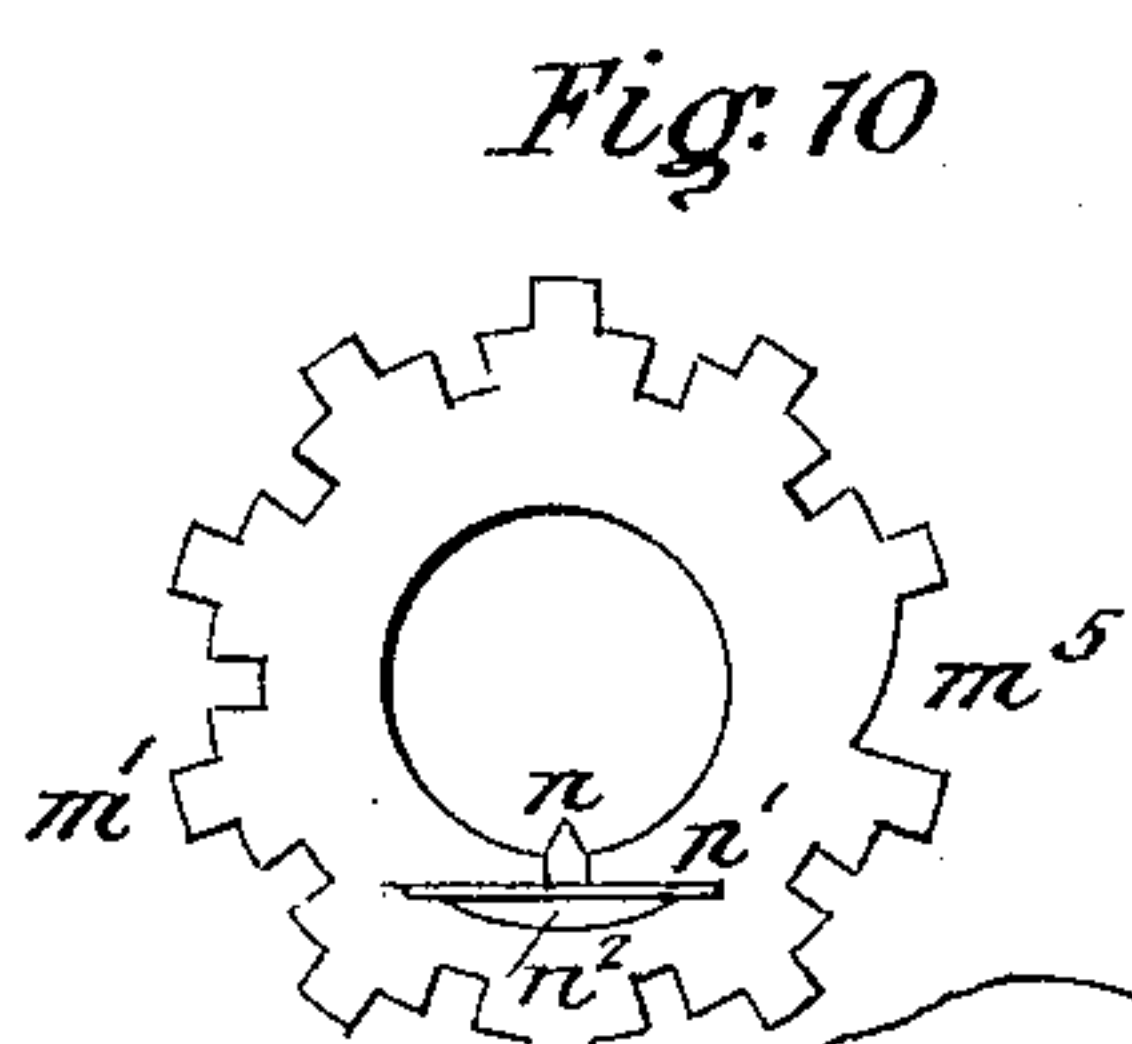
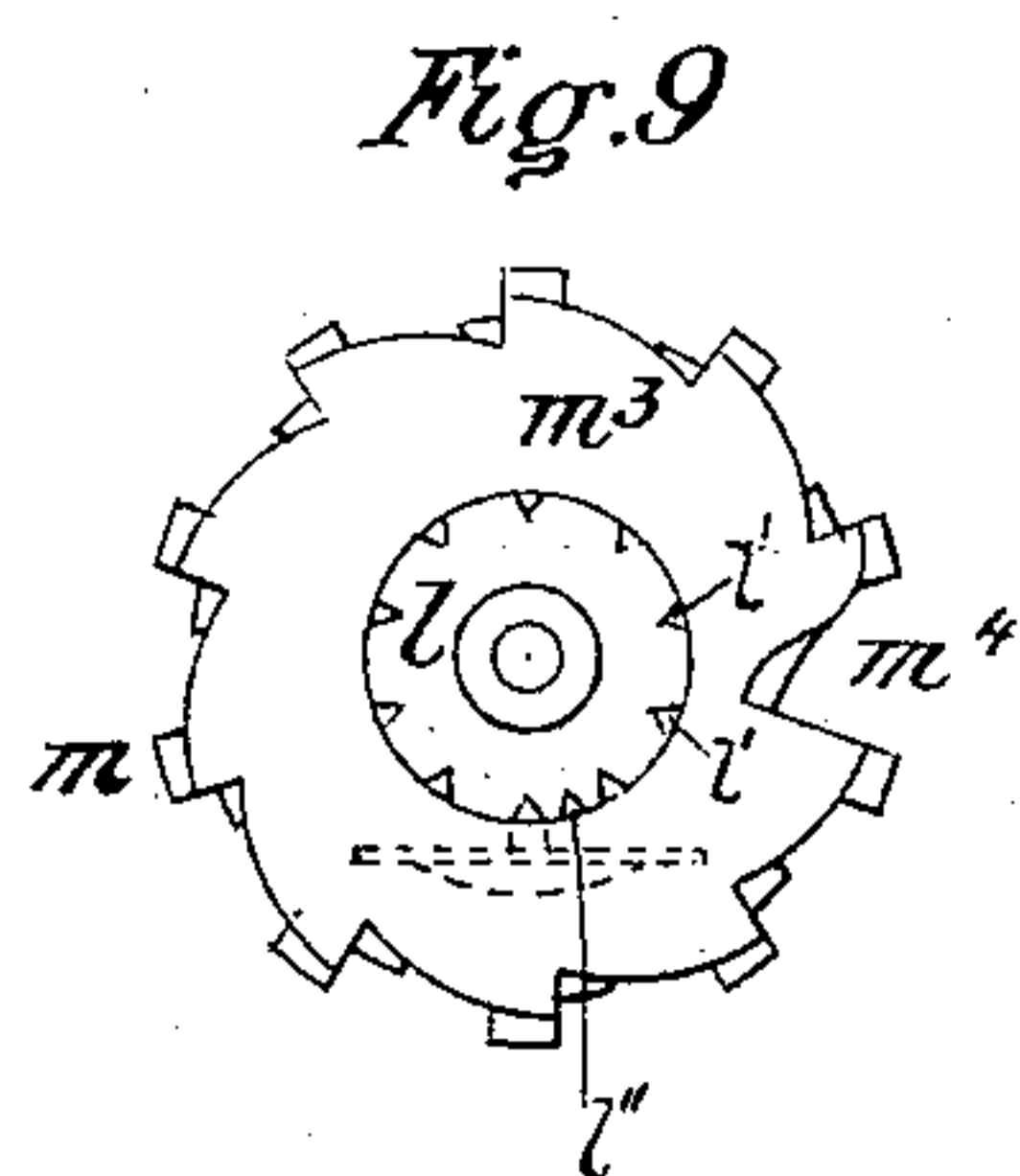
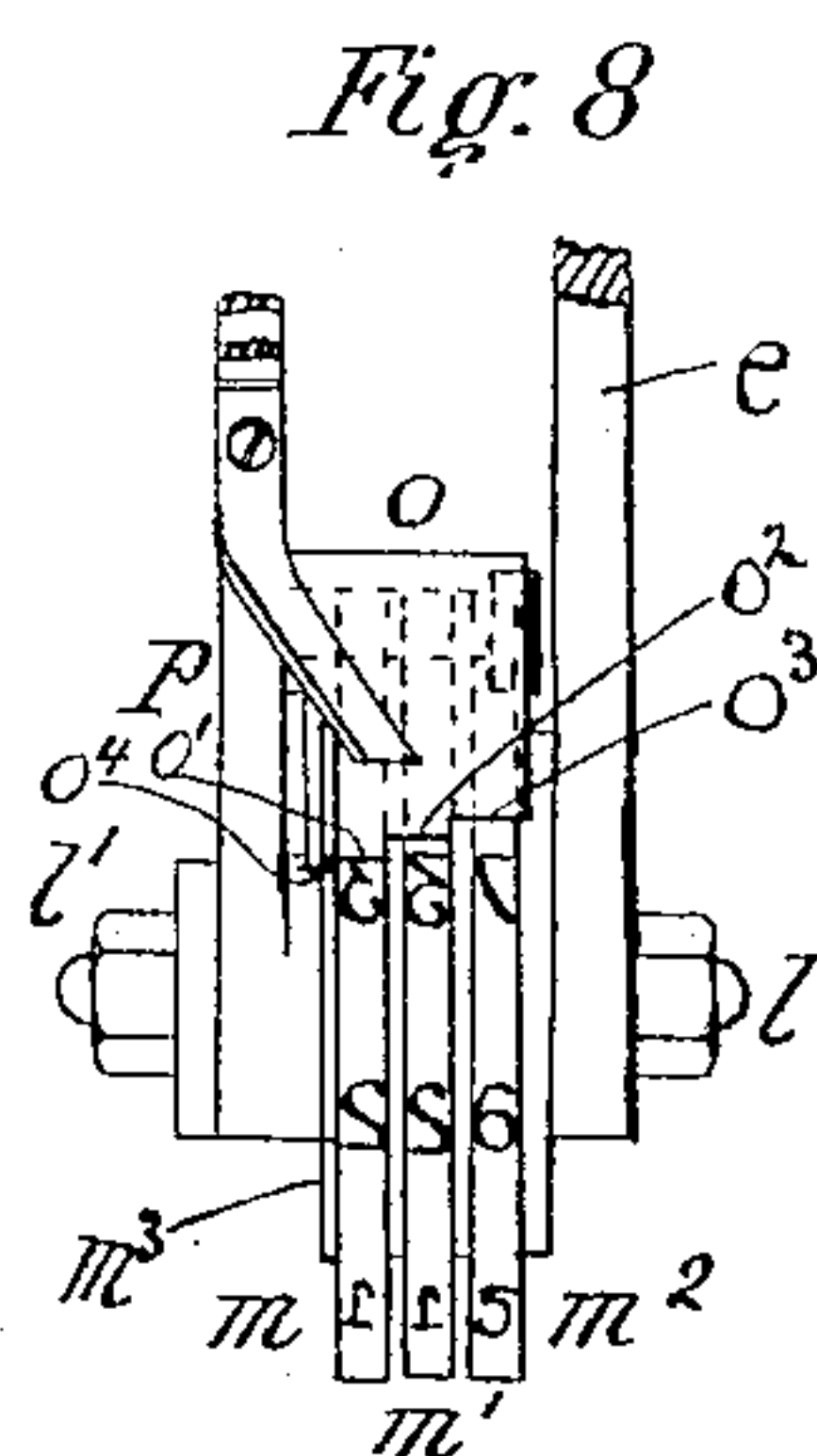
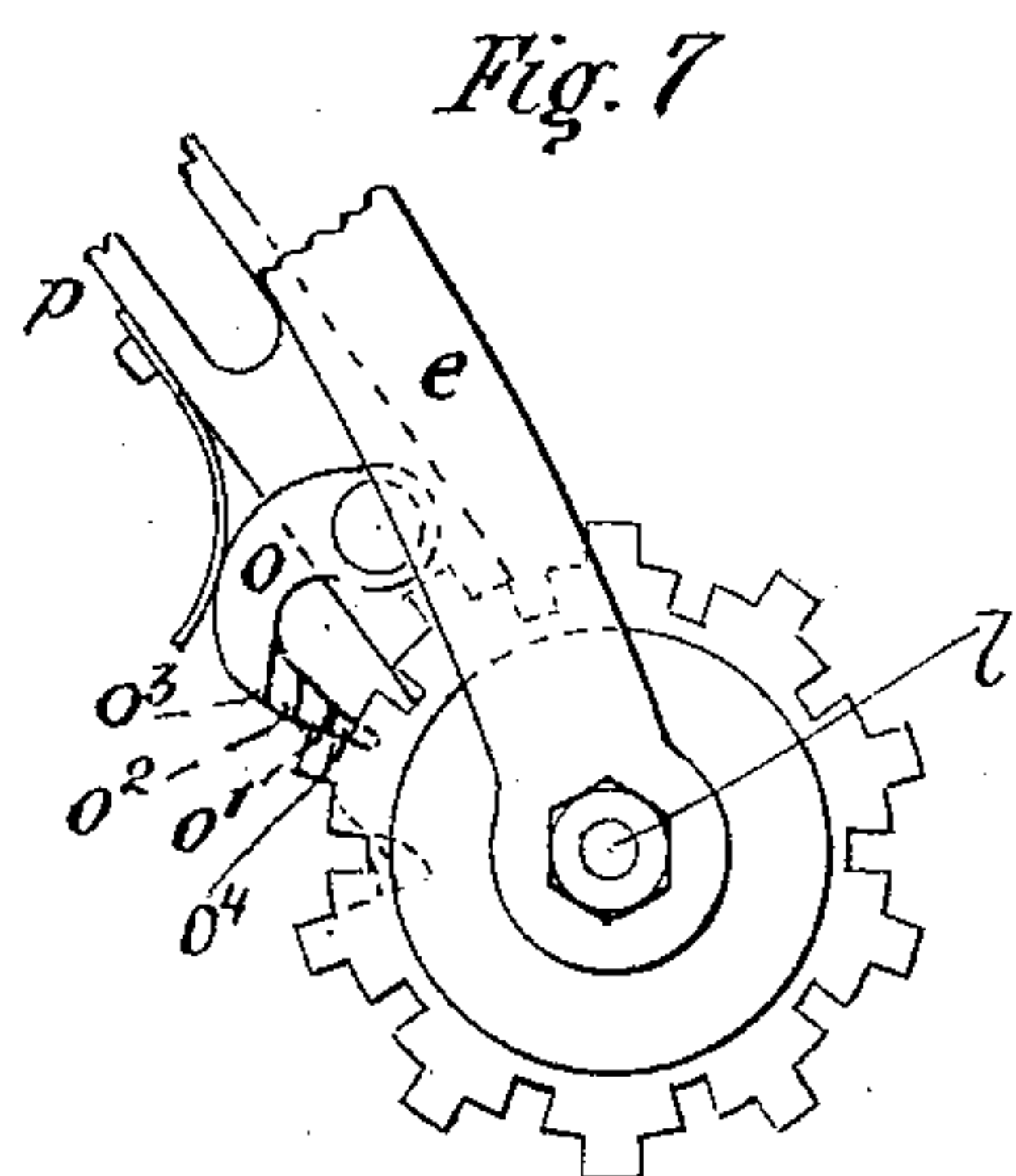
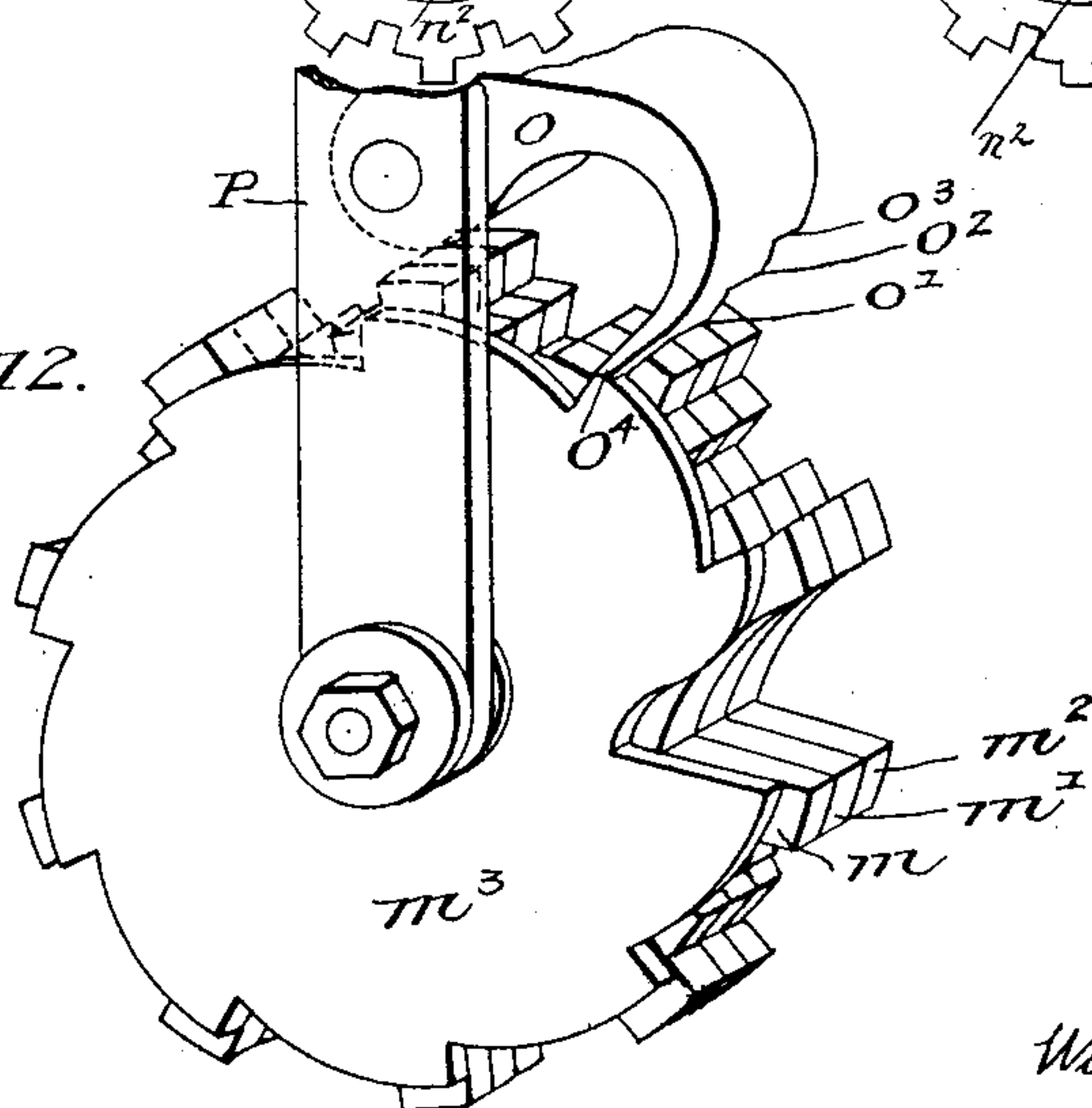


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM E. HOOLE, OF NEWARK, NEW JERSEY.

NUMBERING AND PAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,498, dated March 12, 1895.

Application filed May 2, 1894. Serial No. 509,788. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HOOLE, a citizen of the United States, and a resident of Newark, county of Essex, State of New Jersey, have invented new and useful Improvements in Numbering and Paging Machines, of which the following is a specification.

The improvements in numbering and paging machines forming the subject of this invention lie in the inking mechanism, the figure wheels and means for operating the figure wheels, and in the construction of the operating devices. Rotary motion is imparted to the ink bed by means of two pawls carried by the ink roller carriage, at each operation, to a sufficient extent to insure a perfect distribution of the ink. The actuating device of the figure wheels is so constructed as to move each of the wheels positively at the right time and to avoid all danger of the imperfect setting of the wheels when this part of the machine becomes worn from constant use, which is a source of much trouble in this class of machines, and the retention springs of the wheels and other parts of the figure head are so improved that this part of the machine may be readily taken apart for the purpose of cleaning it and for substituting other figure wheels and be again set up in operative position by any ordinary mechanic.

These improvements and others relating to the general construction I will now fully describe by referring to the accompanying drawings, in which—

Figure 1 is a side elevation of a numbering and paging machine embodying my improvements, the lower part of the frame and operating treadle being omitted. Fig. 2 is a plan view, and Fig. 3 is a front elevation of the same. Fig. 4 represents the figure head and adjacent devices in the position they occupy when an impression is being made. Fig. 5 is a plan view of the inking roller and ink bed, on an enlarged scale, taken on the line 5, 5, Fig. 1. Fig. 6 is a sectional elevation of the ink bed. Fig. 7 is an enlarged side elevation of the figure head being the reverse of that shown in Figs. 1 and 4. Fig. 8 is a rear view of the same, and Figs. 9, 10, 11 are detached views of the figure wheels. Fig. 12 is a perspective view of the numbering head showing the manner in which the feeding pawl is

caused to clear the figures on the numbering wheels during its retrograde movement.

The frame is composed of two side pieces *a a* being formed at the upper part as shown in Fig. 1. Cast with or attached to an upwardly projecting limb at the front of the frame is the impression bed *a'*, and this limb acts as a guide for the adjustable table *b*. This table has a screw *b'* secured to its under side which is held and controlled by the hand wheel nut *b²*, said nut lying between two horns projecting from the upwardly projecting limb of the frame.

Between the side pieces *a a* of the frame is pivoted the operating lever, which is preferably composed of two branches *c c* joined to the hub *c'*, through which and the sides of the frame is passed the pivotal bolt *c²*. To the lower end of this lever *c c* is attached the rod *d* which connects it to the operating treadle or other power applying device of the machine, not shown in the drawings.

d' is a spring connected to the frame *a a*, and rod *d* having the function of moving and holding the lever *c c* in the position it occupies in Figs. 1, 2 and 3.

The figure wheels and other parts of the figure head are carried at the free end of the curved arm *e*, which is located between the two branches of the lever *c c*, and is supported by the two pivotal conical bearings formed on the ends of the screws *e' e'*. These screws *e' e'* pass through the sides *a a* of the frame and by their adjustment the arm *e* and figure head carried thereby may be set as desired. Around the hub of the arm *e* is placed a helical spring *e²*, one end of which acts against a pin projecting from the side of the arm *e* and the other end acts against a pin projecting from one of the sides *a* of the frame, as shown at Fig. 2. The arm *e* and its adjuncts are by means of this spring *e²* caused to recoil after an impression has been made, and to be held in the position shown in Fig. 1. The upper side of the arm then bears against the screw stop *e³* which passes through the bar *a²* of the frame, and by means of this screw the position of the figure head carried by the arm *e* may be adjusted vertically as desired. The bar *a²* also limits the return movement of the lever *c c* by the upper sides of the two branches of said lever coming in

contact with said bar when the lever is retracted by the spring d' , as shown at Fig. 1. A bracket piece e^4 projects from the front of the arm e and lies in the path of the bar c^3 , secured to the branches $c c$ of the operating lever when this lever is depressed.

The ink bed f is located behind the figure head and is an inverted circular plate provided with a hub f' , bored to fit over the neck f^2 of the stud f^3 which is screw threaded and turns in a tapped hole formed in the bar a^3 connecting together the front ends of the two sides $a a$ of the frame. This stud f^3 is provided with a collar having holes f^5 formed therein and by means of which, with a suitable tool, the stud may be rotated to raise or lower the ink surface of the bed f . The neck of the stud is circumferentially grooved, into which groove extends the end of the thumb screw f^4 fitted in the hub f' . This allows the ink bed to be rotated freely while it is securely held on said stud, and also permits of the ready removal of the ink bed to receive a fresh supply of ink and for cleaning purposes. The ink bed is vertically adjusted so that its ink surface is in a horizontal plane with the face of the underneath figures of the figure wheels. Rotary motion is imparted to the ink bed by means of pawls carried by the ink roller carriages, hereinafter described, acting on ratchet teeth formed on its periphery. The inking roller g is fitted to rotate in a frame g' which is secured by means of screws to the carriage composed of the side bars $g^2 g^2$ and end cross bar g^3 . These side bars are fitted to slide in horizontal bearings $a^4 a^4$ formed on the sides of the frame $a a$, and to lugs at the ends of the cross bar g^3 are pivoted the lower ends of the lever $h h$. The upper ends of these levers $h h$ are, by means of the link h' and suitable bearing bolts, connected to the upper ends of the branches of the operating lever $c c$, and their fulcrums are formed by studs $h^2 h^2$ set in the sides $a a$ of the frame. The central part of the levers fit over the studs $h^2 h^2$ the bearings in the levers being slotted to allow of their vertical movement due to their lower ends being caused to travel in right lines in a horizontal plane. The levers $h h$ are held on the studs $h^2 h^2$ by means of washers and nuts.

The holes in the frame g' through which the screws pass that hold said frame to the cross bar g^3 of the carriage are slotted to admit of the vertical adjustment of the inking roller g relatively to the ink bed and figures of the figure wheels.

On the carriage $g^2 g^3$ are pivoted the spring actuated pawls i and i' , one of which is straight and the other one hooked, and they are so arranged as to catch into the ratchet teeth of the ink bed, thereby partially rotating it during both the forward and backward movement of the carriage, as the inking roller g moves from the ink bed f to the figure wheels, and from the figure wheels to the ink bed. This double rotative action on the ink

bed turns it at each operation of the machine to a sufficient extent to insure the ink being perfectly distributed by and on the inking roller g , as it travels across the ink bed.

A sheet metal guard k is secured to the frame g' in front of and beneath the inking roller g to prevent the paper being numbered from coming in contact with the roller.

The mandrel l of the figure wheels is secured to the free end of the arm e , and the figure wheels $m m'$ and m^2 are fitted to rotate thereon. The mandrel l is provided with ten equidistant V-shaped grooves l' and another groove l'' between two of the equidistant grooves as clearly shown in Fig. 9, and each of the wheels $m m'$ and m^2 has an opening n^2 formed through it straight at the inner side near the central openings and curved at the other side, narrow slots being formed at the junctures of the straight and curved sides, and a radial opening from the straight side to the central opening, as shown in Figs. 9, 10 and 11, and particularly at Fig. 11. In these openings are placed the retention pawls or pins $n n$, which are secured to the central parts of the flat springs $n' n'$, the ends of these springs being placed in the narrow slots, as clearly shown at Fig. 10, the pins $n n$ then lying in the radial openings with their points normally extending in the central openings so as to fit into the longitudinal V-shaped grooves in the mandrel l as shown at Fig. 9. The extra or eleventh V-shaped groove l^2 is to allow the tens and hundreds wheels m' and m^2 to be set and held with their figures out of operative positions when starting to number paper or to page a book. By this construction of the retention device great simplicity is had, working bearings for the pawls are provided the full thickness of the wheels, and facility is afforded in applying the wheels to the mandrel. Spacing disks are placed between the wheels, and they may if desired be secured to the wheels.

The wheels actuating device consists of a stepped spring actuated pawl o extending across the full width of the wheels and pivoted to the lever p , which is fitted to rock on the end of the mandrel l against the ratchet wheel m^3 , which is secured to the face of the unit wheel m , said lever p and wheels m, m' and m^2 being held on the mandrel by means of the nut l' .

The ratchet wheel m^3 is acted upon by the extreme point o^4 of the pawl o , which point extends beyond the first step of the pawl, the ratchet wheel being of such a size that the first step o' clears the face of the figures of the wheel m when the pawl o^4 rides back over the ratchet teeth to engage a fresh tooth, said wheel m being principally rotated by the step o' bearing against the sides of the figures. So is the second wheel m' moved by the second step o^2 and the third wheel m^2 moved by the third step o^3 , and in all cases the pawls have a bearing the full width of the wheel,

and by acting against the sides of the figures the direction of thrust is directly in line with the movement of the wheels and also in line with the retention pawls.

5 To cause the second wheel to be moved when its printing figures are to be changed one of the teeth of the ratchet wheel m^3 is cut deeper than the others and a notch is made alongside of one of the figures of the wheel
10 m as shown at m^4 , Fig. 9. A similar though not so deep a notch m^5 is made in the second wheel m' to allow its step of the pawl o to pass therein when the third step of the pawl is required to engage with the third wheel. This
15 lever p is rocked on the mandrel l so as to cause the pawl o to engage succeeding teeth of the wheels when the arm e is depressed to print, and the feeding forward of the wheels takes place during the upward movement of
20 the arm e . To accomplish this the lever p is slotted and through said slot extends a pin or stud p' set in a lug projecting from the front of the frame a . Fig. 4 shows the figure wheels in their downward positions and also
25 the inking roller g in its backward position. The first part of the movement of the lever c moves the inking roller g away from the figure wheels. The bar c^3 then strikes the bracket e^4 of the arm e and so forces it down. During
30 the first part of the retrograde movement when the lever c is released, the arm e and lever c move together. The inking roller g then moves across the ink bed and before it reaches the figure wheels the arm e has attained its
35 highest position, and is at rest. The lever c continuing its upward movement causes the inking roller to travel across the figures of the figure wheels. I have only shown and described a set of three figure wheels. The im-
40 provements here shown and described it will readily be understood are applicable to any number of figure wheels used in this class of machine. The wheels are also shown arranged to number consecutively. For pag-
45 ing books I propose to employ two extra unit wheels to be substituted for the unit wheel shown, one with the odd numbers and the other with the even numbers formed thereon.

I claim as my invention—

50 1. In a numbering and paging machine, the combination of a figure head, an inverted ink bed, a horizontally moving carriage, an inking roller carried thereby and adapted to move across the ink bed and the undermost
55 figures of the figure wheels, a lever or levers centrally slotted and connected at one of its or their ends to the ink roller carriage central fulcrum, fixed stud or studs extending through the slot or slots of the lever or levers,
60 a pivoted arm or lever connected to the power applying device of the machine, and a link attached to the free end of this lever and the other end or ends of the ink roller carriage levers.

65 2. In a numbering and paging machine, the combination of a figure head, an inverted ink bed, a horizontally moving carriage, an ink-

ing roller carried thereby and adapted to move across the ink bed and the undermost figures of the figure wheels, a lever or levers
70 connected at one of its or their ends to the ink roller carriage and having a central fulcrum, a pivoted arm or lever provided with a lateral stud or bar and connected to the power applying device of the machine, a link at-
75 tached to the free end of this lever and the other end or ends of the ink roller carriage levers, a pivoted arm carrying the figure head and having a projection arranged in the path of the lateral stud or bar of the operat-
80 ing lever, a recoil spring connected to this arm, and an impression bed on the frame of the machine.

3. In a numbering and paging machine, the combination of a figure head, an inverted ink
85 bed provided with ratchet teeth, a horizontally moving carriage, and an inking roller carried thereby and adapted to move across the ink bed and the undermost figures of the figure wheels, and two pawls pivoted to the
90 carriage and arranged to engage the ratchet teeth of the ink bed one during the forward movement and the other one during the backward movement of the carriage.

4. In a numbering and paging machine, the
95 combination of a figure head, an inverted ink bed provided with ratchet teeth, a horizontally moving carriage, an inking roller carried thereby and adapted to move across the ink bed and the undermost figures of the fig-
100 ure wheels, two pawls pivoted to the carriage and arranged to engage the ratchet teeth of the ink bed, one during the forward movement and the other one during the backward movement of the carriage a lever or levers
105 connected at one of its or their ends to the ink roller carriage, and having a central fulcrum, a pivoted arm or lever connected to the power applying device of the machine, and a link attached to the free end of this lever and
110 the other end or ends of the ink roller carriage lever.

5. In a numbering and paging machine, the combination of a figure head, an inverted ink
115 bed provided with ratchet teeth, a horizontally moving carriage, an inking roller carried thereby and adapted to move across the ink bed and the undermost figures of the figure wheels, pawls pivoted to the carriage and arranged to engage the ratchet teeth of the
120 ink bed, a lever or levers connected at one of its or their ends to the ink roller carriage and having a central fulcrum, a pivoted arm or lever provided with a lateral stud or bar and connected to the power applying device of the
125 machine, a link attached to the free end of this lever and the other end or ends of the ink roller carriage levers, a pivoted arm carrying the figure head and having a projection arranged in the path of the lateral stud or bar
130 of the operating lever, a recoil spring connected to this arm, and an impression bed on the frame of the machine.

6. In a numbering and paging machine, an

inverted rotatable ink bed having a centrally bored hub, an adjustable stud fitted by a screw thread in the frame of the machine and having a neck circumferentially grooved and fitted in the bored hub of the ink bed, and a screw or pin in said hub and extending in the groove of the stud.

7. In a figures printing device of a numbering or paging machine, the combination of a longitudinally grooved mandrel, a figure wheel having a central bore to fit the mandrel and an opening entirely through it, a flat spring with a pawl stud attached thereto at its central part, and supported at its two ends and arranged in the opening with the pawl or stud, normally extending into the central bore and into one of the grooves in the mandrel.

8. In a figures printing device of a numbering or paging machine, the combination of a longitudinally grooved mandrel, a figure wheel having an opening entirely through it, a flat spring with a pawl stud attached thereto at its central part, and supported at its two ends and arranged in the opening with the pawl or stud, normally extending into one of the grooves in the mandrel, said opening through the wheel having a flat side adjacent to the central opening, a curved outer side, narrow slots at the junctures of the flat and curved sides in which the ends of the spring are held, and a slot extending from the flat side to the central opening of the wheel.

9. In a figures printing device for a numbering or paging machine, the combination of a set of figure wheels having raised or projecting figures, a ratchet on the first wheel having one of the notches deeper than the others, and corresponding to a notch in the first wheel formed alongside one of the figures, the

succeeding wheels having also notches alongside one of their figures, a spring actuated pawl with steps adapted to work against the side of the figures and bear thereon the full width of the wheels, said ratchet being of such a size that the first step of the pawl will clear the face of the figures of the first wheel when said pawl is moved back to engage with said first wheel, and a rocking lever on which the pawl is pivoted.

10. In a figures printing device for a numbering or paging machine, the combination of a set of figure wheels having raised or projecting figures, a ratchet on the first wheel having one of the notches deeper than the others, and corresponding to a notch in the first wheel formed alongside one of the figures, the succeeding wheels having also notches alongside one of their figures, a spring actuated pawl with steps adapted to work against the side of the figures and bear thereon the full width of the wheels, said ratchet being of such a size that the first step of the pawl will clear the face of the figures of the first wheel when said pawl is moved back to engage with said first wheel, a rocking lever on which the pawl is pivoted, said lever being slotted and having its bearing on the mandrel of the wheels, and a fixed pin extending through the slot of this lever.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 27th day of April, 1894.

WILLIAM E. HOOLE.

Witnesses:

ALFRED SHEDLOCK,
ARTHUR C. BLATZ.