

No. 765,406.

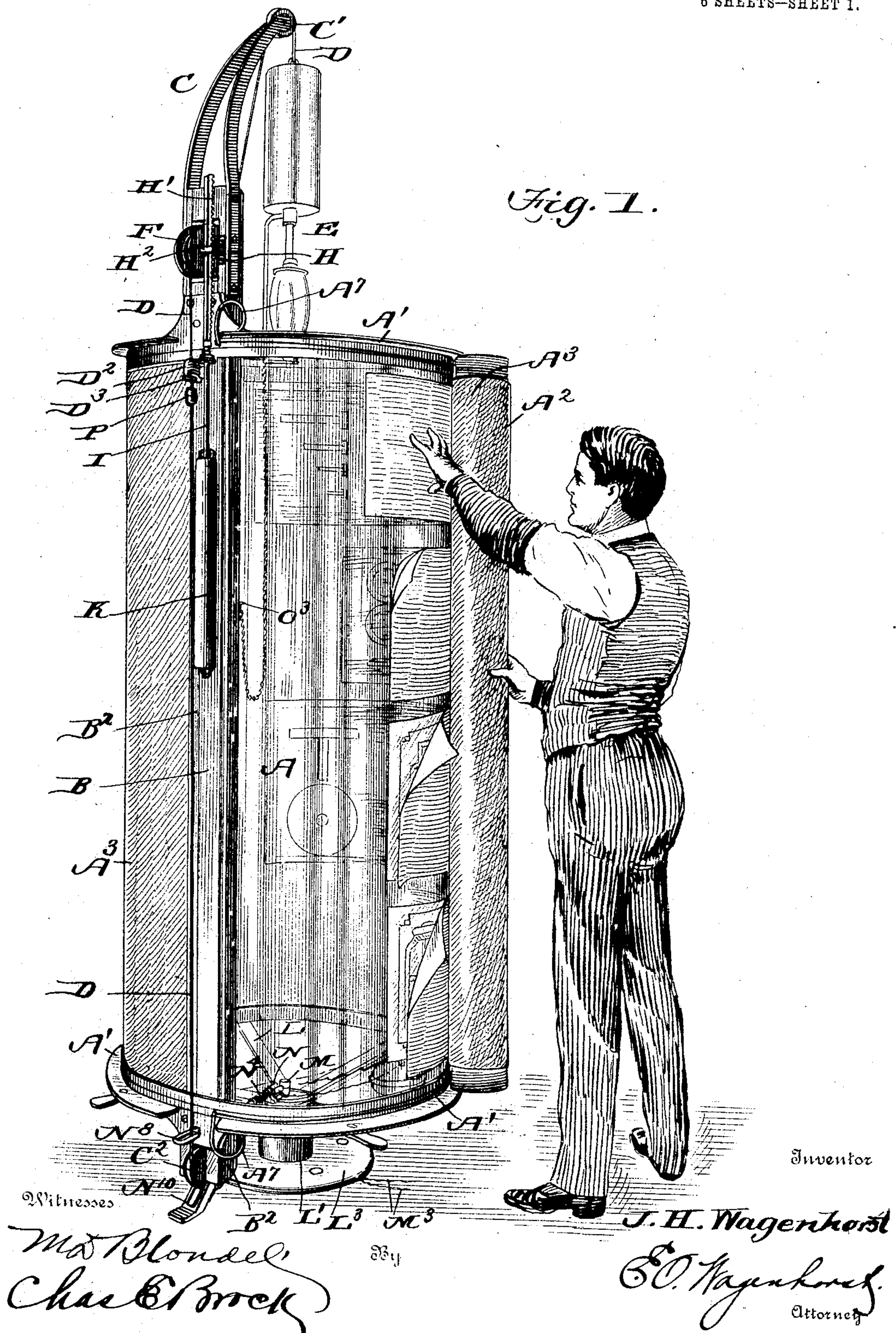
PATENTED JULY 19, 1904.

J. H. WAGENHORST.
BLUE PRINTING APPARATUS.

APPLICATION FILED AUG. 18, 1903.

NO MODEL.

6 SHEETS—SHEET 1.

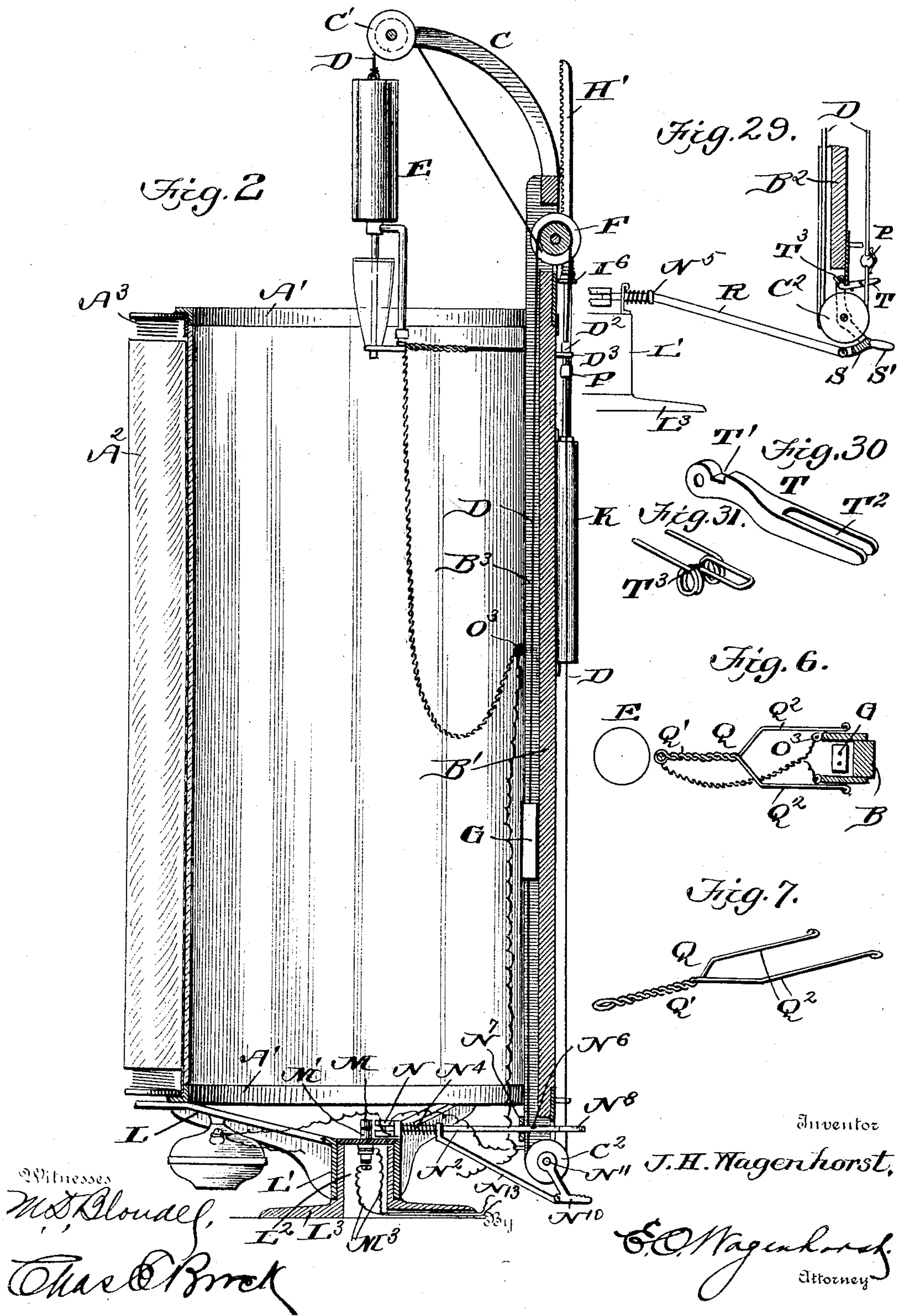


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6 SHEETS—SHEET 2.



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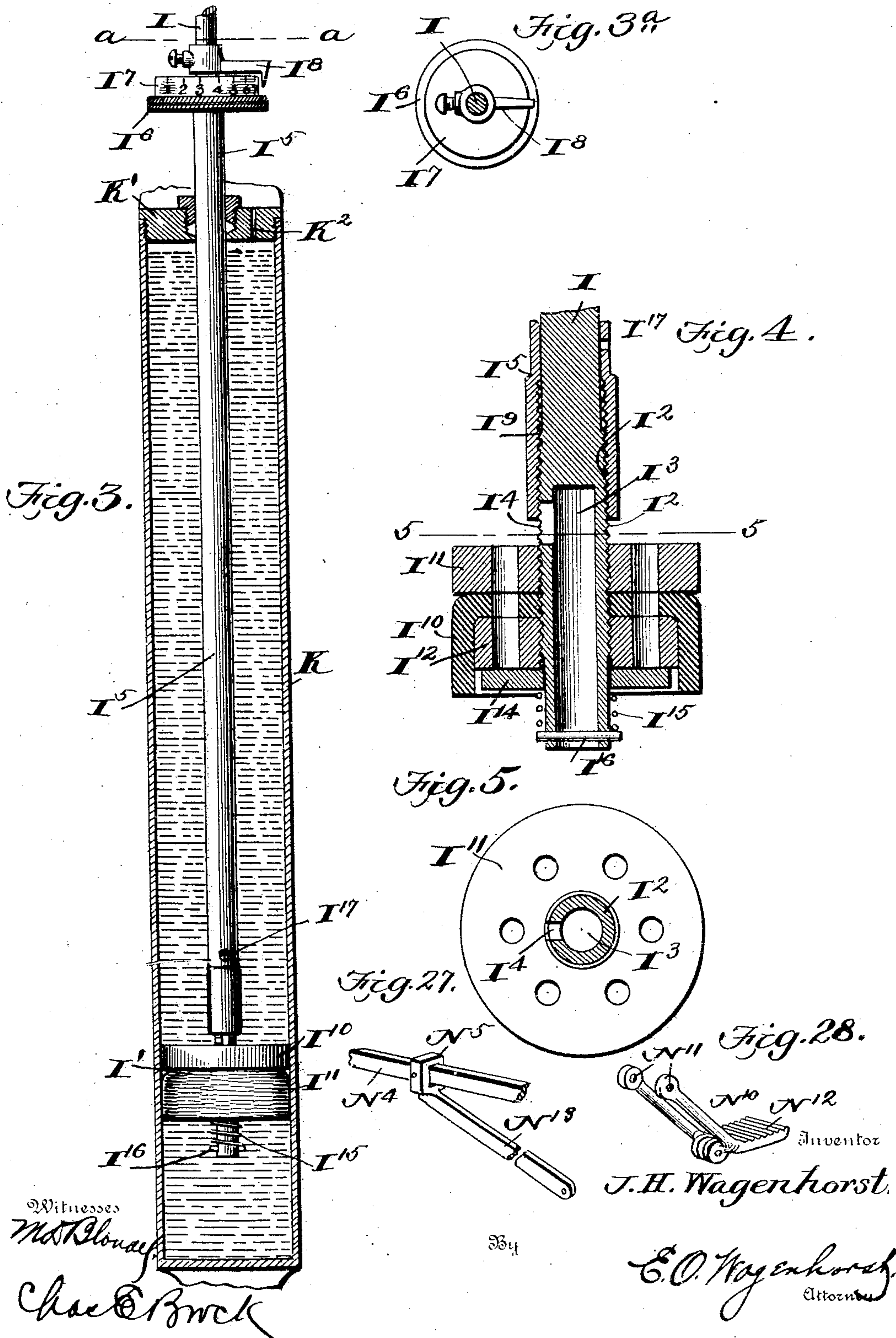
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6 SHEETS—SHEET 3.

NO MODEL.



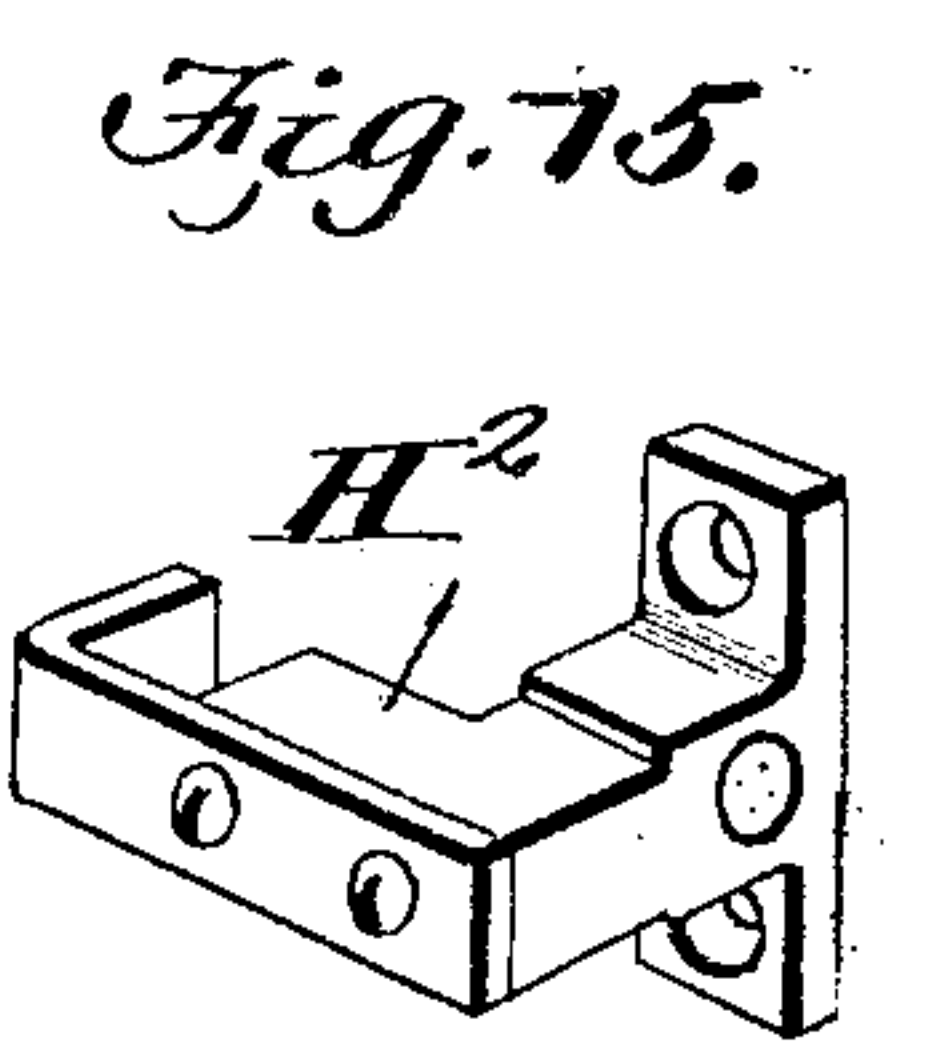
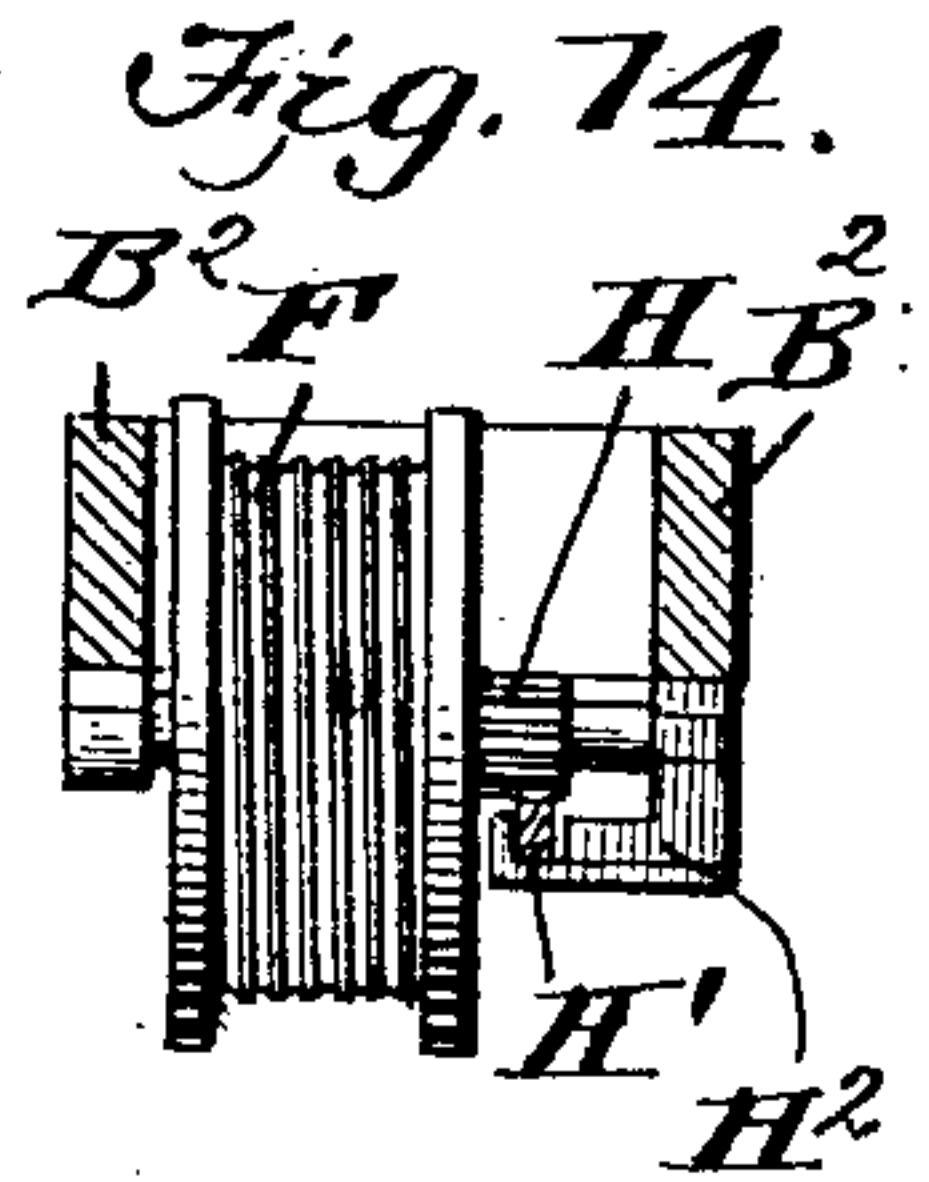
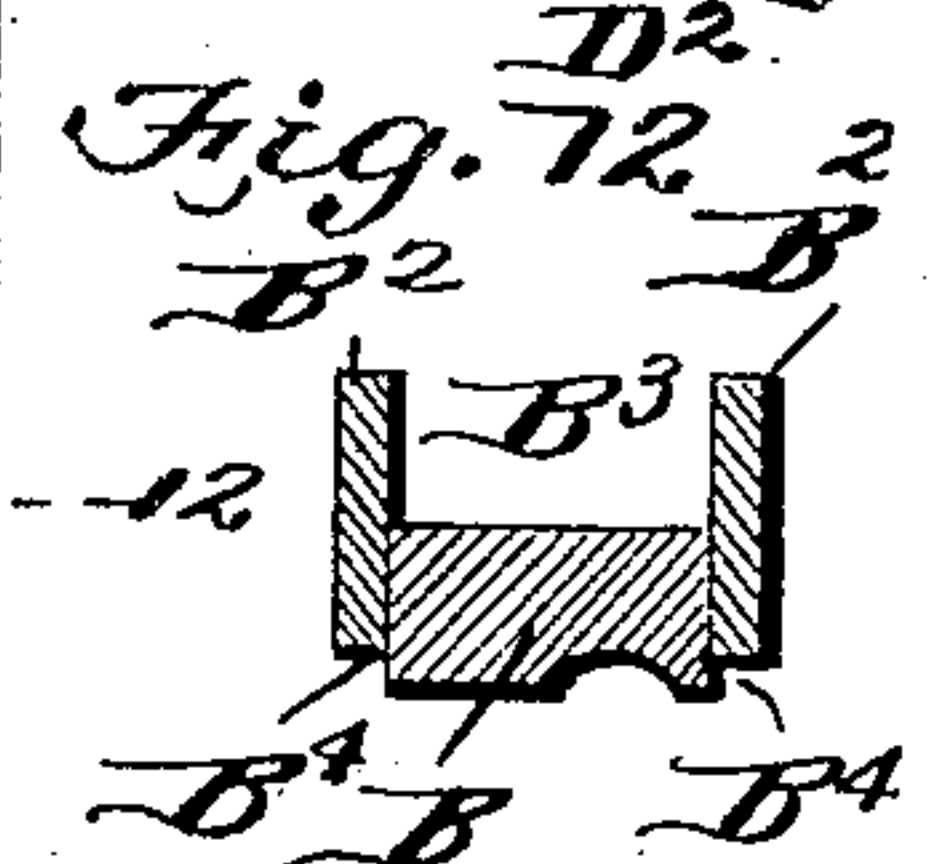
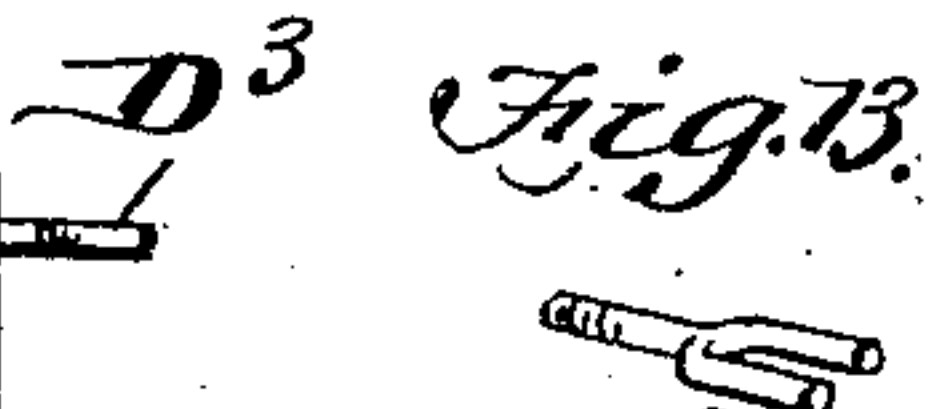
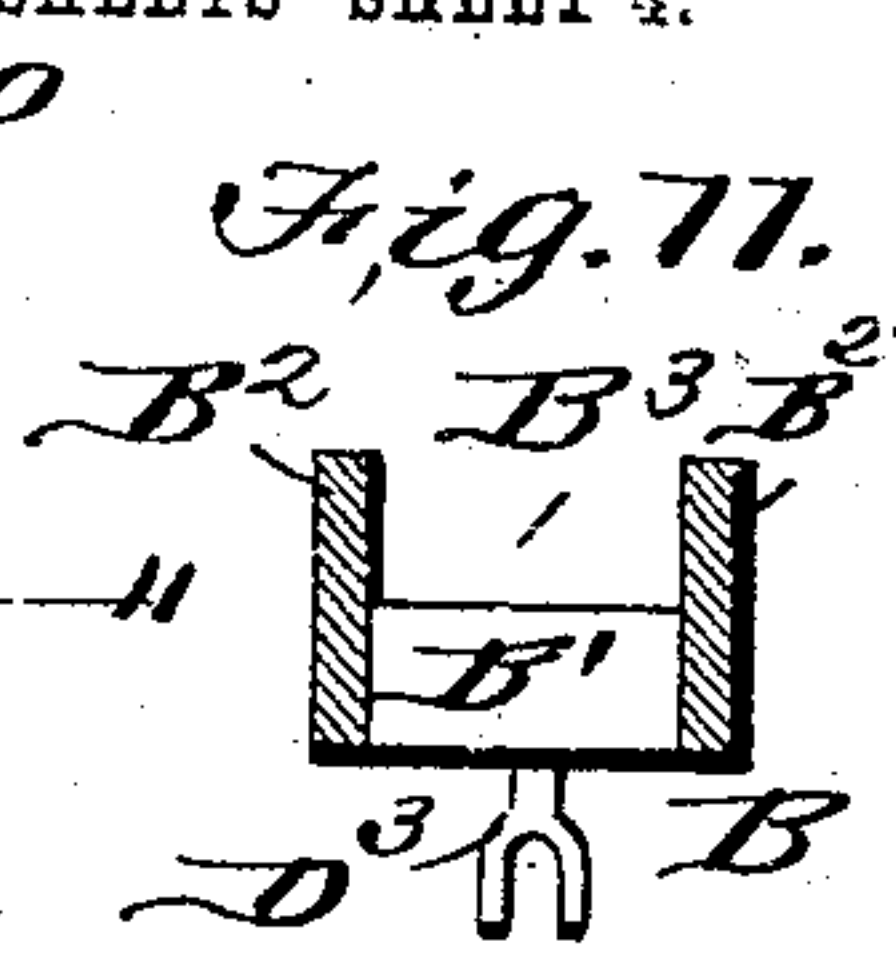
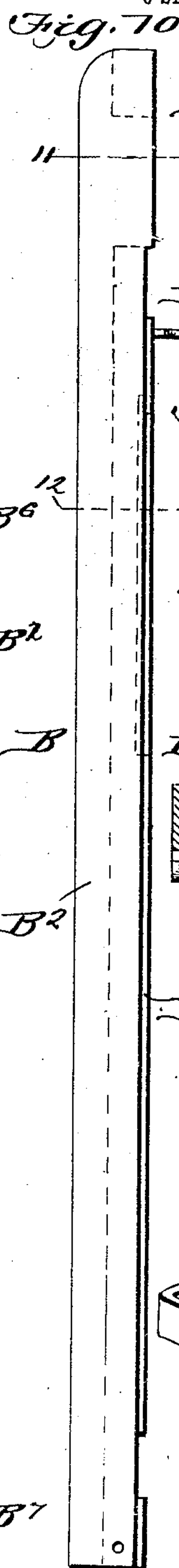
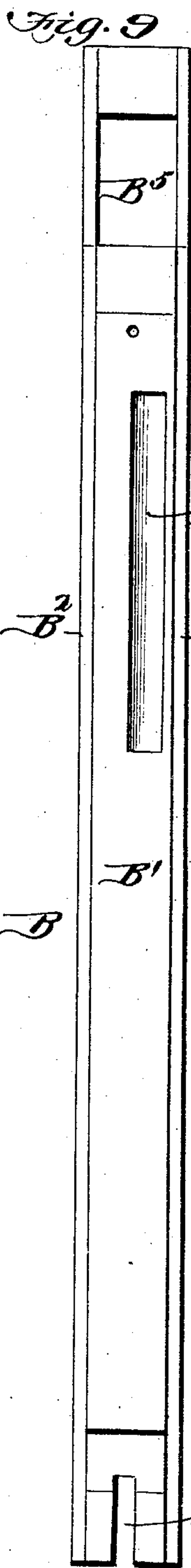
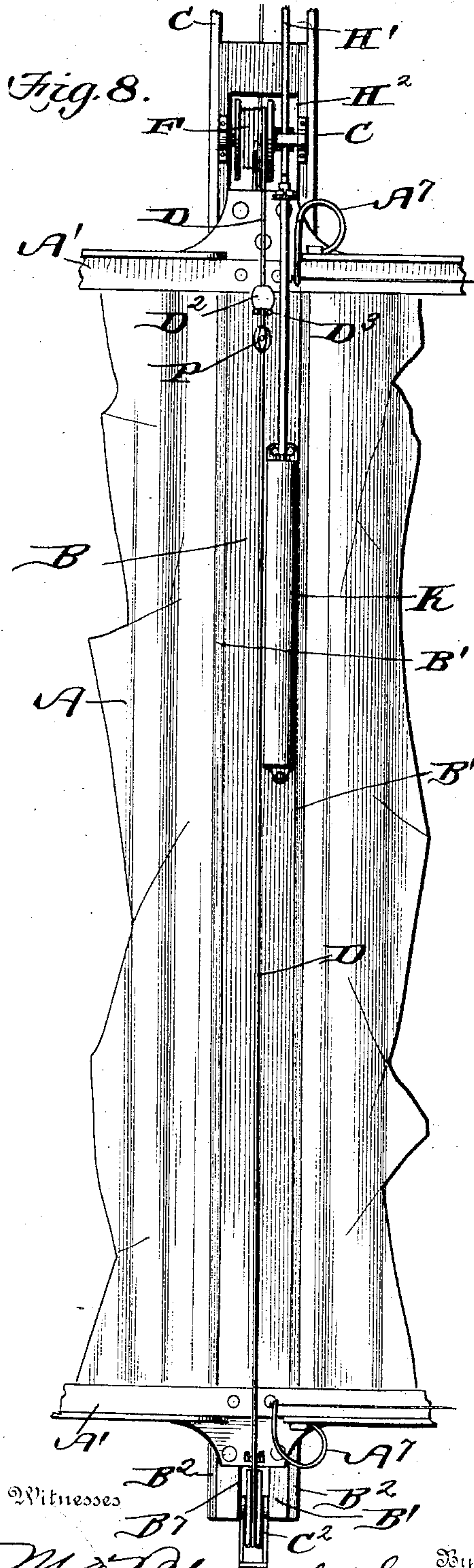
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6 SHEETS—SHEET 4.



Inventor

Witnesses

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No. 765,406.

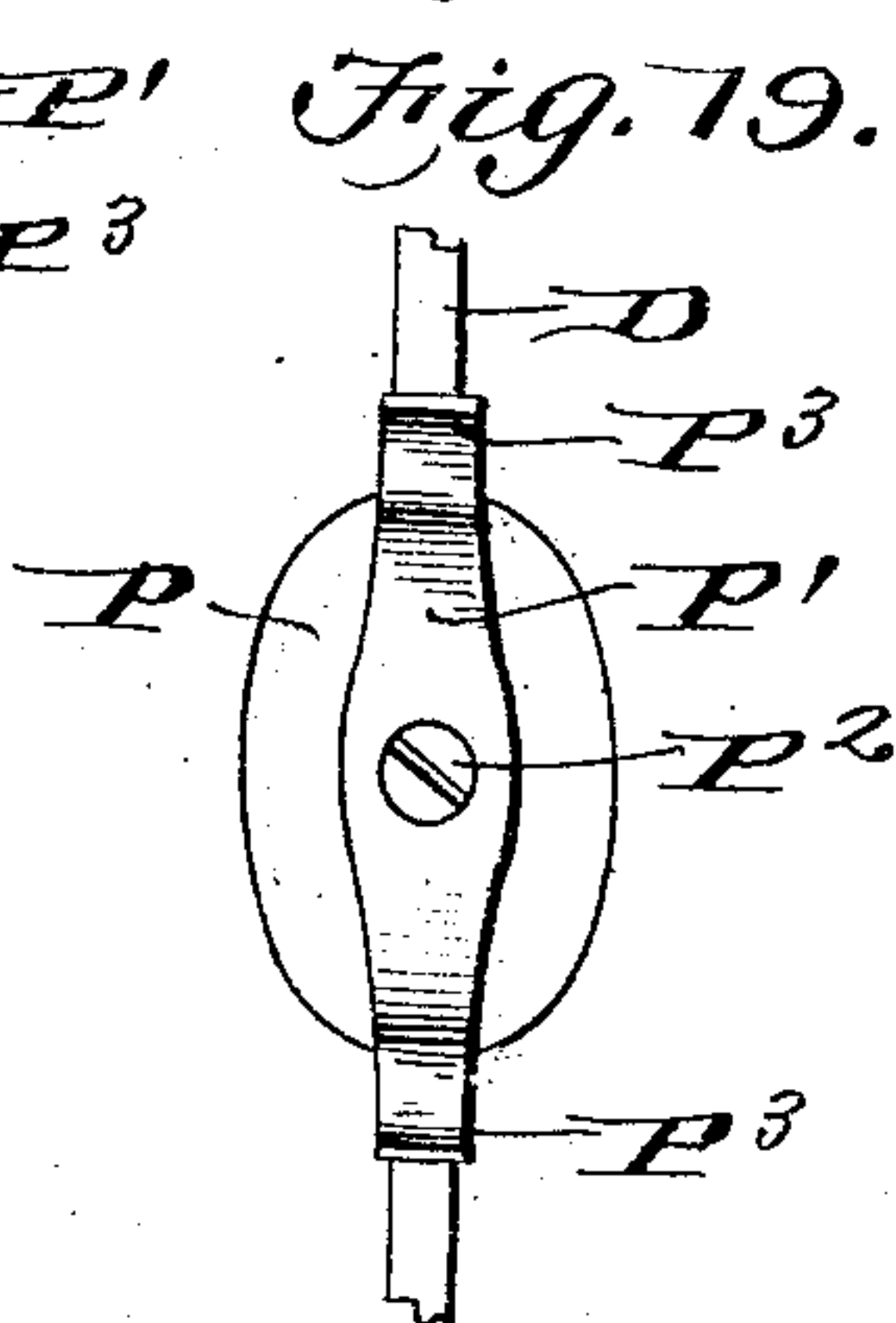
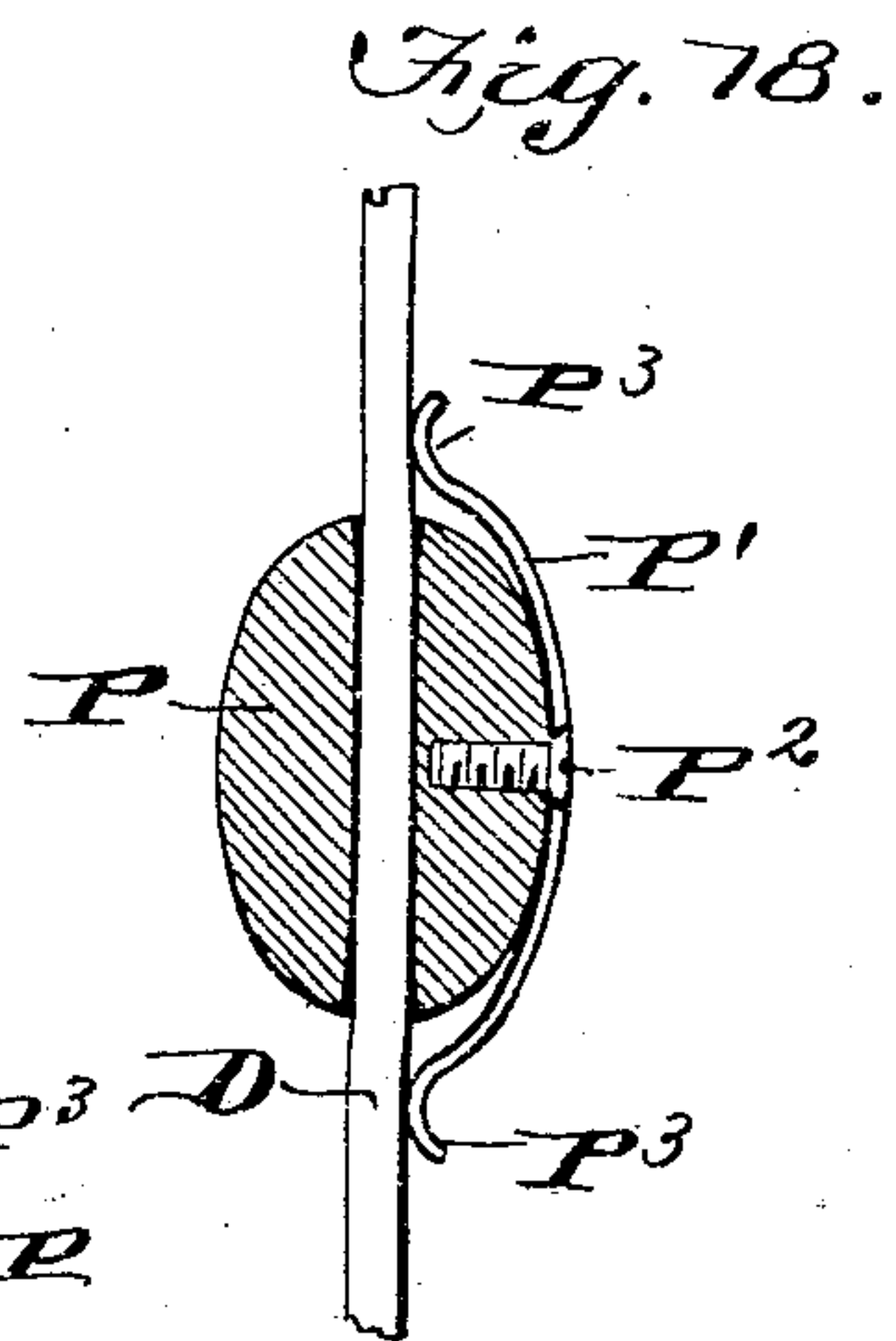
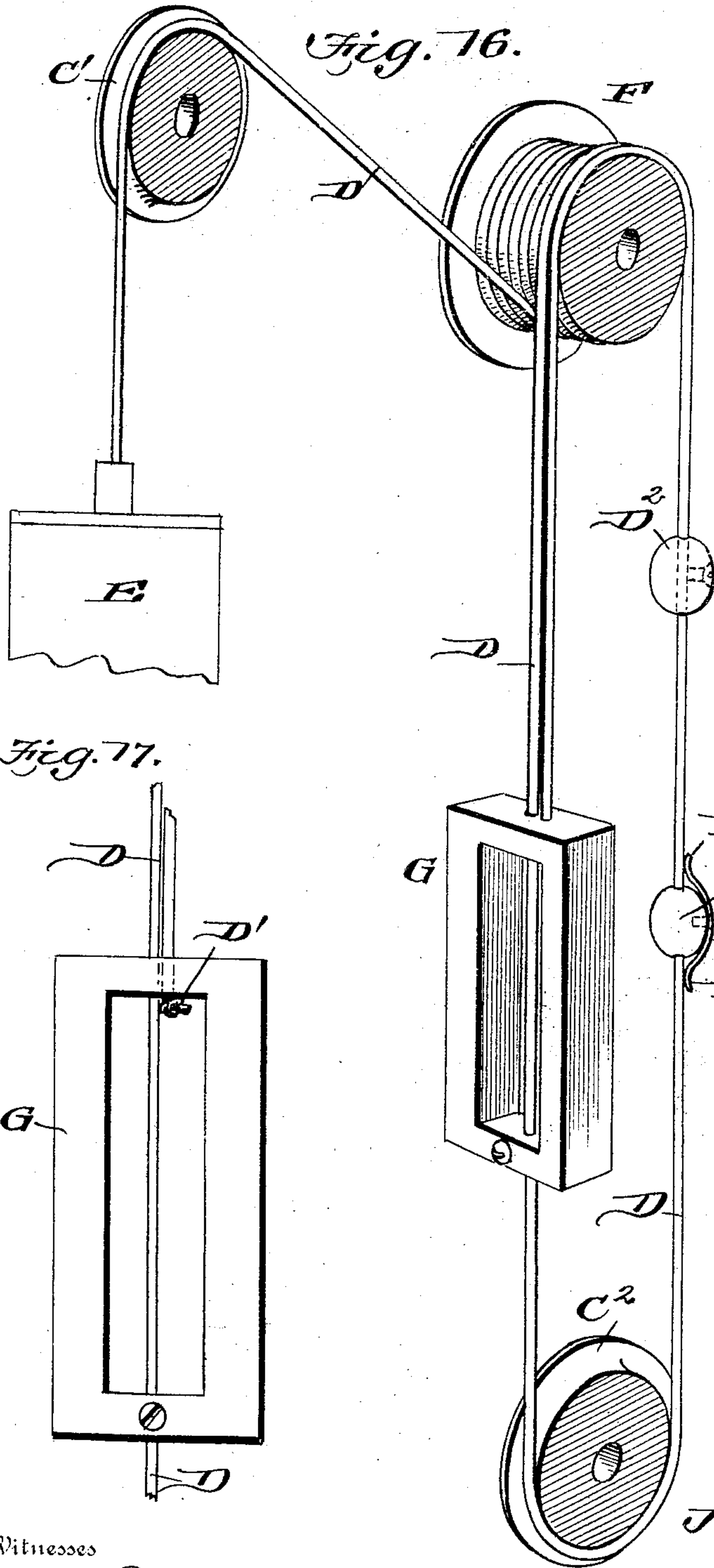
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J. H. WAGENHORST.
BLUE PRINTING APPARATUS.

APPLICATION FILED AUG. 18, 1903.

NO MODEL.

6 SHEETS—SHEET 5.



Witnesses
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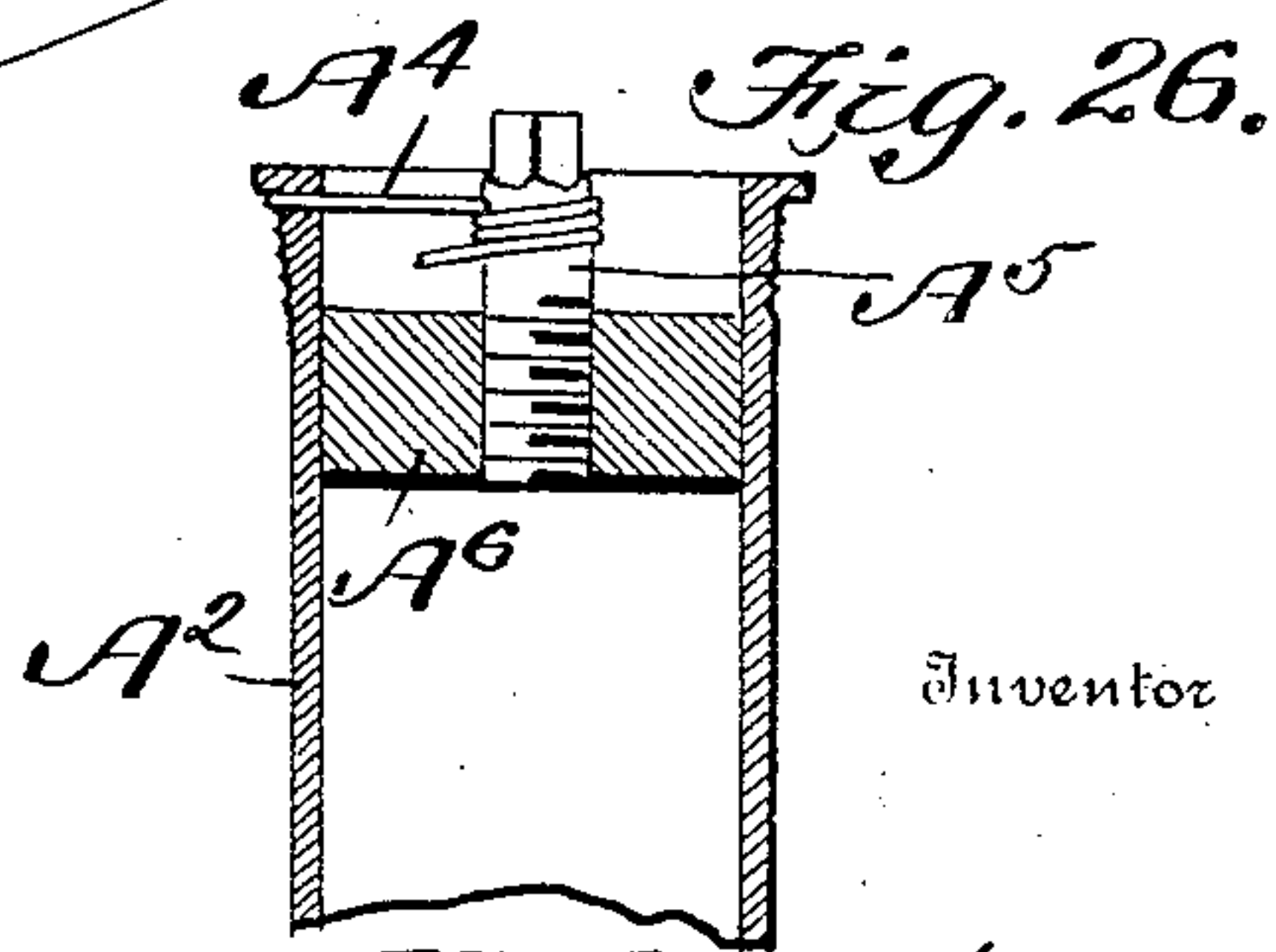
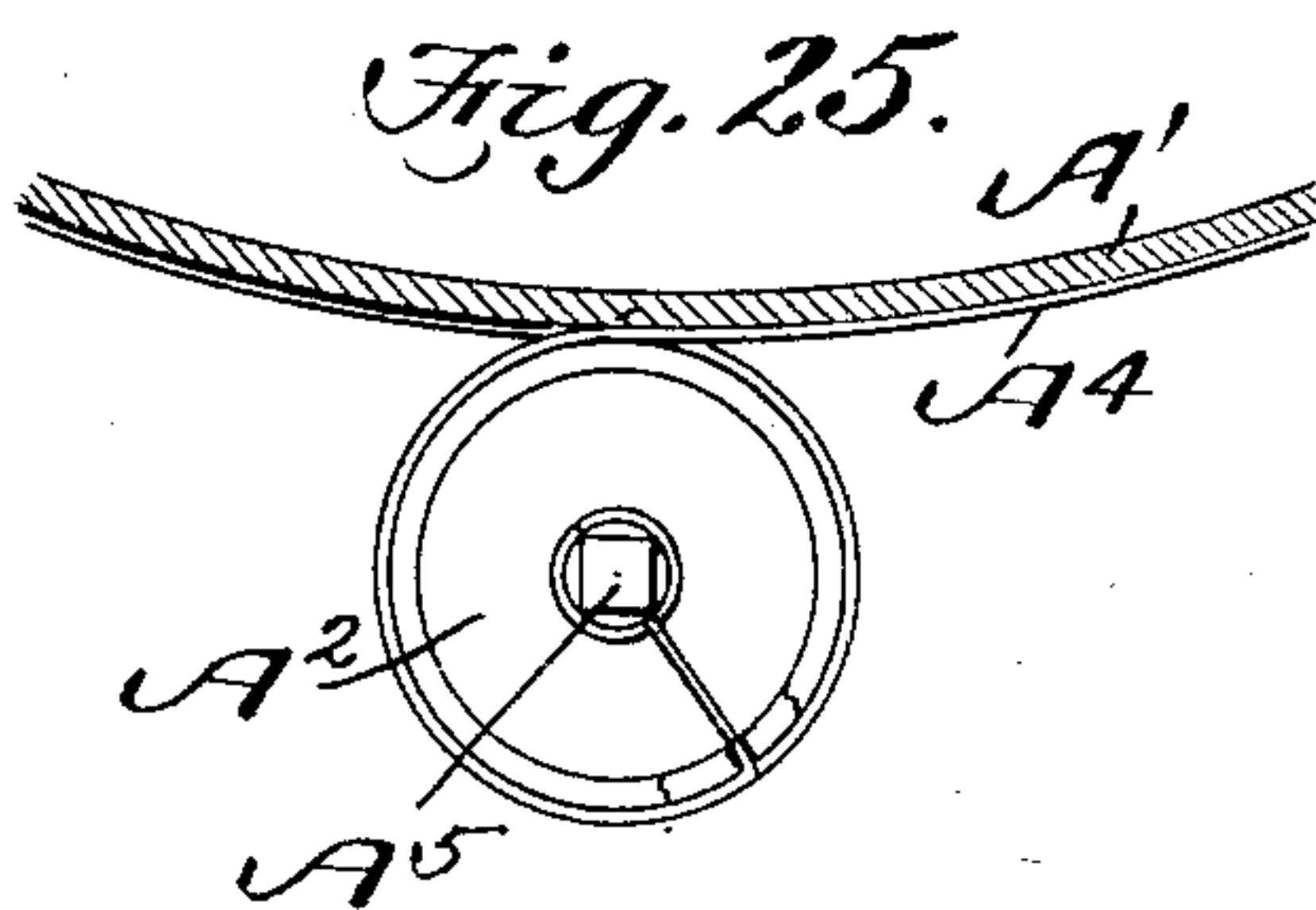
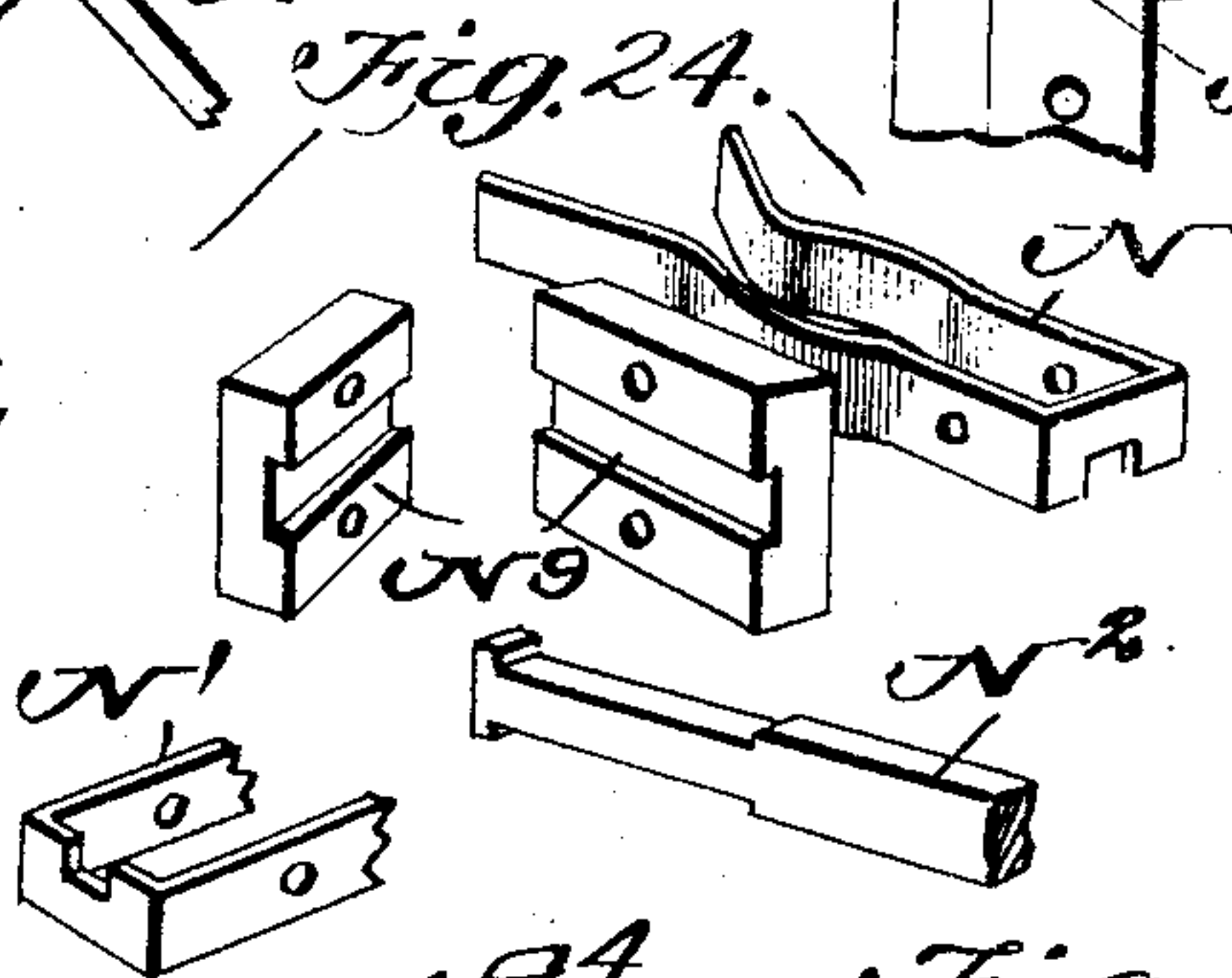
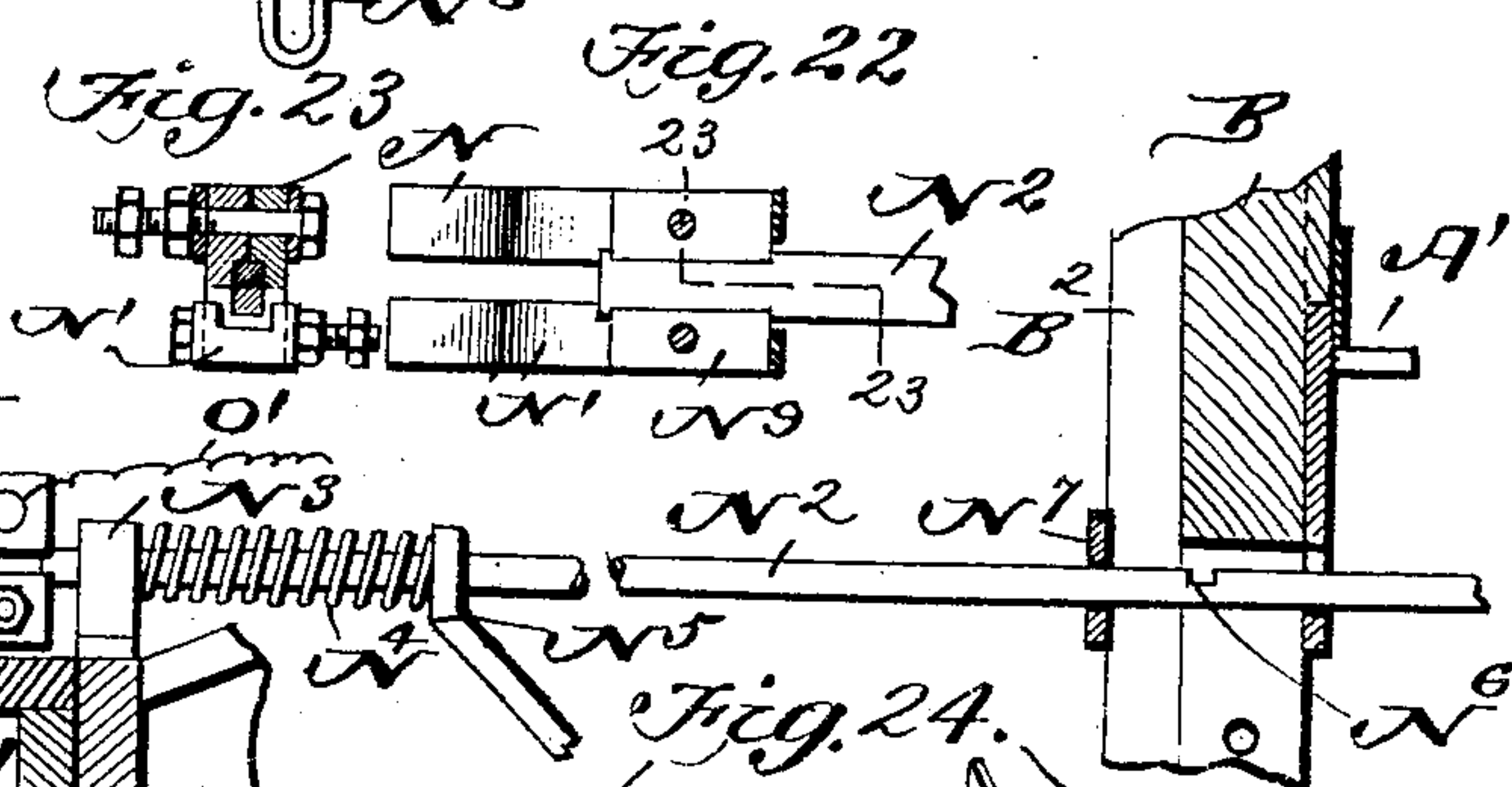
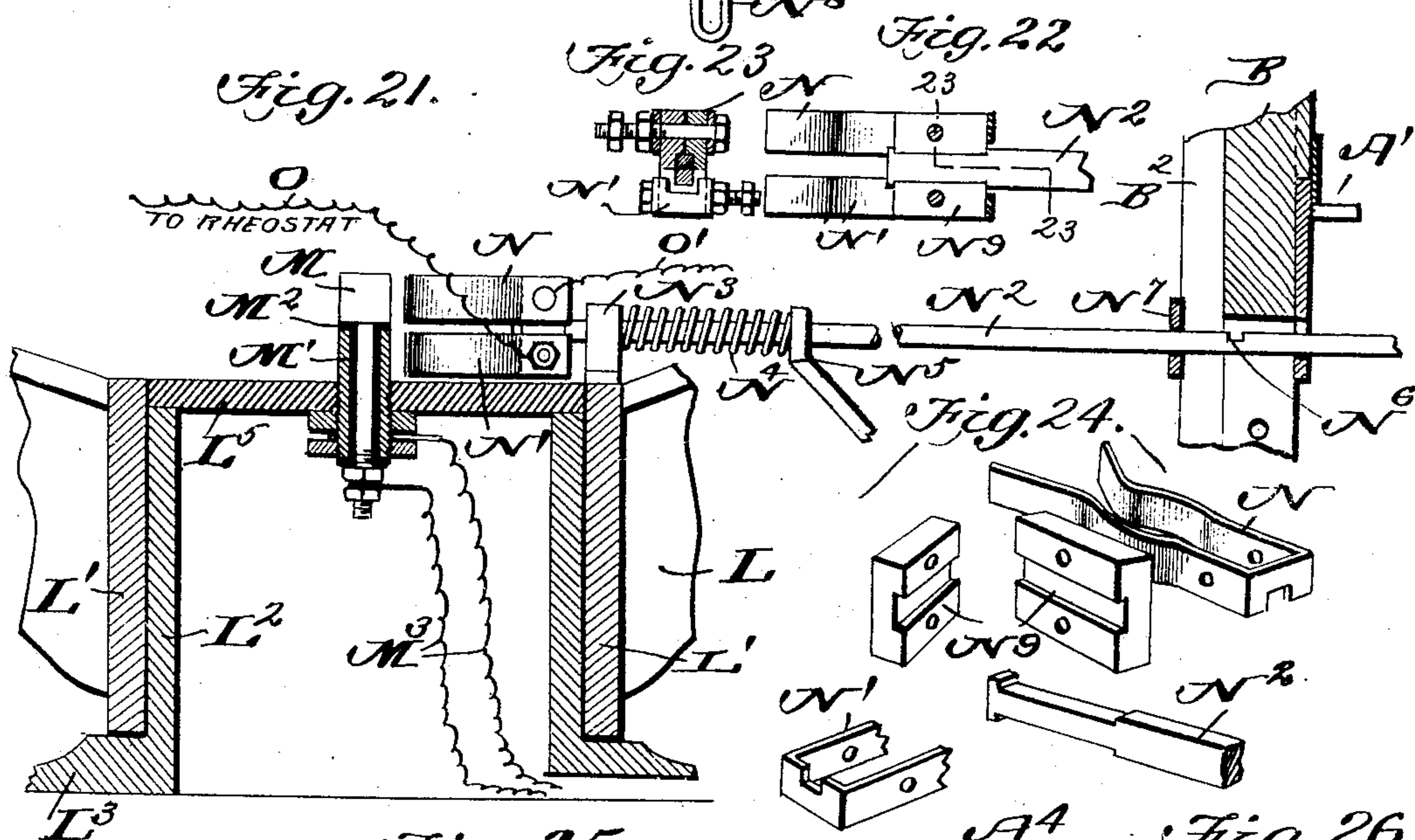
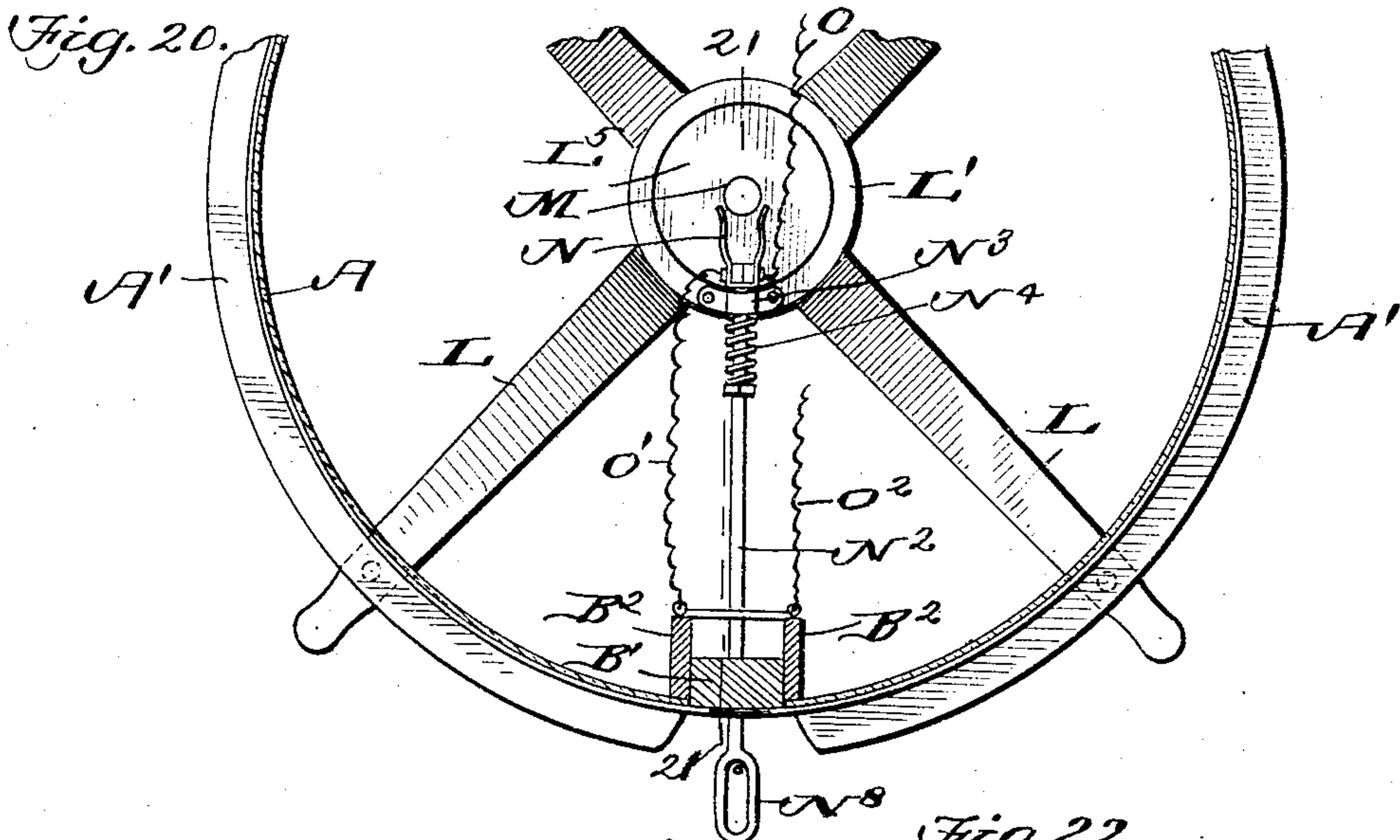
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NO MODEL.

6 SHEETS—SHEET 6.



Witnesses

W. B. Blondel,
Chas E Brock

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Inventor

J. H. Wagenhorst,
E. Wagenhorst
Attorney.

UNITED STATES PATENT OFFICE.

JAMES H. WAGENHORST, OF MANSFIELD, OHIO.

BLUE-PRINTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 765,406, dated July 19, 1904.

Application filed August 18, 1903. Serial No. 169,894. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. WAGENHORST, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented a new and useful Improvement in Blue-Printing Apparatus, of which the following is a specification.

This invention relates generally to blue-printing apparatuses in which an electric-arc light is used in connection with a glass cylinder, around which the drawings and sensitized paper are held by means of a spring-actuated curtain, such as are shown and described in the patent granted to me February 17, 1903, No. 720,862.

The object of the invention is to provide a novel means for lowering the electric light into the cylinder, said means being capable of regulation, so that the speed of descent may be regulated with accuracy, so as to expose the prints to the light the exact length of time required.

Another object of the invention is to provide for automatically cutting off the light the moment the light has traversed the entire height of the glass, thereby avoiding overexposure or burning of the print.

Another object of the invention is to provide for cutting off the light and stopping its descent at any predetermined time, thereby rendering the apparatus capable of use for making large or small prints, and a still further object is to provide for shutting off light at any desired time by either hand or foot power.

Another object of the invention is to provide a guiding-bracket in connection with the lamp for the purpose of preventing the shadows of the lamp-bracket and wire connections being thrown upon the prints.

With these various objects in view the invention consists in the employment of a glass cylinder arranged to rotate upon a base to which the line of wires are connected, said glass cylinder having an upright wooden strip arranged in connection therewith, said wooden strip having a lamp-bracket extending upwardly from its upper end, an electric lamp suspended from a cable passing over a pulley carried by the bracket, said wooden strip also carrying means by which the descent of the

lamp into the cylinder is regulated, said means being adjustable, a switch adapted to be brought into contact with the connections upon the base, together with means for throwing the said switch out of engagement with the base connections when desired.

The invention consists also in the employment of a cylinder having a piston working thereon, said piston being provided with a by-pass for controlling the passage of liquid from one side of the piston to the other, the rod of the piston being operatively connected with the cable for raising and lowering the lamp, whereby the speed of descent of said lamp can be regulated.

The invention consists also in the peculiar construction of the strip arranged in connection with the cylinder and also in certain other details of construction and novelties of combination, all of which will be fully described hereinafter and pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a perspective view of an apparatus constructed in accordance with my invention and showing the operation thereof. Fig. 2 is a vertical sectional view of the same, certain parts being shown in elevation. Fig. 3 is a detail sectional view of the cylinder, the piston and the piston-rod being shown in elevation. Fig. 3^a is a detail sectional view on the line *a a* of Fig. 3. Fig. 4 is an enlarged sectional view of the lower end of the piston-rod and the piston arranged thereon. Fig. 5 is a sectional plan view taken on the line 5 5 of Fig. 4. Fig. 6 is a detail view partly in top plan and partly in section and illustrating the operation of the guide connected to the lamp. Fig. 7 is a detail perspective view of said guide. Fig. 8 is a side elevation showing a portion of the glass cylinder and metal rings connected thereto and also the wooden strip arranged in connection with the glass cylinder and carrying the means for controlling the descent of the lamp into the cylinder and also the means for operating the switch. Fig. 9 is a face view of the wooden strip disconnected from the cylinder. Fig. 10 is a side view of said strip. Fig. 11 is a sectional view on the line 11 11 of Fig. 10. Fig. 12 is a sectional view on the line 12 12 of Fig. 10.

Fig. 13 is a detail perspective view of the fork for holding the knob when it is desired to hold the lamp in its elevated position. Fig. 14 is a detail view illustrating the operation of the guide in connection with the rack-bar and pinion. Fig. 15 is a detail perspective view of the said guide. Fig. 16 is a view illustrating the cable for carrying the lamp, the pulleys and the drum around which the cable passes, the counterweight connected to the cable, and the permanent and adjustable buttons arranged upon the cable. Fig. 17 is a face view of the counterweight. Fig. 18 is a sectional view of the adjustable button. Fig. 19 is a face view of said button and the friction-spring carried thereby. Fig. 20 is a horizontal sectional view taken on the line 20 20 of Fig. 2 and showing the spring-actuated switch and the central post to which the line-wires are connected. Fig. 21 is a vertical sectional view on the line 21 21 of Fig. 20, certain parts being shown in elevation. Fig. 22 is a detail view showing the arrangement of the contact-plates carried by the switch, and Fig. 23 is a detail sectional view on the line 23 23 of Fig. 22. Fig. 24 is a view showing the details of construction of the switch. Fig. 25 is a top plan view of the roller, showing the manner of connecting the wire thereto. Fig. 26 is a sectional view of the same. Figs. 27 and 28 are detail perspective views illustrating the foot-lever and pitman connected thereto for the purpose of operating the rod by foot-pressure. Figs. 29, 30, and 31 show details.

In carrying out my invention I employ a glass cylinder A, having top and bottom metal rings A', roller A², carrying the curtain A³, all of said parts being substantially the same as those shown and described in my prior patent before referred to. In connection with the glass cylinder I employ a wooden strip B, against which the edges of the glass cylinder rest and to which metallic top and bottom rings are connected. Although I prefer to make the strip B of wood, it is obvious that other suitable material may be employed, if so desired, and in practice I prefer to build this strip with a face-piece B' and the side pieces B², thereby providing a vertical guideway B³ upon the interior, and at the same time I provide shoulders B⁴ upon the exterior for the edges of the glass cylinder to rest against. The strip has an opening B⁵ near the top, a recess B⁶ adjacent the opening, and the bifurcation B⁷ at the lower end, the function of which will appear hereinafter. A curved bifurcated bracket C is connected to the upper end of the strip B, the upper end of said bracket extending directly over the center of the cylinder and carrying a pulley C', over which travels the cable D, carrying the electric-arc light E. It will thus be understood that in making the blue-prints the tracings or drawings and the sensitized papers

are arranged upon the exterior of the glass cylinder and held in place by means of the curtain and spring-actuated roller carrying said curtain and that in order to make the prints the electric-arc light is lowered into the glass cylinder, and it is necessary that the electric light should descend gradually, and, furthermore, it is often desirable to regulate the speed of descent, as some prints may require more or less light-exposure than others. It is also desirable to cut off the light as soon as it accomplishes its purpose, thereby economizing in the use of the current, and it is with the idea of accomplishing these objects that I have devised the present means for controlling and regulating the descent of the lamp and the cutting off of the light. The cable D after passing around the pulley C' passes one or more times around a grooved drum F, said drum being journaled in boxes arranged upon opposite sides of the cut-out portion B⁵ of the strip. The cable then passes downwardly in the vertical guideway B³ and through the counterbalance-weight G, which slides vertically in the guideway B³, and the cable after passing through the counterbalance-weight G passes around a pulley C², journaled in the bifurcated end B⁷ of the strip B, along the outer face of the strip through the opening B⁵, and over the grooved drum F again, and down to the counterweight, the end of the cable being connected to said weight, as shown at D'. The lamp E is slightly heavier than the counterbalance-weight G and will descend as soon as the cable is released; but the weight will make the descent gradually and at the same time keep the cable tight upon the pulleys and drum. For the purpose of securing the cable and holding the lamp in its elevated position I attach a button D² permanently to the outer flight of the cable, which button is adapted to engage the fork D³, fastened to the strip B adjacent its upper end, and so long as the button rests upon the fork the lamp will be held in its elevated position; but as soon as the button is disengaged from the fork the descent of the lamp will begin.

Mounted upon the shaft of the drum F is a pinion H, which meshes with a rack-bar H', said rack-bar being held in engagement with the pinion by means of a guide H², connected to an arm carried by one of the journal-boxes of the drum-shaft. The lower end of the rack-bar H' is connected to a piston-rod I, carrying a piston I', which works in a cylinder K, located in the recessed portion B⁶ of the strip B. This cylinder K has a detachable cap K', through which the piston works, said cap having an opening K² to prevent the formation of a vacuum. The lower end of the piston-rod is threaded, as shown at I², and in the extreme end of the piston-rod is produced a longitudinal passage I³, having an opening I⁴, arranged at a point above the pis-

ton I', so that as the piston is forced downwardly the liquid can pass through the passage to the upper side of the piston, this passage constituting the by-pass within the piston-rod, and for the purpose of regulating the size of the discharge-opening so that the rate of descent of the piston can be regulated I employ a tube I⁵, which surrounds the piston-rod for the greater portion of its length, said tube extending through the cap K² of the cylinder, and is provided with a milled wheel I⁶ at its upper end, said milled wheel carrying a circular boss I⁷, which is graduated and provided with suitable indicating-numbers, and a pointer I⁸ is rigidly attached to the piston-rod, said pointer serving to indicate upon the graduated boss the size of the opening exposed and from which the rate of descent can be judged. The lower end of the tube I⁵ is threaded, as shown at I⁹, and by turning the milled wheel I⁶ this tube is caused to move up or down upon the piston-rod, thereby enlarging or decreasing the size of the opening I⁴, through which the oil passes from the under side of the piston to the upper side. It will thus be seen that I arrange a by-pass for the liquid within the piston-rod and arrange the controlling means upon the rod, thereby avoiding the necessity of supplemental by-passes and valves, which are liable to leak or get out of order.

Any suitable liquid may be placed in the cylinder; but in practice I prefer to use oil, as I find it particularly adapted for my purpose.

The piston-cup I¹⁰, held upon the end of the piston-rod between the metal disks I¹¹ and I¹², arranged above and below the said cup, said disks being threaded upon the piston-rod and provided with registering perforations I¹³, the cup also having perforations which register with the said perforations I¹³, so that when the piston is moved upwardly the liquid above the piston will pass therethrough. The passage of the liquid through these perforations is prevented during the downward movement of the piston by means of a check-valve I¹⁴, mounted upon the smooth reduced end of the piston-rod and normally held against the disk I¹² by means of a spring I¹⁵. A pin I¹⁶, passed through the lower end of the piston-rod, holds this spring in place. This spring, together with the pressure of the liquid, keeps the valve firmly seated during the downward movement of the piston; but the valve is unseated during the upward movement of the piston, said unseating being accomplished by the pressure of the liquid above the piston, aided by the partial vacuum created below the piston, it being understood that the piston is only moved upwardly when the lamp is carried back to its initial or starting position.

It will thus be seen that I not only provide for a gradual descent of the lamp, but also provide for regulating such descent, so that

prints can be exposed to the action of the light for a long or short period of time, as circumstances may require.

The glass cylinder is supported upon spider-arms L, which radiate from a tubular bearing L', which rotates freely upon a tubular upright journal L², having a flat base L³, which rests upon the floor. A circular plate L⁵, of non-conducting material, rests upon the top of the tubular journal L², and fixed in said plate is an upright post M, surrounded by a tube M', said post and tube being insulated from each other by means of an insulating-sleeve M². Line-wires M³ pass upwardly through the floor through the tubular journal and are connected to the lower ends of the post M and tube M'. The post and tube are circular and are of the same diameter, so that the U-shaped spring contact-plates N and N' of the switch can contact therewith and can revolve or turn freely thereon whenever it becomes necessary to turn or rotate the glass cylinder. The contact-plate N engages the post M, while contact-plate N' engages the tube M', said contact-plates being carried upon the inner end of a rod N², which works through a guide N³ and has a coil-spring N⁴ arranged thereon, an adjusting-collar N⁵ being arranged upon the rod and secured by a pin or set-screw for the purpose of applying the proper tension to the spring N⁴. A notch N⁶ is produced in the top of the bar adjacent its outer end for the purpose of engaging a plate N⁷, carried by the strip B adjacent its lower end, the outer end of the rod working through the bifurcated portion and terminating in a loop or handle N⁸, through which the cable D passes after passing around the pulley C². The U-shaped contact-plates N and N' are secured to blocks of insulating material N⁹, fastened upon the end of the rod N². The spring N⁴ normally holds the contact-plates out of engagement with the conductor-posts; but by pushing the rod inwardly these plates come in contact with the conductor-post and tube and close the circuit, and when the rod is so pushed in the notch N⁶ engages the plate N⁷ and holds the switch closed. For the purpose of operating the rod by foot-pressure I employ an angled lever N¹⁰, pivoted at N¹¹ upon the shaft carrying the roller C² and provided with an outwardly-extending foot-piece N¹², a pitman-rod N¹³ being pivotally connected to the angle of the lever N¹⁰, the inner end of said pitman being rigidly connected to the collar N⁵, so that by pressing downwardly upon the foot-piece the pitman pushes the rod inwardly and upwardly, so as to bring the notch N⁶ into engagement with the plate N⁷. The contact-plates are each provided with binding-screws from which lead conductor-wires O and O', the conductor-wire O leading to a rheostat suspended from one of the spider-arms, while the conductor-wire O' leads to the lamp, and the wire O², leading from the

rheostat, leads also to the lamp, said wires being carried up the strip B on the inner side to a point O³, and from there they lead to the lamp, the conductor-wires being slack to permit the lamp to move freely up and down. When the switch is thrown out of engagement with the conductor-post, the current is broken and the lamp of course extinguished, and the opening of the switch can be accomplished by pressing downwardly upon the outer end of the rod, either by hand or foot; but in order to provide for automatically shutting off the lamp when it has traversed the entire cylinder or for the purpose of shutting off the lamp at any predetermined time I employ an adjustable button P upon the cable D, which button can be arranged at any desired point so that it will contact with the slotted or handle end of the rod N², it being understood that as the lamp descends the cable moves, carrying with it the adjustable button P, and only a slight pressure is needed upon the outer end of the rod to throw the notch N⁶ out of engagement with the plate N⁷, and the spring N⁴ will immediately open the switch, shutting off light. The button P is held in position upon the cable by means of the friction-spring P', secured to the button by means of a screw P², the ends of the plate being curved outwardly, as shown at P³, and adapted to bear against the cable. By means of this adjustable button I am enabled to automatically shut off the light at any time during the descent of the lamp.

In order to prevent shadows of the lamp-bracket and conductor-wires being thrown upon the print, I employ a lamp-guide Q, attached to the lamp and which comprises the shank portion Q', leg portions Q², and which straddle the strip B, and thereby cause the lamp to descend in a straight line, and the only shadows cast will be thrown upon said strip B and will not be thrown upon the prints. By reference to Fig. 6 it will be noted that the lamp-guide works upon the strip B upon the exterior, while the counterbalance-weight is guided upon the interior of said strip.

In Figs. 25 and 26 I have shown the manner of connecting the wires A⁴ to the rollers A², said wires being connected to screw-plugs A⁵, fastened in blocks A⁶, carried at the ends of the rollers. The opposite ends of these wires A⁴ are connected to U-shaped springs A⁷, said springs being fastened to the upper and lower rings A', as most clearly shown in Figs. 1 and 8. In this manner the proper tension can always be had upon the roller and curtain attached thereto.

In operation the lamp is raised to its highest position and held there by the button D² engaging the fork D³. The switch at this time is of course open, and the operator can then place the drawings and the sensitized papers upon the exterior of the cylinder and cover them by means of the curtain, and the cylin-

der can be rotated, if desired, during such operation, thereby rendering the arrangement of the drawings and sensitized paper upon the cylinder much easier. After the drawings, &c., have been arranged, the button D² is disengaged from the fork D³, the by-pass of the piston-rod regulated according to the rate of descent desired, and the adjustable button P adjusted to the proper position. The rod N² is then pushed inwardly, closing the switch and lighting the lamp. The lamp will descend gradually at the predetermined rate of speed, and owing to the lamp-guide and the arrangement of the wires no shadow will be cast upon the prints, but will be cast only upon the wooden strip B. As the lamp descends the counterbalance-weight ascends, the drum F is rotated, operating the pinion, which in turn operates the rack-bar and forces the piston downwardly, and this piston in turn forces the liquid from the lower end of the cylinder through the by-pass of the piston-rod. During the printing operation the cylinder can be rotated for the purpose of inspecting the prints from the opposite side of the cylinder, and such rotation of the cylinder will not affect the switch nor the clamp nor any of the parts attached thereto. The moment, however, the adjustable button contacts with the rod it disengages said rod, and the spring carried thereby causes the switch to be opened and the light to be shut off.

It will be noted that the apparatus is not connected to the wall or ceiling and has no connection whatever with any portion of the room except the floor, and inasmuch as the line-wires pass upwardly through the floor and the journal upon which the cylinder rotates it is obvious that there are no parts to become entangled, and the operator can pass freely around the apparatus, or he can remain in one place and turn the apparatus so as to bring any part thereof close to him. Thus it will be noted that I have provided a simple and efficient construction of blue-print apparatus capable of accomplishing all of the objects hereinbefore mentioned.

Instead of the spring-actuated rod N² and pitmen N¹³ employed for opening and closing the switch and illustrated in Figs. 2, 20, 21, and 27 and 28 I may employ the modified construction, the details of which are clearly shown in Figs. 29, 30, and 31, and by referring to the said figures it will be noted that I employ a rod R, which carries the spring contact-plates N at its inner end and is surrounded by the spring N⁴ and carries the collar N⁵ the same as the rod N². This rod, however, is bent downwardly and is pivotally connected to the lower end of an elbow-lever S, having a foot-piece S', said lever being mounted upon the shaft of the roller C² and is bifurcated at its upper end, and pivoted in said bifurcation is a latch T, having a notch T', which is adapted to engage the lower cyl-

inder-ring, and this catch is also bifurcated at its outer end, as shown at T^2 , and through which the cable D passes. A spring T^3 normally holds the catch in engagement with the cylinder-ring and holds the contact-plates in contact with the posts. When, however, the adjustable stop P contacts with the bifurcated end of the catch, the said catch is thrown down, disengaging the notch T' from the cylinder-ring, and the spring N^4 will then act to disengage the contact-plates and open the switch. To reset the parts, it is only necessary to press down upon the foot-piece S' , as the latch T will be brought into engagement with the ring simultaneously with the closing of the switch. It will also be noted that I produce a small opening I^{17} in the tube I^5 adjacent the lower end for the purpose of permitting the escape of any oil which may pass upwardly between the piston-rod and tube.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus of the kind described comprising a glass cylinder provided with means for holding printing material thereto, a bracket carried by the cylinder and from which depends a cable carrying a lamp together with means carried by the cylinder for regulating the rate of descent of the lamp, together with means carried by the cylinder for automatically opening and closing the circuit for the lamp.

2. An apparatus of the kind described, comprising a base, a glass cylinder rotatably arranged upon said base, and provided with means for holding the printing materials upon the exterior thereof, an electric lamp adapted to move vertically within the cylinder, a cable from which the lamp is suspended, means carried by the cylinder for winding and unwinding said cable, and means also carried by the cylinder for regulating the rate of speed of the cable-winding mechanism.

3. An apparatus of the kind described comprising a transparent cylinder provided with an enveloping curtain, an electric lamp adapted to be lowered into the cylinder, means carried by the cylinder for controlling the descent of the lamp, the electric conductors leading to the lamp, and a switch carried by the cylinder together with means for opening and closing the same, substantially as set forth.

4. The combination with a cylinder of transparent material of an electric lamp adapted to be lowered into the cylinder a cable carried by the cylinder and from which the lamp is suspended, a cylinder adapted to contain a liquid, arranged upon the exterior of the glass cylinder and provided with a by-pass piston working in the liquid-cylinder and means for operatively connecting the piston with the cable whereby the rate of speed of descent is regulated.

5. The combination with a transparent cyl-

inder and electric lamp adapted to be lowered into said glass cylinder, a cable for carrying the lamp, the drum and pulleys around which the cable passes, the counterweight connected to the cable, a cylinder arranged upon the exterior of the glass cylinder and adapted to contain a liquid, said cylinder having a piston-rod provided with a by-pass, a valved piston working in the cylinder together with means for operatively connecting the piston-rod with the drum around which the cable passes.

6. The combination with the glass cylinder having a wooden strip, of a cylinder connected to the exterior of the wooden strip and having a piston-rod provided with a by-pass provided with a regulating-tube, the valved piston working in the cylinder, the piston-rod having a rack-bar connected thereto, a pinion with which the rack-bar meshes, a grooved drum mounted upon the shaft and carried by the strip, a lamp-guide carrying a pulley, a cable passing around the pulleys and drum and connected to a lamp at one end, and a counterbalanced weight at the opposite end.

7. The combination with a glass cylinder having a vertical strip extending into the same, of an electric lamp adapted to descend into the glass cylinder and a lamp-guide comprising a shank connected to the lamp, and the leg portions adapted to straddle the vertical strip and guide the lamp as set forth.

8. The combination with a glass cylinder and the bearing upon which it turns, of the journal upon which the bearing fits, the conductor-posts carried by said journal, a switch carried by the rotating cylinder together with means for moving it into and out of engagement with the conductor-posts, an electric lamp carried by the rotating cylinder and the conductor-wires leading from the switch to the lamp, as set forth.

9. The combination with the journal supporting the conductors to which the line-wires are connected, the glass cylinder provided with a bearing turning upon said journal, the electric lamp adapted to be lowered into the cylinder, a cable for suspending said lamp, together with means for controlling the movement of said cable, the contact-plates adapted to engage the conductors supported by the journal the rod for carrying said plates the conductor-wires leading from the plates to the lamp, a spring for normally holding the plates out of engagement with the conductors, means for locking plates in engagement with the conductors together with means carried by the cable for unlocking the plates, substantially as set forth.

10. The combination with a rotatable glass cylinder, having a strip at one side thereof, said strip having a guideway upon the inner side, cut away adjacent its upper ends, and bifurcated at its lower end, of the journal upon

which the cylinder rotates, a bracket connect-
ed to the upper end of the strip and carrying
a pulley, a grooved drum journaled in the
opening of the strip, a pulley journaled in the
5 bifurcated end of the strip, an electric lamp
adapted to be lowered into the cylinder, a
cable for suspending said lamp, said cable
passing around the pulleys and drum, as de-
scribed, a counterweight sliding in the guide-
10 way of the strip and to which the cable is con-
nected, a cylinder arranged upon the exterior
of the strip, a piston-rod having a controlled
by-pass, a valved piston working in the cyl-
inder, a rack-bar connected to the piston-rod,
15 a pinion mounted upon the drum-shaft and

with which the rack-bar meshes, the buttons
arranged upon the outer flight of the cable,
the conductor-post and tube arranged as de-
scribed, the spring-actuated rod having a loop
at its outer end, and a notch adjacent said 20
loop, a plate adapted to engage said notch, the
contact-plates carried upon the inner ends of
the spring-actuated rod, the conductor-wires
connected to the contact-plates and leading to
the lamp, substantially as described.

J. H. WAGENHORST.

Witnesses:

L. W. CALLARD,
N. O. FLEMING.