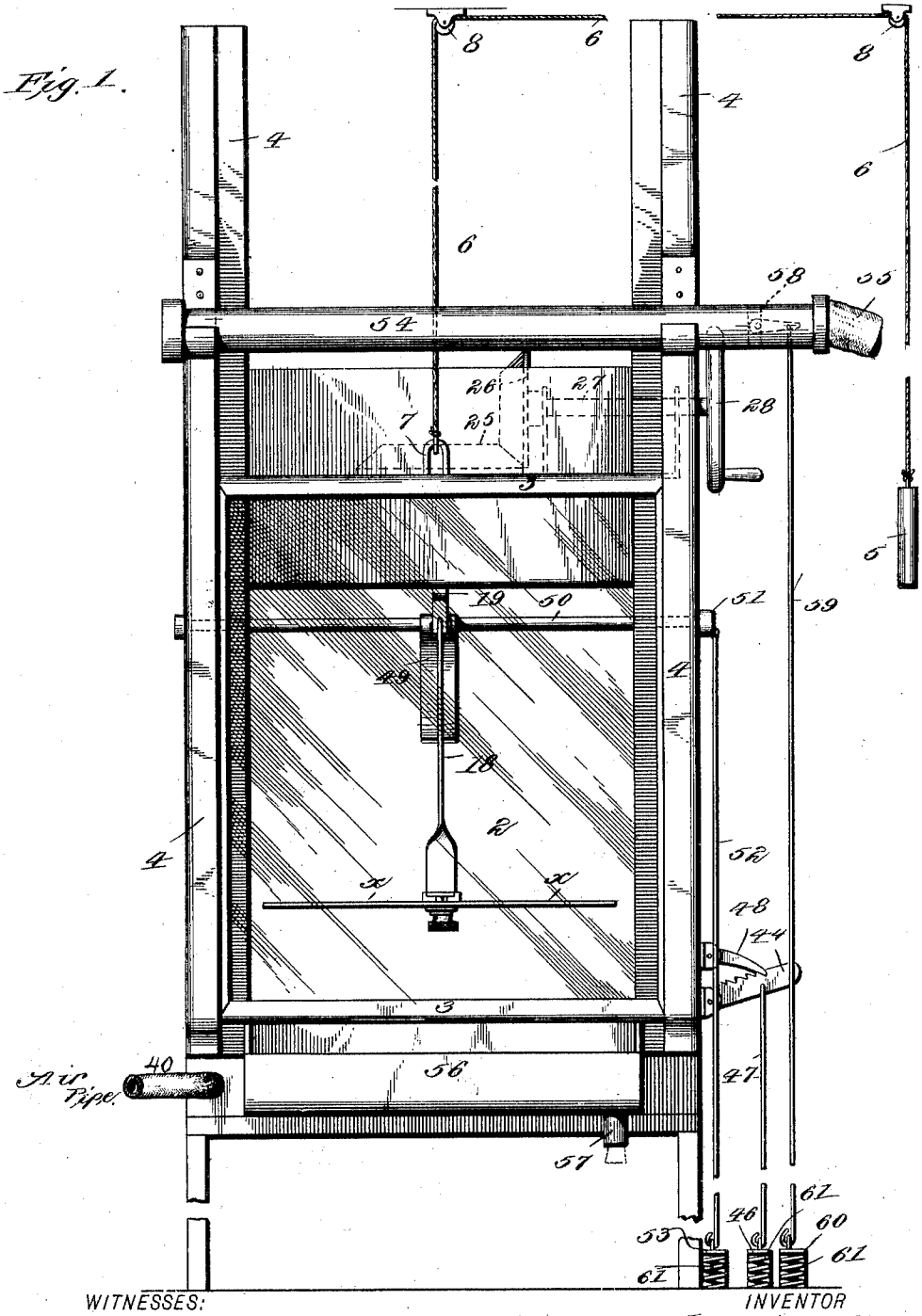
No. 760,276. PATENTED MAY 17, 1904.

W. G. THORPE.

APPARATUS FOR TREATING NEGATIVES AND PRINTING PLATES.

NO MODEL. APPLICATION FILED DEC. 2, 1902. 7 SHEETS—SHEET 1.

Fig. 1.



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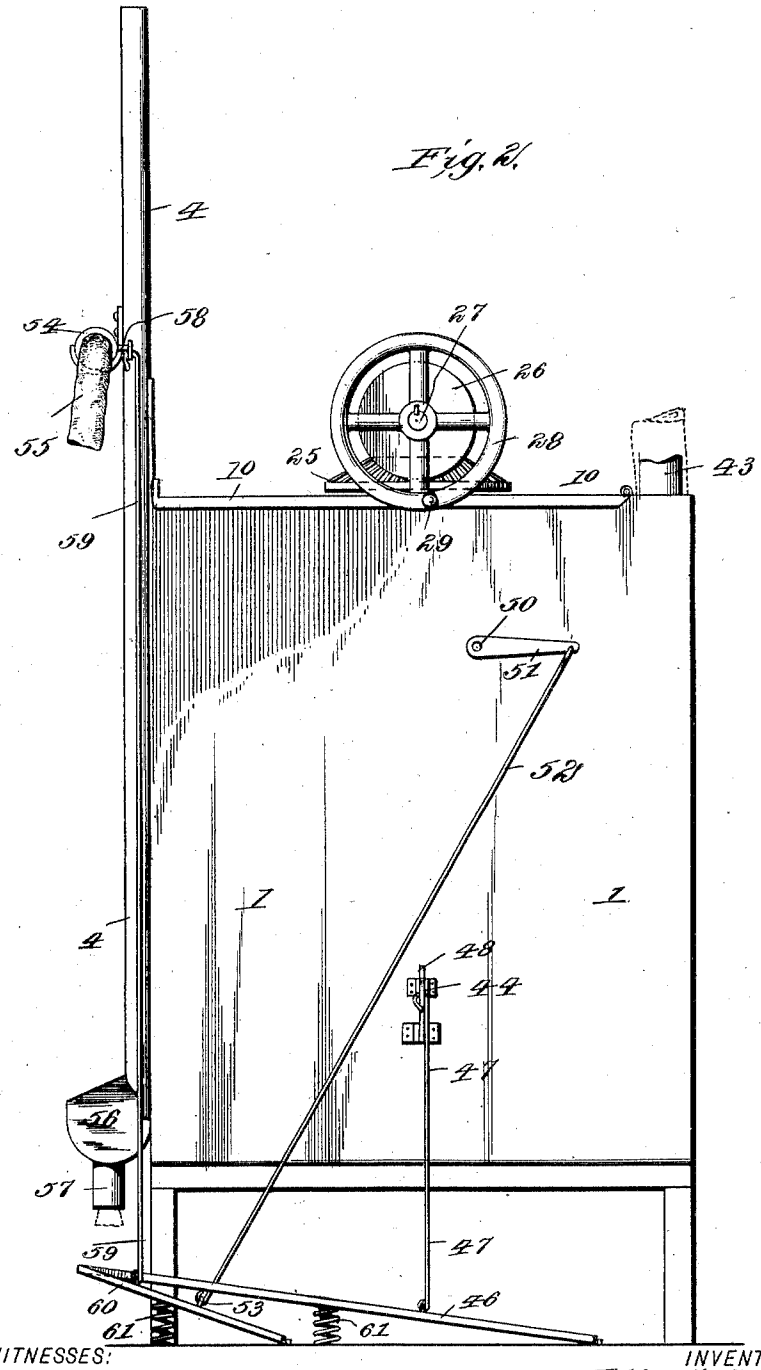
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NO MODEL. 7 SHEETS—SHEET 2.

Fig. 2.



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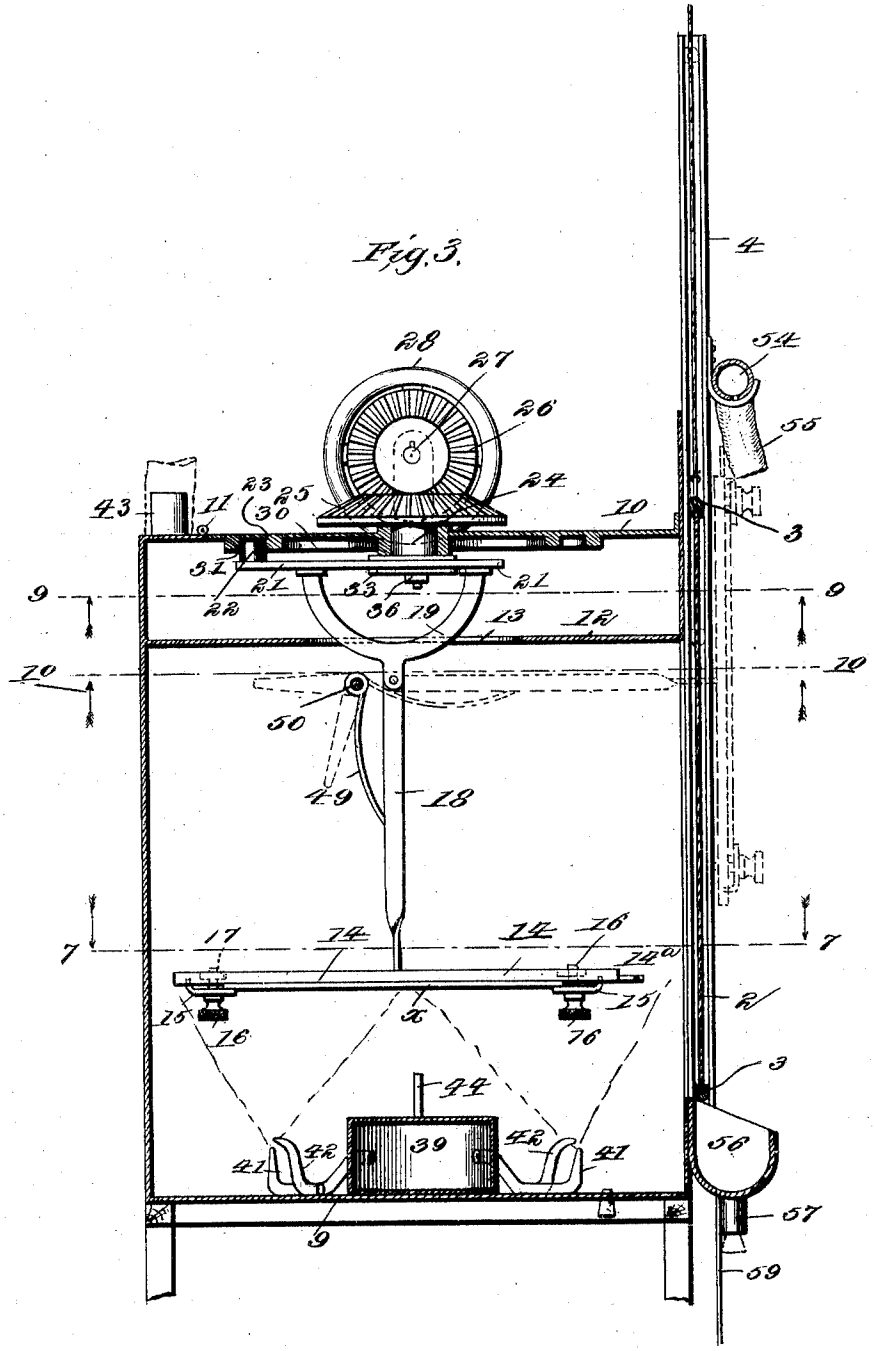
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Fig. 3.



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Fig. 4.

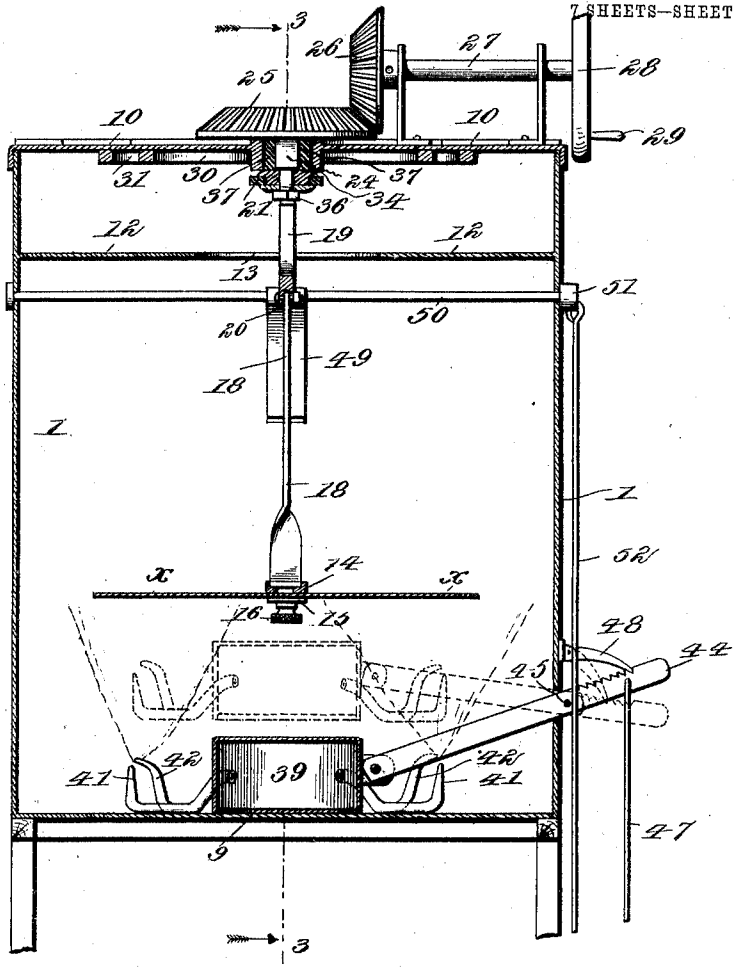


Fig. 5.

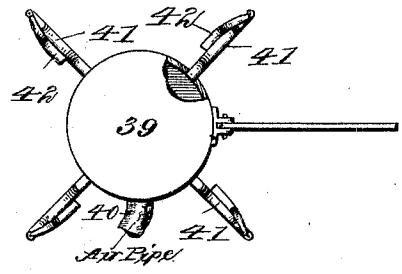


Fig. 6.



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APPLICATION FILED DEC. 2, 1902.

NO MODEL. 7 SHEETS—SHEET 5.

Fig. 7.

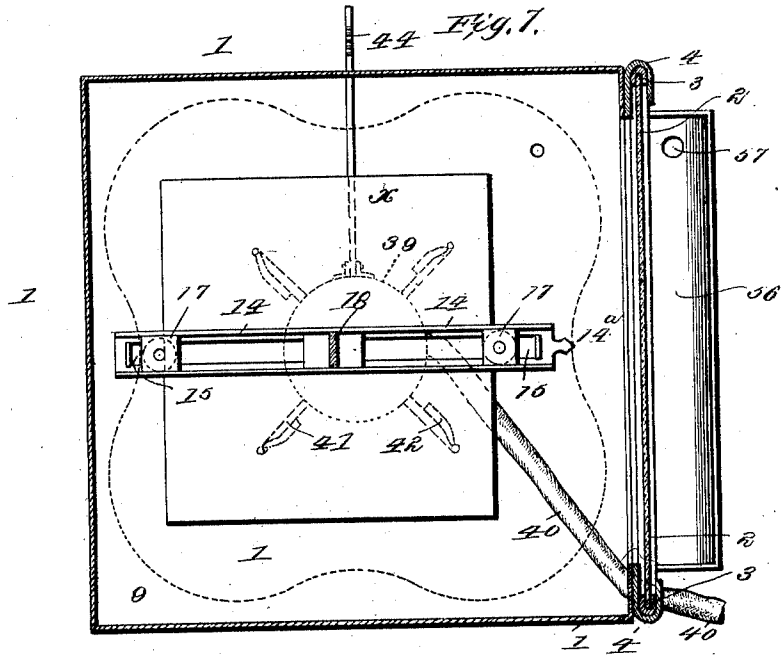
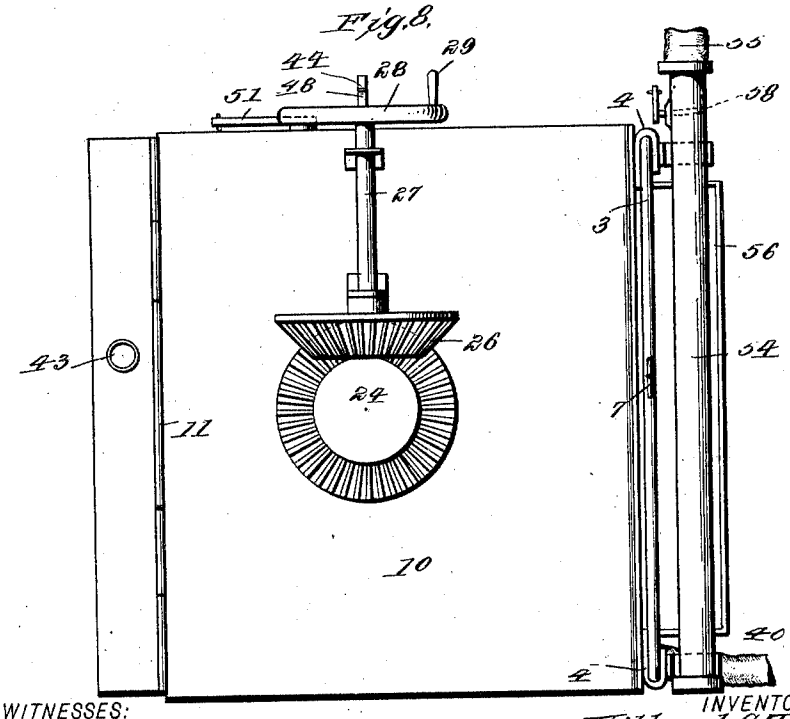


Fig. 8.



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APPLICATION FILED DEC. 2, 1902.

NO MODEL. 7 SHEETS—SHEET 6.

Fig. 9.

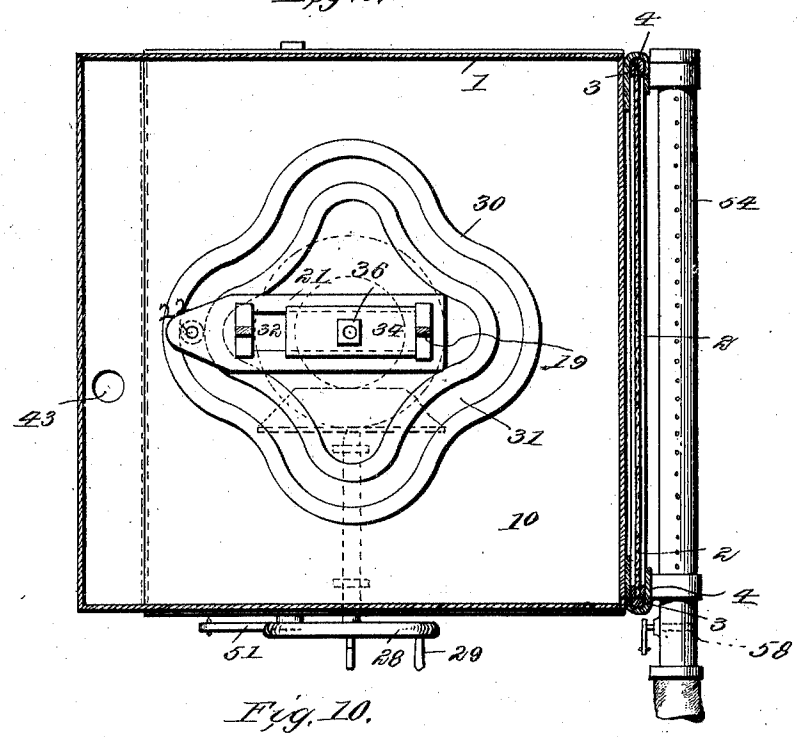
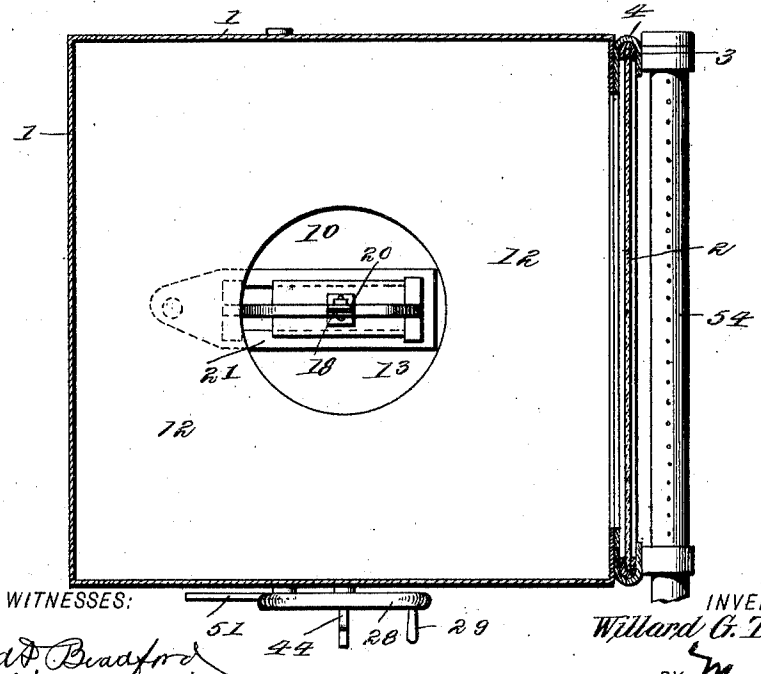


Fig. 10.



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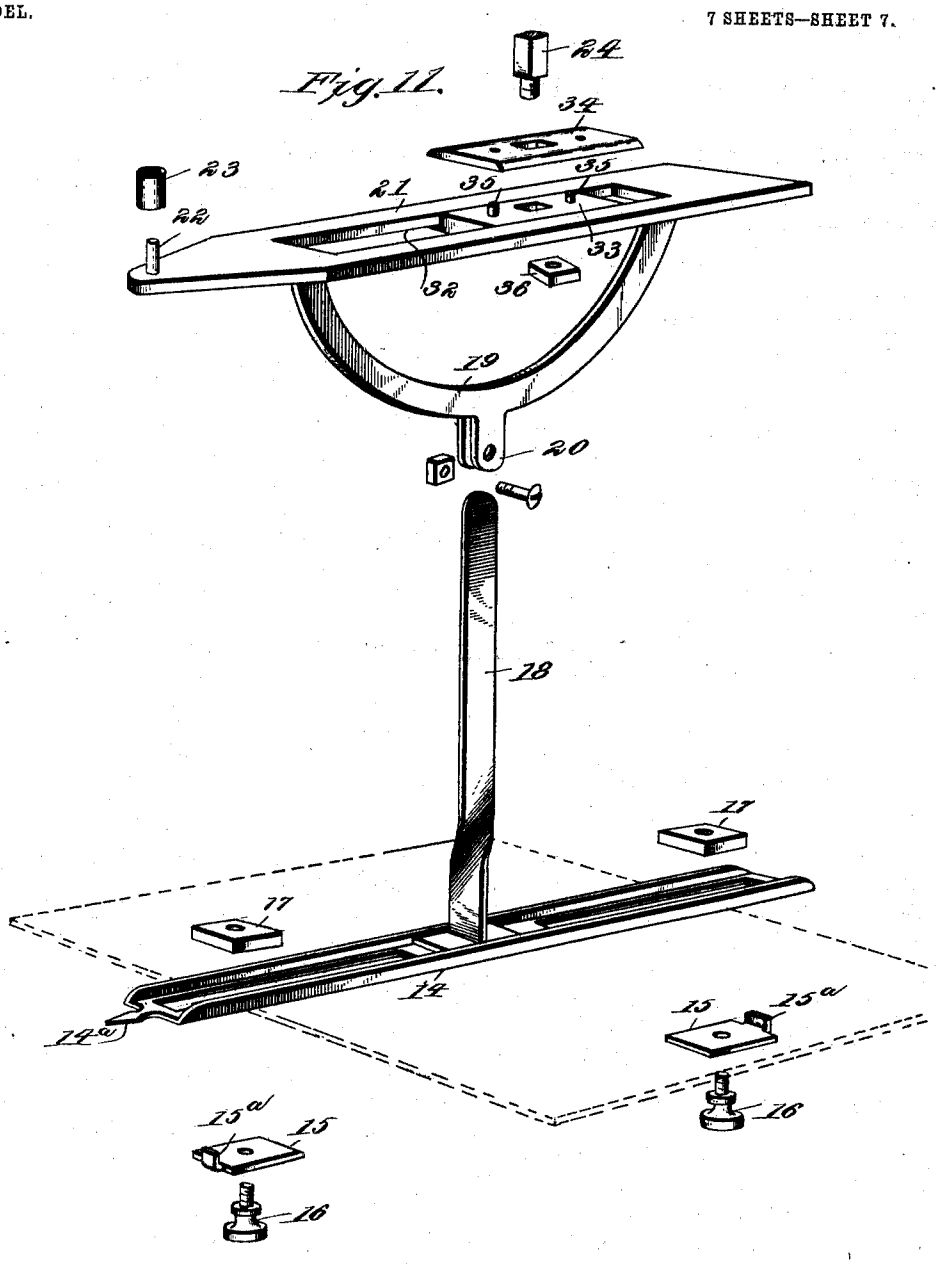
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APPARATUS FOR TREATING NEGATIVES AND PRINTING PLATES.

APPLICATION FILED DEC. 2, 1902.

NO MODEL. 7 SHEETS—SHEET 7.

Fig. 11.



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No. 760,276. Patented May 17, 1904.

UNITED STATES PATENT OFFICE.

WILLARD GARDNER THORPE, OF ST. PAUL, MINNESOTA.

APPARATUS FOR TREATING NEGATIVES AND PRINTING-PLATES.

SPECIFICATION forming part of Letters Patent No. 760,276, dated May 17, 1904.

Application filed December 2, 1902. Serial No. 133,537. (No model.)

To all whom it may concern:

Be it known that I, WILLARD GARDNER THORPE, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have made certain new and useful Improvements in Apparatus for Treating Negatives and Printing-Plates, of which the following is a specification.

My invention is an improved apparatus for drying photographic negatives after developing and for treating half-tone and other printing plates by means of an etching solution to produce a relief-surface thereon and by subsequently developing and washing such surface.

The details of construction, arrangement, and operation of parts are as hereinafter described, reference being had to accompanying drawings, in which—

Figure 1 is a front elevation of my improved apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section on the line 3 3 of Fig. 4. Fig. 4 is a vertical central section taken at right angles to that shown in Fig. 3. Fig. 5 is a plan view, part being broken away, of the means for discharging air for drying negatives, also for inducing currents of water or an etching solution. Fig. 6 is a detail view of a portion of the parts shown in Fig. 5. Fig. 7 is a transverse section on the line 7 7 of Fig. 3. Fig. 8 is a top plan view of the apparatus. Fig. 9 is a horizontal section on the line 9 9 of Fig. 3. Fig. 10 is a horizontal section on the line 10 10 of Fig. 3. Fig. 11 is a perspective view of the rotatable plate-holder, its parts being shown dismembered.

1 indicates a box casing or cabinet which may be supported upon legs, as shown, or by any other suitable means. This cabinet is provided with a glass front, (see Figs. 1, 7, 9, and 10,) the same having a metal frame 3, which is slidable in vertical guideways 4, formed by means of grooved or other channeled standards which extend to above the cabinet proper. (See Figs. 1 and 2.) A counterbalance-weight 5 (see Fig. 1) is connected by means of a cord 6 with a loop 7, forming a rigid attachment of the glass front. The latter is adapted to slide easily in the guideways 4 and is held in any vertical adjustment by means of the counterweight 5. As shown in Fig. 1, the rope or cord 6 passes over pulleys 8, fixed to the ceiling or any other suitable support. The cabinet 1 may be constructed of sheet metal or in part of metal and wood or any other material that may be found suitable. The said cabinet has a flat bottom 9 (see Fig. 3) and a hinged top 10, the hinge 11 being located near the rear side. A false bottom or diaphragm 12 is arranged a short distance below the hinged top 10, and the same is provided with a central opening 13. (See also Fig. 10.) To the said hinged cover 10 is attached a rotatable and otherwise adjustable plate or negative holder, whose construction, arrangement, and operation are as follows: The plate-holder proper (see Figs. 3, 4, 7, and 11) consists of a straight channeled bar 14 and clamping-plates 15, which are secured adjustably to the bar 14 by means of screws 16 and nuts 17—that is to say, the said bar 14 is grooved longitudinally and the clamping-plates 15 are provided with upward projections or prongs 15^a, (see Fig. 11,) which project into the slots of bar 14, and the nuts 17 are adapted to slide in the ways provided by the upturned side edges or flanges of the bar. The screws pass up through the clamping-plates which are applied on the under side of the bar and enter the nuts 17, as best illustrated in Fig. 3. For convenience of manipulation the screws 16 are provided with enlarged milled heads. A photographic negative requiring to be dried after developing or any form of printing-plate x is secured, as shown in Figs. 3 and 4, to the under side of the bar 14, its edges being clamped by the plates 15. It is obvious that by adjusting the plates 15 and nuts 17 farther from or nearer to the center of the bar 14 various sizes of plates or negatives may be clamped in place. The said bar 14 is connected by means of a vertical bar 18 with a hanger 19, which is semicircular in form, (see Figs. 3 and 11,) the two being jointed together at 20, so that the holder proper, 14, may be swung outward into horizontal position, as shown by dotted lines in Fig. 3, for the purpose of holding a plate or negative in position to be washed. The hanger 19 projects into

the opening 13 in the horizontal partition or diaphragm 12 and is permanently attached to a straight bar 21, which is provided at one end with a vertical stud 22, having an antifriction-sleeve 23. (See Fig. 11.) The parts 19 and 21 may be taken to constitute the hanger as a whole. This hanger is connected with the shaft 24 (see Figs. 3 and 4) of a bevel-gear 25, the said shaft having its bearings in the center of the cover 10. The gear 25 meshes with another 26 of similar form, which is arranged vertically, (see Figs. 2 and 8,) it being keyed upon a horizontal shaft 27, held rotatably in suitable bearings on the cover 10. The outer end of said shaft is provided with a combined crank and balance-wheel 28, the same having a short handle 29 for convenience in rotating it. It is obvious that by rotating the wheel 29 rotary motion will be imparted to the hanger 19 21, and thereby to the plate-holder proper, 14. The said plate-holder has, however, a combined motion, the same being imparted by means of a cam 30, (see Figs. 3, 4, and 9,) which consists of a metal frame having a wave-line groove 31, in which works the sleeve of the stud 22, projecting from the cylinder 21. In order to enable the stud to follow the groove, it is obviously requisite that the connection between the hanger-bar 21 and the shaft 24 shall be a slidable one. To this end the hanger-bar 21 is provided with a lengthwise slot 32, (see Fig. 11,) in which a block or plate 33 is adapted to slide, the same having a rabbeted edge adapted for engagement with the under side of the bar 21. The block 33 is provided with a square hole, and the plate 34, having a similar hole, is arranged upon the block, the same being held from lateral movement by means of dowels or studs 35. The shaft 24 of the gear 25 is square and adapted to pass through both the plates 34 and 33, and its lower end is reduced and threaded to permit application of a nut 36, which is in contact with the under side of the plate 33. By this means when the shaft 24 is rotated the hanger 19 21 and the plate-holder connected therewith will be rotated, and the stud 22, fitting the wave-line groove of the cam 30, will force the hanger alternately in one direction and the other horizontally, while the block or plate 33 slides longitudinally in the hanger-bar 21. Thus the plate or negative x, attached to the holder proper, 14, is not only rotated, but carried from side to side, the movement being practically a combined rotary and oscillating one. It is apparent that the negative or plate x will thus be carried rapidly over any medium which may be employed for forcing air or an etching solution or water against its under surface, so that all portions of the latter will be treated alike. A sleeve 37 (see Fig. 4) is applied to the square shaft 24 and forms a rotary bearing in the fixed bar 38, provided in the hinged cover 10.

Within the cabinet or box 1 and resting upon the bottom 9 of the same is the apparatus or device 39, which for convenience of description will be termed the "air-distributer." The same consists of the following parts: The body or main portion of the same is a box 39, which in this instance is shown cylindrical in form. Air is conveyed to this box by means of a flexible hose 40, (see Figs. 1, 7, and 8,) the same extending out of the cabinet and connecting in practice with an air-pump or an air-compressor. The box 39 is provided with a series of air-discharging pipes 41, which extend laterally therefrom and are curved upward at their outer ends to form nozzles adapted to direct currents of air upward. (See especially Figs. 5 and 6.) Alongside these pipes 41 and attached thereto are short pipes or goosenecks 42, whose upper ends are bent into nearly horizontal position and are arranged in close proximity to the nozzles of the air-discharge pipes 41. The lower ends of the pipes 42 terminate alongside the lowest portion of the air-pipes 41. It will now be apparent that if a liquid—say water or an etching solution—be poured into the cabinet so as to reach a depth sufficient to cover the lower ends of the pipes 42 and if air be admitted under due pressure to the box 39 the currents of air radiating from the nozzles or pipes 41 will induce discharge of liquid from the nozzles of the pipes 42. In other words, the apparatus will operate practically upon the principle of the well-known atomizer, and the liquid will be sprayed upward upon the negative or plate x. It is now clear that when the air-box 39, with its attached pipes 41 42, rests upon the bottom 9 of the cabinet 1, as shown in Figs. 3 and 4, any liquid which it may be desired to use in treating a plate x may be forced upward or sprayed upon the plate and that the latter will be rotated and oscillated, as before described, so that all portions of its surface will be sprayed in a practically uniform manner. During the operation of etching in this manner, which is applicable for developing a half-tone or line plate or any other form of printed plate upon which relief-surfaces are required, the glass front 2 of the cabinet is closed, as represented in Figs. 1 and 3. It has been demonstrated that in etching by projecting the liquid in the form of spray upon the metal surface of the printing-plate there is a great gain in rapidity of operation over the methods usually practiced, since a stronger etching fluid may be used. The impact of the spray on the printing-surface does not disturb the resist forming the design. In brief, this method has distinct advantages over the immersion method, particularly in etching copper and zinc. Spraying also effects a considerable economy in the use of acid or other etching solution, a large per cent. of the same being saved. The fumes of the acid passing upward through the hole 13 in diaphragm 12 will

escape at the top of the cabinet through a tube 43, (see Figs. 3 and 8,) through which they will be conducted off by a suitable pipe to a point of safety. It is further apparent that water being placed in the cabinet 1 it may be sprayed upon a plate *x* for the purpose of washing it. Should the cabinet be made of any material incapable of resisting the acid, the bottom portion of the cabinet will be suitably lined or a pan of an acid-resisting material will be arranged therein. If it be desired to dry a plate *x*—say a photographic negative after developing—the air-distributer 39 is raised, so as to remove the pipes 42 from the liquid, and air being forced in as before will be discharged by the pipes 41 upon the under surface of the plate, so that it is dried expeditiously and uniformly, it being rotated as before. For the purpose of thus lifting the air-distributer 39 I provide a lever 44, (see Figs. 1 and 4,) the same consisting of a straight bar, which is pivoted to the air-distributer proper and extends out through the side of the cabinet or box 1, where it is pivoted at 45. The inner end of the lever is cut at such an angle that when the same is tilted the lower corner of the lever will engage the side of the drum or box 39, and thus hold the latter in horizontal position when raised. A treadle 46 (see Fig. 1) is connected by a rod 47 with the said lever 44, so that the operator by placing his foot upon the treadle may readily depress the outer end of the said lever, and thereby elevate the air-distributer conveniently and at will. For the purpose of holding the air-distributer in the raised position, as indicated by dotted lines, Fig. 4, a pawl 48 may be pivoted to the side of the cabinet 1 and its free end engage a series of the notches formed in the lever. In this respect, however, I propose to employ any suitable means. It is further apparent that various means may be employed for elevating the air-distributer. The air-distributer will be adapted for use outside of the cabinet—as, for example, for drying negatives—and for this purpose the pivot-pin 45 of the lever 44 and also the rod 47 will be adapted to be readily detached.

Reference has been heretofore made to the adjustment of the plate-holder proper in the position shown by dotted lines, Fig. 3. In order that it may be brought into this position, it is obvious that the glass front 2 must be raised. For the purpose of throwing it upward to such position I employ the device 49, (see Fig. 3,) consisting of an arm attached to a rotatable shaft 50, (see also Figs. 1 and 4,) the same extending transversely through the cabinet 1 and being suitably journaled in the sides of the same. As shown in Fig. 2, an arm 51 is fixed to the outer end of the shaft 50, and a rod 52 extends therefrom to a treadle-lever 53. (See Fig. 1.) It is apparent that by depressing the treadle 53 the shaft 50 will be rocked and the lever-arm 49 will force the plate-holder upward to the horizontal position indicated by dotted lines, Fig. 3. Such position enables the operator to inspect the plate *x*, so as to determine the result of his work. Such position of the plate is also required for washing the same by means of water admitted through a pipe 54, (see Figs. 1, 3, 9, and 10,) the same being arranged horizontally on the front of the standards 4 of the cabinet. Water is supplied, through flexible hose 55, from any suitable source, and the pipe 54 is perforated in its under side, as shown in Fig. 3, to enable it to discharge water downward over the surface of the plate *x* thereunder. The water flowing off the plate is received into a trough 56, (see Figs. 1, 2, and 3,) the same being located on the front of the cabinet 1 and near the bottom thereof. The said trough has a discharge-pipe 57, which will ordinarily be closed by means of a suitable plug.

For the purpose of governing the admission and discharge of water, as above described, I provide the pipe 54 with a valve, (see Figs. 1 and 2,) the same having a lever-arm 58, which is connected by a rod 19 with a treadle-lever 60. In the position of parts shown in Fig. 1 the valve is normally closed; but upon depressing the treadle it is opened to allow discharge of water. As shown in Fig. 1, the three treadles are supported by spiral springs 61.

As shown in Figs. 3 and 11, the plate-holding bar 14 is provided at one end with a pointer or index 14^a, the same being merely an end projection of the bar. This device serves as a means for indicating which end of the bar 14 should be adjusted at the front or toward the glass plate 2 to enable the plate-holder to be raised to the vertical position indicated by dotted lines, Fig. 3.

It will be seen that by hinging the plate-suspension bar 18 (see Fig. 3) to the hanger 19 and by mounting the cam and hanger on the hinge-cover 10 the latter may be thrown upward when for any purpose it is desired to inspect, adjust, or remove the plate-holder and its attachments. It is also apparent that the glass front 2 permits the operator to conveniently inspect the operations within the cabinet, and also in the lowered position (indicated by full lines in several figures) the said front 2 prevents the escape of acid fumes.

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

1. In an apparatus for the purpose specified, the combination, with a cabinet or box, of a plate-holder arranged therein, means for suspending such holder, means for imparting, simultaneously, a combined rotary and oscillating movement to said holder, and means for simultaneously discharging a fluid upon the under side of the plate which may be carried by the holder, substantially as described.

2. The combination, with a cabinet, of a

plate-holder suspended therein, a cam arranged in the upper portion of the cabinet, a hanger connected with the plate-holder and adapted to oscillate horizontally and follow the cam, and means for imparting rotation to the plate-holder, substantially as shown and described.

3. The combination, with the cabinet, and a plate-holder having a hanger provided with a stud, of a cam fixed in position in the upper portion of the cabinet and provided with an irregular groove in which the stud is adapted to travel, a vertical shaft having a slidable connection with the said hanger and serving to support the same, and gearing for imparting to such shaft rotary motion whereby the plate-holder is both rotated and oscillated horizontally, substantially as shown and described.

4. The combination, with a cabinet and a plate-holder proper having a hanger provided with a lengthwise slot and upwardly-projecting stud, of a cam with which such stud is adapted to engage, a slidable block arranged in the groove of the hanger, a vertical shaft journaled in a suitable support and connected with such block, and means for imparting rotation to the shaft for imparting rotary and oscillating movement to the plate-holder, substantially as shown and described.

5. The combination, with the cabinet, of a plate-holder comprising a horizontal bar having means for clamping a plate, a vertical bar and a hanger connected therewith, said hanger having a horizontal portion which is grooved longitudinally and provided with a projection from its upper surface, a cam fixed in position and adapted to engage such projection, a vertical shaft journaled in the top of the cabinet and having a slidable connection with the hanger, a bevel-gear fixed on said shaft, a second bevel-gear engaging the first-named one, and a crank-shaft, all arranged and operating substantially as shown and described.

6. The combination, with the cabinet having a slidable front, of a plate-holder and means for suspending the same, and means for raising the plate-holder into vertical position on the front of the cabinet, substantially as shown and described.

7. The combination, with the plate-holder and a suitable hanger to which it is jointed, of a rock-shaft having an arm adapted to engage a portion of the plate-holder, and means for rotating such shaft, whereby the plate-holder may be raised to a vertical position, substantially as shown and described.

8. The combination, with the cabinet, of a plate-holder which is normally suspended horizontally, a rotatable hanger to which the plate-holder is jointed, a rock-shaft arranged horizontally and having a pendent arm adapted to engage the vertical suspending-bar of the plate-holder, and the treadle and rod connecting it with a crank-arm of the rock-shaft, substantially as shown and described, for the purpose specified.

9. The combination, with the cabinet, and the plate-holder proper consisting of a horizontal bar having a pointer or index at one end and provided with clamps, a hanger to which the plate-holder is jointed, means for imparting rotation to such hanger and thereby to the plate-holder also, and means for raising the plate-holder to permit inspection thereof, substantially as shown and described.

10. The combination, with the body of the cabinet, and the cover hinged thereon, of a rotatable plate-holder, a hanger to which it is jointed, and means attached to the said cover for rotating the plate-holder, substantially as shown and described.

11. The combination, with the cabinet, and a plate-holder arranged therein, and a hanger to which it is jointed, of means for adjusting the plate-holder in vertical position, and means for discharging water upon the plate, substantially as shown and described.

12. The combination, with the cabinet, of a water-discharging pipe arranged on the front and at the top of the same, a plate-holder and the hanger therefor to which it is jointed, and means for raising the plate-holder into vertical position beneath the said pipe, substantially as shown and described.

13. The combination, with the cabinet, and a water-discharging pipe arranged on the front and at the top of the same, a valve located in said pipe and means for controlling its position, of a plate-holder arranged within the cabinet, a hanger therefor to which it is jointed, and a rock-shaft provided with an arm adapted to engage the suspension-bar of the plate-holder proper, and means for rocking said shaft for throwing the plate-holder into vertical position on the front of the cabinet, substantially as shown and described.

14 The combination, with the cabinet, having a slidable front, and a water-discharging pipe arranged as shown and provided with means for regulating discharge, of the plate-holder proper having a suspension-bar, and the hanger to which it is jointed, and means for raising the plate-holder to vertical position beneath the said pipe, substantially as shown and described.

15. The combination, with the cabinet, of a water-discharge pipe arranged on the front and at the top of the same, a trough arranged horizontally directly beneath said water-discharge pipe and adjacent to the bottom of the cabinet, a plate-holder and the hanger therefor to which it is jointed, and means for raising the plate-holder into vertical position, between the water-discharge pipe and the receiving-trough, substantially as shown and described.

16. The combination, with a cabinet, of an air-distributer comprising a drum having air-

discharge nozzles, a flexible supply-pipe connected with said drum, and means for raising the drum with its attachments, substantially as and for the purpose specified.

17. The combination, with the cabinet, of the air-drum having a flexible supply-pipe connected therewith and provided with air-discharge nozzles, of a lever connected with said drum and pivoted in the side of the cabinet through which it projects, substantially as shown and described.

18. The combination, with the cabinet, of the air-drum having a flexible supply-pipe and provided with air-discharge nozzles, of a lever which is pivoted to said drum, and also pivoted in the side of the cabinet from which it projects laterally, and a pawl adapted to engage the outer end of the lever for holding the air-distributer at any desired height, substantially as shown and described.

19. The combination, with the cabinet, of the air-drum arranged therein and having a flexible air-supply pipe, of a lever pivoted to the air-drum and also pivoted in the side of the cabinet from which it projects laterally, a pawl adapted to engage a ratchet on the lever, and the treadle and rod connected with the outer end of the lever, for depressing it in the manner shown and described.

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