

Sept. 5, 1933.

W. F. HUCK

1,925,963

PLATE GRAINING MACHINE

Filed Sept. 14, 1932

3 Sheets-Sheet 1

FIG. 1.

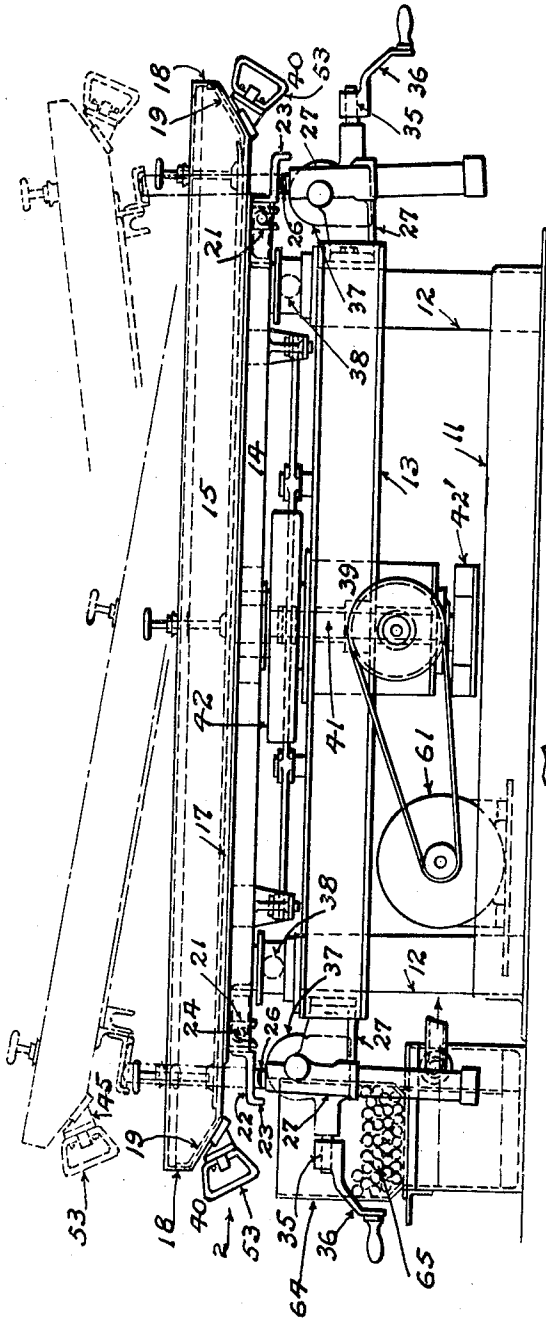


FIG. 2.

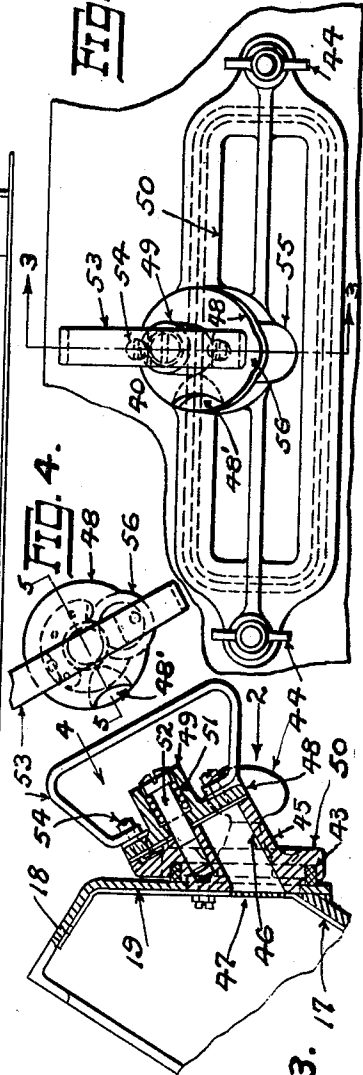


FIG. 4.

FIG. 3.

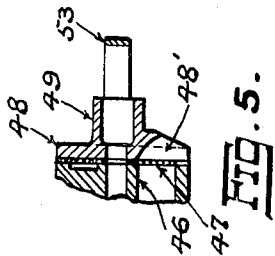


FIG. 5.

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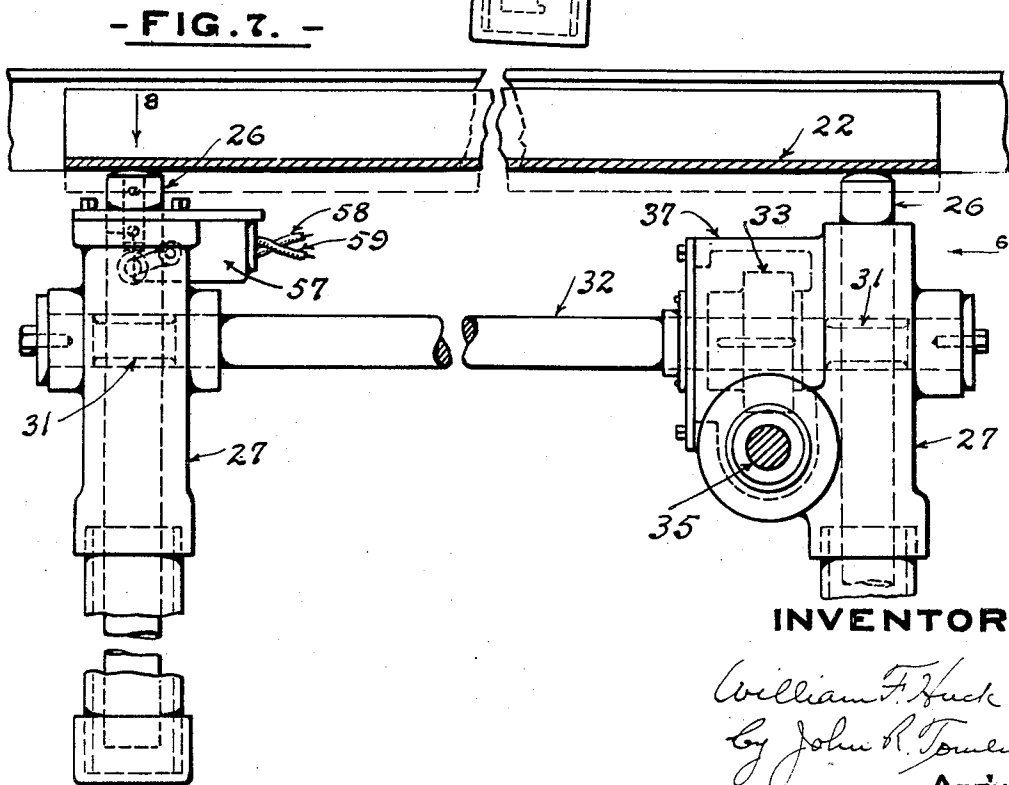
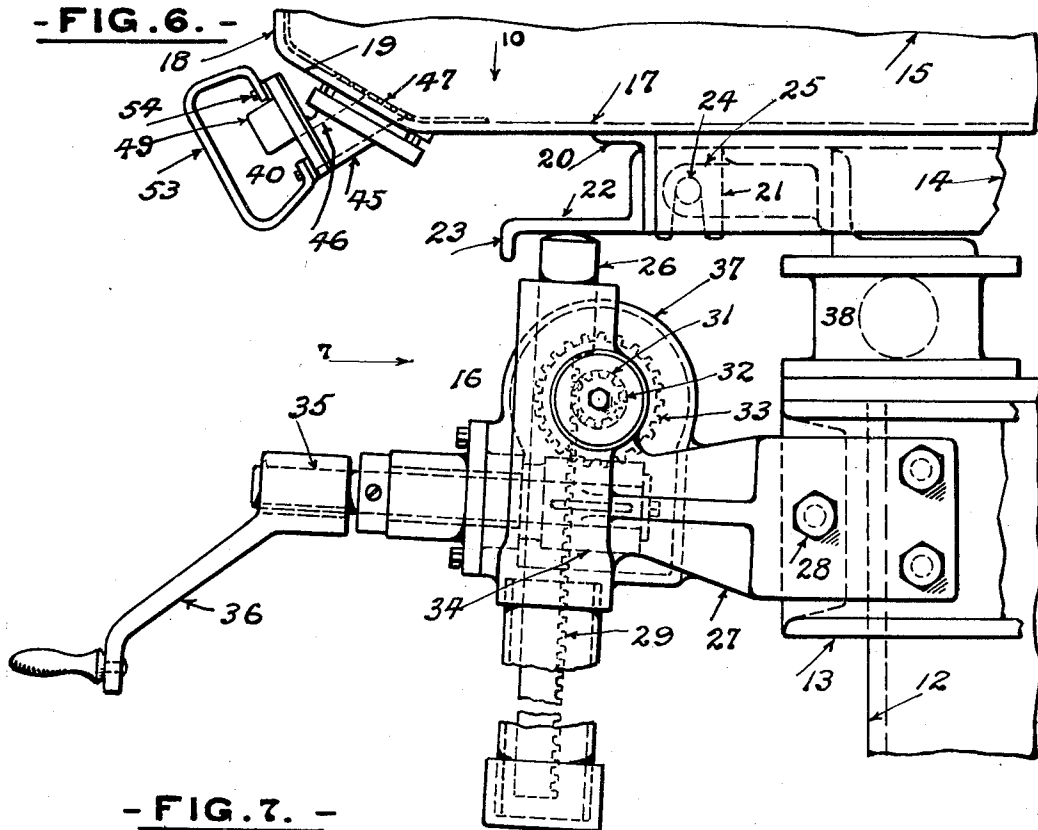
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3 Sheets-Sheet 2



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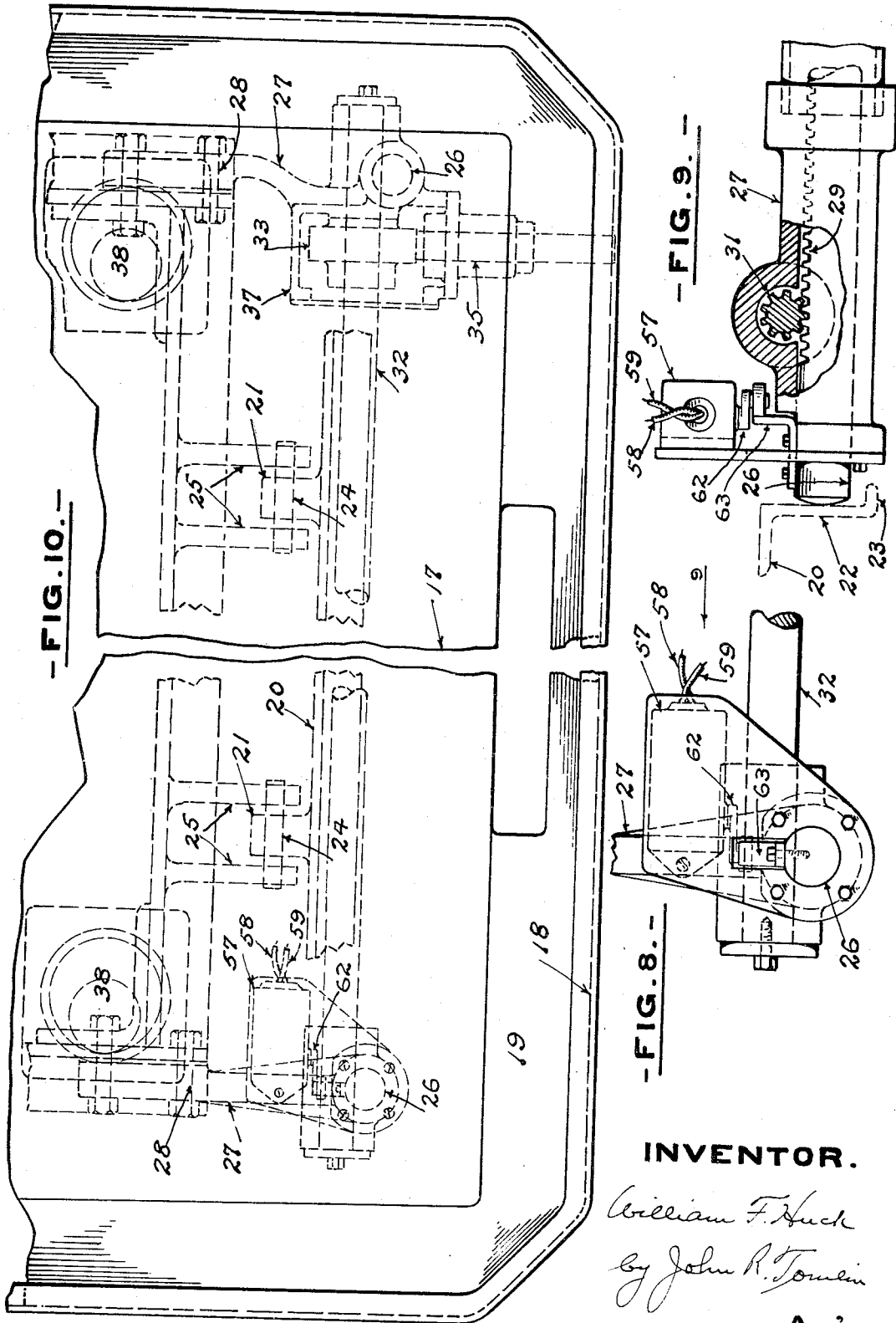
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PLATE GRAINING MACHINE

1,925,963

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

1,925,963

PLATE GRAINING MACHINE

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Application September 14, 1932
Serial No. 633,065

14 Claims. (Cl. 51—6)

This invention relates to graining machines of the type used in lithographic printing for the preparation of the surfaces of metallic plates which receive the forms that are to be printed.

More particularly the present invention is directed to certain desired improvements over those disclosed in the device shown in my copending application Serial No. 489,898, filed October 20, 1930, for graining machines.

One of the objects of the present invention is to provide a graining machine which may be more conveniently and efficiently operated.

Another object is the provision of means for preventing accidental operation of the machine when it is in tilted or inclined position.

Another object is to provide electrically controlled means for preventing the normal operation of the machine when draining fluid from the graining or oscillating box.

A further object is to provide means for conveniently tilting the graining box at either end.

It is also an object to provide a graining machine of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevational view of the invention;

Figure 2 is a fragmentary end elevational view of one of the improved drain fittings as seen in the direction of the arrow 2 of Figure 1;

Figure 3 is a fragmentary transverse sectional view, partly in elevation, as viewed on the line and in the direction of the arrow 3 of Figure 2;

Figure 4 is a fragmentary elevational view of details as seen in the direction of the arrow 4 of Figure 3;

Figure 5 is a fragmentary sectional view taken on line 5—5 of Figure 4, of details connected with one of the drain fittings, as viewed in the direction of the arrows;

Figure 6 is an enlarged fragmentary side elevational view showing on a larger scale certain of the parts seen in Figure 1;

Figure 7 is a fragmentary elevational view of the device as seen in the direction of the arrow 7 of Figure 6;

Figure 8 is a fragmentary elevational view as seen in the direction of the arrow 8 of Figure 7;

Figure 9 is a fragmentary enlarged elevational view, partly in section, with parts broken away, of details as seen in the direction of the arrow 9 of Figure 8; and

Figure 10 is a fragmentary top plan view of the device as seen in the direction of the arrow 10 of Figure 6.

With more particular reference to the drawings wherein similar characters of reference indicate corresponding parts in the several views of the preferred form of the invention, the numeral 11 designates the base of the machine, the main frame of which is shown generally in the figures is preferably formed of welded steel angle and channel bars. The said main frame also includes posts 12 and upper frame members 13, these parts comprising the main portion of the fixed frame on which the movable frame, hereinafter described, is freely mounted.

The movable frame indicated generally at 14, is preferably formed of steel angle bars and carries a box or tray 15 which may be raised or tilted at either end by mechanism indicated generally at 16 and shown in detail in Figure 6. The box or tray 15 which is generally of a size adapted to accommodate two printing plates has a flat, plane bottom 17, substantially vertical sides 18 and inclined portions 19 between the said bottom and sides.

As an important feature of the present invention the box or tray 15 has secured thereto at each end angle bars 20 which carry stirrups or forked members 21, said angle bars 20 having secured thereto brackets 22 provided with flanges 23, the said brackets 22 being engaged by reciprocating members hereinafter described, for the purpose of raising or tilting the box 15 in order to facilitate the removal of the printing plates therein, and also, when required, drain its fluid contents. The stirrups 21 receive pins 24, fastened to lugs 25, secured to the frame 14, thus permitting the box to be tilted upwardly at one end, while swinging or pivoting at the other end about the pin 24 as a hinge. The brackets 22 to which the box 15 is attached, are loosely mounted or rest on the top of rods or posts 26. The posts 26 which reciprocate in bearings provided in brackets 27 secured in any suitable manner as by the screw bolts 28 to the frame posts 12, are each formed with a rack 29 engaged with a pinion 31 preferably formed as an integral part of a shaft 32 having a worm gear 33 secured thereto, the worm gear 33 being engaged by a worm 34 fas-

tened on another shaft 35 to which an operating handle 36 is fastened for operation of the tilting mechanism indicated at 16 which may be housed within a suitable casing 37.

5 The movable frame 14 to which the box 15 is fastened is provided with ball bearing retaining mechanism for rotatably supporting same indicated generally at 39 and for causing the box 15 to be moved bodily in a small circular path, these details being described in the above men-
10 tioned copending application 489,898, and forming no part of the present invention. A drive shaft 41 for the said movable frame 14 is counter-balanced as at 42, 42' in a manner similar to the device described in the said application. The de-
15 tails for raising and lowering the box or tray 15 are preferably identical at each end of same, as indicated by the correspondence in reference numerals.

20 Another feature of the present invention is the provision of improved means for draining the box 15 at either end which includes a fitting indicated generally at 40 in Figures 1 and 6 and illustrated in detail in Figure 3. The said fitting
25 40 which as indicated above is provided at each end of the box 15, has secured thereto a cover portion 50 which is adapted to receive a gasket 43 arranged to seat against the outside of the inclined portion 19 of the box 15, the fitting being
30 fastened to the box by wing nuts 44. A spout portion 45 which forms a part of the fitting 40 has a bore 46 that extends through the cover portion 50, the bore 46 being covered with a per-
35 forated plate or screen 47 where it opens into the tray or box 15, the screen 47 being suitably secured to the inner side of the tray. To the outer end of the spout portion 45 is yieldingly secured a plate or lid 48 having an extension or socket 49 which
40 receives a spring 51, the latter encircling the stem of a bolt 52 passing through the plate 48 and threaded in a recess formed in the spout portion 45, the head of the bolt 52 pressing the spring 51 against the bottom of the socket 49. The lid or plate 48 is also provided with an opening or
45 vent 48' which is adapted, when the said lid is turned, to register over a lip 55 formed on the spout portion 45, thus permitting liquid in the box to be quickly drained. An operating handle 53 is fastened by screws 54 to the plate 48. It will
50 now be understood that when the handle 53 is turned in counter-clockwise direction, as shown in Figure 2, to bring the vent or opening 48' into alignment with the bore 46 (Figure 5) and over the lip 55, the liquid of the box 15 can be drained
55 therefrom. It will be observed that in the normal operating or horizontal position of the tray 15, illustrated in Figure 2, the lip 55 is covered by a bulge or rounded projection or tongue 56 formed on the cover plate 48 while the vent 48' is spaced from the lip 56 approximately 90° on the
60 periphery of the said plate 48.

As another feature of the present invention means are provided to prevent the rotation of the movable table 14 on which the tray 15 rests
65 when the tray is tilted out of a horizontal position. The said means comprises limit switches indicated generally at 57 which may be of any well-known or approved construction (as shown in Figures 7 and 10) adapted to make and break
70 an electric circuit through the wires 58, 59 to an electric motor 61, as an arm 62 (shown in Figure 9) connected to and controlling the above-mentioned contacts is engaged by another arm or member 63 secured to one of the posts 26. It
75 will now be seen that when one of the posts 26

begins to raise, the arm 63 will first engage and move the arm 62 of the limit switch before the top of the post 26 actually engages the bottom of the bracket 22, thereby causing the separation of the contact points in the limit switch 57
80 alluded to above and opening the circuit to the motor 61 and preventing its operation.

If desired, a bin 64 (Figure 1) for the graining elements 65 may be supported in any conven-
85 ient manner adjacent the device.

When it is desired to remove the graining mem-
90 bers or marbles 65, the cover 50 may be conveniently removed by means of the wing nuts 44, and the said graining members permitted to drop into the bin 64.

The present device may be tilted at either end as desired, and drained by the improved draining members as described above. Likewise, the rais-
95 ing and lowering or tilting mechanism provides a convenient arrangement in that the worm gear 33 and worm 34 are of the irreversible or self-locking type, i. e., the worm 34 may turn the worm gear 33, but the said worm gear 33 cannot turn the worm.

The general function and manner of opera-
100 tion of the graining machine herein indicated has been described in the copending application mentioned above, it being understood that metal lithograph plates are secured in the tray 15 in which abrasive material and water are con-
105 tained, and balls or marbles 65 are rolled over the surface of the plate by moving the table 14 and consequently the tray 15 in a circular path.

The means for counterbalancing the mecha-
110 nism and for moving the table in a circular path have been described in application 489,898 above referred to. The motion imparted to the box 15 results in causing a relative motion between the plate to be grained and the marbles that produce the desired grain on the plate. The said motion
115 causes the marbles to run up the inclined surface of the box to some extent, but this motion is checked before they reach the vertical sides and a smooth quiet action is obtained.

The box or tray 15 is preferably made of a size
120 sufficient to accommodate at least two printing plates of the largest size, which are generally arranged one at each end of the said box. During the process of graining, it is essential to in-
125 spect the plates from time to time to determine whether or not the desired finish or grain has been attained, and it is for this purpose that the elevating mechanism hereinbefore described is particularly adapted. One plate at a time is in-
130 spected which is conveniently done by tilting the box at either selected end to the desired degree by turning one of the handles 36 in order to expose the plate at the raised end by the passing of the liquid to the lower end.

When it is desired to clean the box 15, the ele-
135 vating mechanism is again brought into play to tilt the box at either end, after which the drain fitting 40 at the lowered end of the said box may be opened, and the liquid drained.

It will be understood that the invention may
140 be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired the present embodiment be considered in all respects as illus-
145 trative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What I claim is:

1. In a device of the character described, the 150

combination of a fixed frame, a box movable relatively to said fixed frame, a motor connected to move said box in a rotary path, manually operable means to tilt said box, and means acting automatically to render said motor inoperative when said box is tilted.

2. In a device of the character described, the combination of a fixed frame and a movable frame, a box freely mounted on said movable frame, electrically-actuated means to turn said movable frame, and manually operable means to tilt said box and simultaneously deenergize said electrically-actuated means.

3. In a device of the character described, the combination of a fixed frame and a movable frame, a box freely mounted on said movable frame, electrically-actuated means to turn said movable frame, means for tilting said box, and circuit making and breaking instrumentalities connected to said device for rendering inoperative said electrically-actuated means when the said means for tilting the box are actuated.

4. In a device of the character described, including a fixed frame and a movable frame, said movable frame having a table mounted thereon, and means for draining said table, said means comprising a spout, a lid resiliently secured to said spout for normally closing same, and a manually operable member for moving said lid to open and close said spout when desired.

5. In a device of the character described, a fixed frame, a second frame movably mounted on the fixed frame, and a box having brackets provided with stirrups removably mounted upon pins secured to the second frame, said brackets being freely mounted on means manually raised and lowered.

6. In a device of the character described, a fixed frame, a second frame movably mounted on the fixed frame, a box having brackets provided with stirrups removably mounted upon pins secured to the second frame, said brackets being freely mounted on means manually raised and lowered, and electrically-actuated means for moving said second frame, said electrically-actuated means being automatically deenergized when said box is tilted at either end thereof.

7. In a device of the character described, the combination of a fixed frame, a box movable relatively to said fixed frame, a motor connected to move said box in a rotary path, a first manually operable means to tilt said box in one direction, a second manually operable means to tilt said box in another direction, and means acting automatically to render said motor inoperative when said box is tilted.

8. In a device of the character described, the combination of a fixed frame and a movable

frame, a box freely mounted on said movable frame, electrically-actuated means to move said movable frame in a rotary path, means for tilting said box, and a switch connected to said device for rendering inoperative said electrically-actuated means when the said means for tilting the box are actuated.

9. In a device of the character described, the combination of a fixed frame, a movable frame, a box freely mounted on said movable frame, means for tilting said box at either end, electrically-actuated means for moving said movable frame, and other means for deenergizing the electrically-actuated means immediately upon the actuation of said first-mentioned means for tilting the box.

10. In a device of the character described, the combination of a fixed frame, a movable frame, a box tiltably mounted on said movable frame, electrically-actuated means for moving said movable frame, manually operable means for tilting the box, and a switch for deenergizing the electrically-actuated means immediately upon the actuation of the manually operable means for tilting the box.

11. In a device of the character described, the combination of a fixed frame, a second frame movably mounted upon the fixed frame, a box hingedly mounted on the second frame, manually controlled means engageable with said box for tilting same, and electrically-actuated means for moving the second frame, said electrically-actuated means being deenergized when the manually controlled means is operated to tilt the box.

12. In a device of the character described, the combination of a fixed frame, a second frame movably mounted upon the fixed frame, and a box tiltably mounted on the second frame and containing a pair of printing plates; said box being adapted when tilted, to expose for removal, either one of said pair of printing plates.

13. In a device of the character described, the combination of a fixed frame, a second frame movably mounted upon the fixed frame, a box movably mounted on the second frame and containing a pair of printing plates, and means for tilting said box relatively to said second frame to alternately expose for inspection said printing plates.

14. In a device of the character described, the combination of a fixed frame, a second frame movably mounted upon the fixed frame, a box tiltably mounted on the second frame, said box being of a size sufficient to accommodate at least two printing plates of the largest size, and manually operable means for elevating and lowering the opposite ends of said box one at a time to alternately expose for inspection said printing plates.

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