

Dec. 11, 1945.

J. T. CAMPBELL

2,390,497

LITHOGRAPHIC PLATE MAKING APPARATUS

Filed Dec. 31, 1942

2 Sheets-Sheet 1

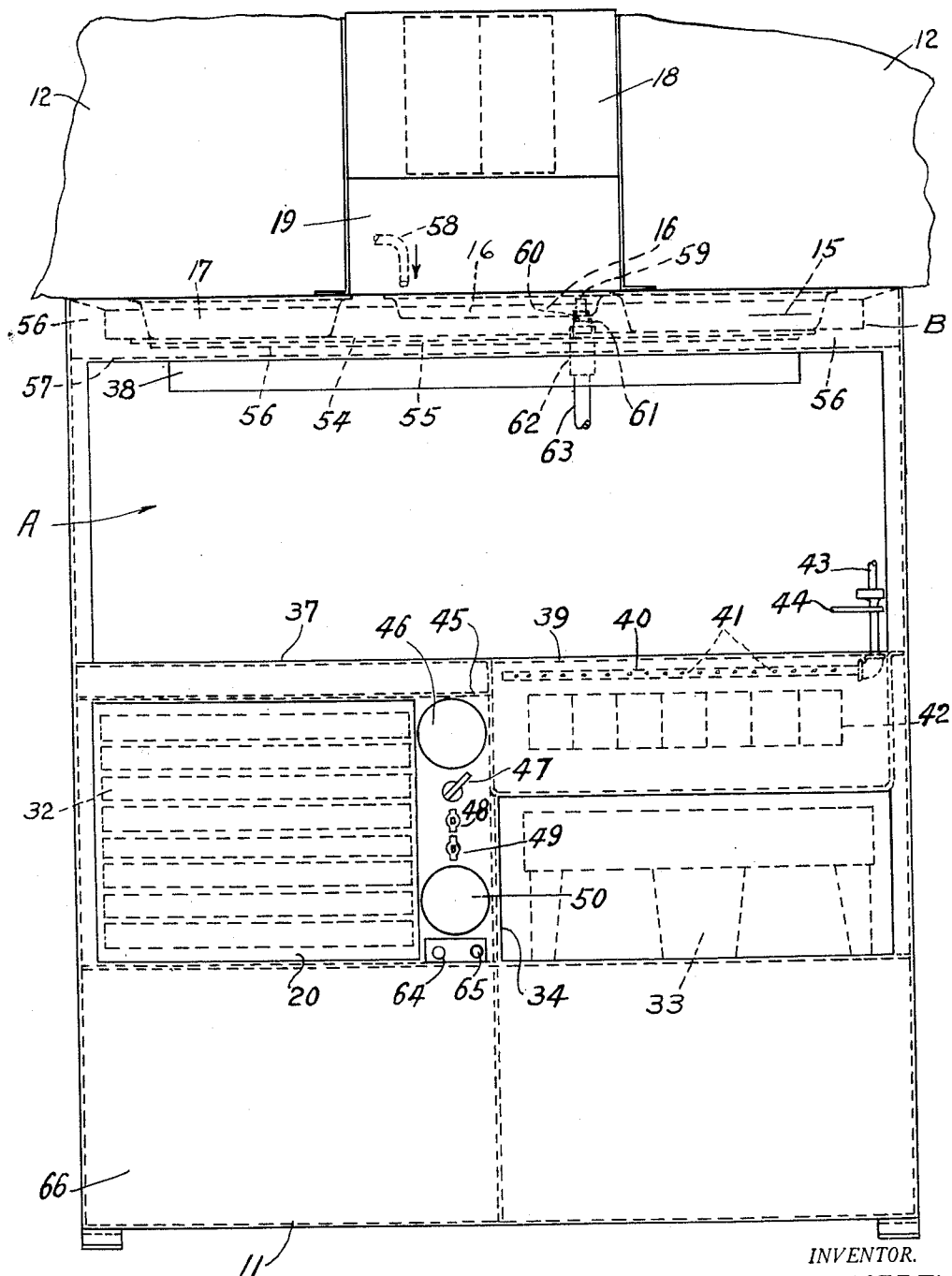


Fig. 1.

INVENTOR.
JAMES T. CAMPBELL.
BY
Robert A. Sloman

Dec. 11, 1945.

J. T. CAMPBELL

2,390,497

LITHOGRAPHIC PLATE MAKING APPARATUS

Filed Dec. 31, 1942

2 Sheets-Sheet 2

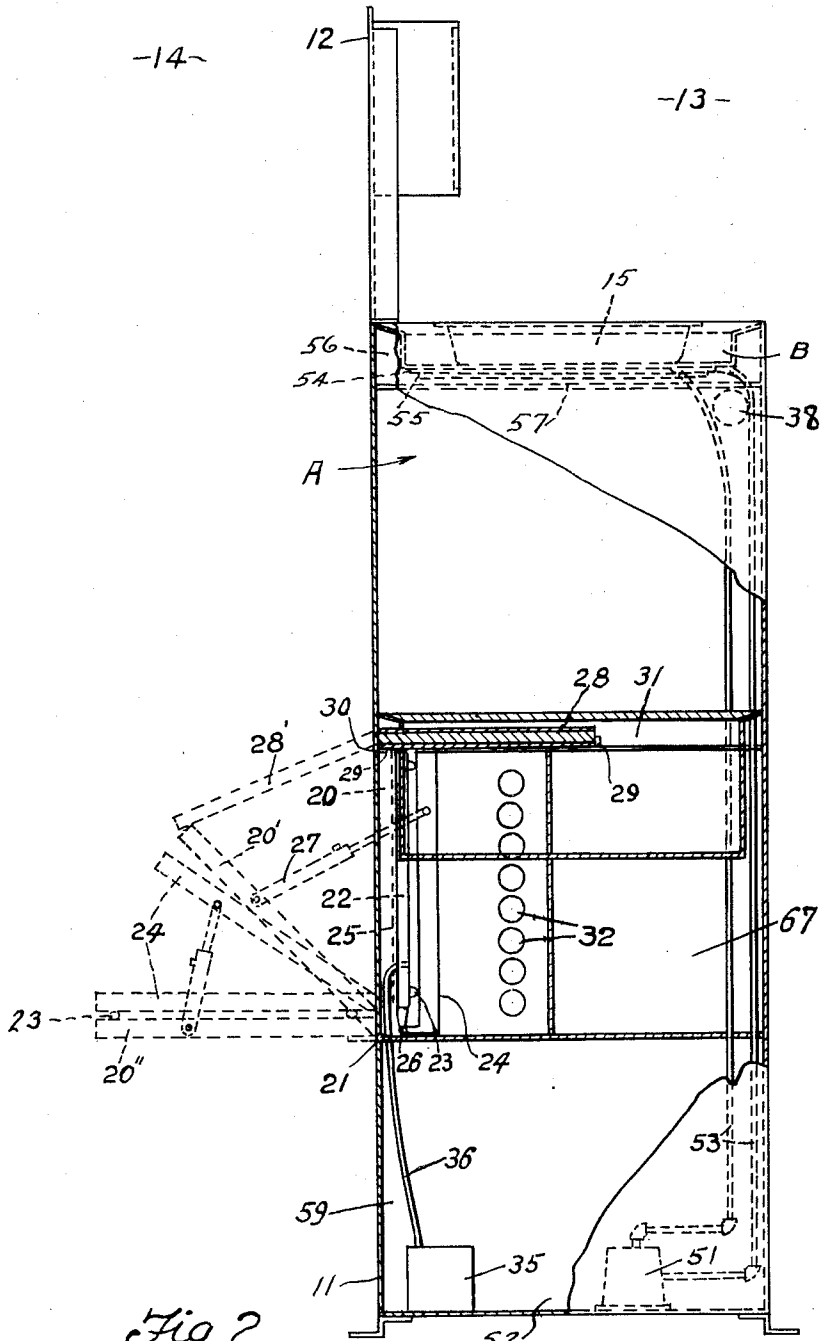


Fig. 2.

INVENTOR.
JAMES T. CAMPBELL.
BY
Robert A. Sloman

UNITED STATES PATENT OFFICE

2,390,497

LITHOGRAPHIC PLATE MAKING APPARATUS

James T. Campbell, Detroit, Mich.

Application December 31, 1942, Serial No. 470,871

2 Claims. (Cl. 95—76)

This invention relates to apparatus for making lithographic plates and more particularly to apparatus for processing lithographic plates from developed film suitable for lithography and multi-lith presses.

Heretofore various apparatus has been employed for accomplishing this process, entailing extensive floor space and numerous unnecessary operations, both of which the present invention has sought to eliminate.

It is the object herein to provide means for printing a developed film on a sensitized metal plate and for fully processing the same for use in a printing press.

It is the object herein to provide in combination suitable film developing apparatus disposed within a dark room, and metal plate processing means forming a part thereof but preferably disposed outside the dark room.

It is the further object herein to provision said apparatus within a suitable housing disposed through and within a dark room wall, together with communicating means between the dark room and the exterior whereby the developed film may be transferred for further processing outside of the dark room.

Other objects will be seen in the following specification and claims describing the various elements and their combinations as illustrated in the accompanying drawings of which—

Fig. 1 is a front elevational view of the entire printing and developing apparatus.

Fig. 2 is a right end elevational view of the same.

It will be understood that said drawings illustrate merely a preferable embodiment of the invention and that it is contemplated that other embodiments are possible within the scope of the claims hereafter set out.

In the drawings Fig. 1 shows the plate making cabinet 11 which may be provisioned with hinged doors if desired, though not shown, which is disposed with its front surface flush with the partition 12 separating the camera dark room 13 from the exterior room 14 for access to said cabinet.

Said dark room normally contains the camera, has access to the temperature controlled sink which is disposed within the top of the cabinet 11, being divided into a developing bath section 15, a central wash section 16, and a section 17 for containing a fixing solution.

Suitable means are employed for controlling the temperature of the sink by heating or cooling whereby a uniform quality of work can be obtained in the processing of exposed film.

A safety lamp 18 is indicated above the sink within the dark room 13 having two separately illuminated compartments covered with ruby and flashed opal glass. A ruby glass is used for illumination during developing of the exposed film,

while the clear glass illumination is used for inspecting the finished negative after its development.

An opening 19 is disposed below the safety light 18 and through the partition wall 12, whereby the developed film may be transferred from the dark room to the exterior room 14 for further processing and printing upon a metal plate, suitable closure means being employed for said opening.

The developed negative is then examined and if opaquing is necessary a suitable translucent opaquing table is employed so that the negative may be touched up where desired.

A blanket plate printing frame 20, later described in detail and operation, hingedly mounted in cabinet 11 at points 21 is adapted to be normally positioned vertically within the cabinet, but also adapted to be pivoted outwardly to the dotted line position indicated at 20' and 20''.

Frame 20 consists of seamless square tubing to provide a rectangular frame, with a resilient blanket member 22 secured upon its inner surface, said blanket having a beading 23 forming a part thereof which extends around and adjacent the outside edge of the blanket for air sealing engagement with the glass frame 24.

An intermediate plywood or other supporting base 25 is provisioned within the blanket frame 20 providing a yielding support for the blanket member 22 and also limiting inward movement thereof. Said glass frame 24 also constructed of seamless square steel tubing, preferably, with a glass plate secured therein, is suitably hinged at 26 to the blanket frame 20 whereby while said glass frame may move outwardly with its supporting blanket frame, it may also be tilted upwardly with respect thereto.

Being so hinged the glass frame may remain in vertical position, and at the same time outward movement of the blanket frame 20 is permitted to the position indicated at 20' with a suitable slide bracket 27 limiting the relative movement.

On the other hand both frames 20 and 24 may be swung outwardly to horizontal positions on hinges 21, and further glass frame 24 may be angularly elevated around its hinged connection 26 to permit access to the blanket frame for printing of the sensitized metal plate in the manner hereafter described.

After examination of the developed negative, if opaquing is desired, the blanket frame is moved outwardly to the position shown at 20', and the sliding opaquing table 28 normally disposed in horizontal position within opening 31 in cabinet 11, is slid outwardly on suitable runners and tilted downwardly to the position shown at 28', with its outer end resting upon the upper end of the outwardly tilted blanket frame as shown at 20'.

The opaquing table consists of a steel or wooden

frame of the size required with one piece of flashed opal and one piece of blue plate glass inserted into the frame. The inner end of the frame has provisioned thereon clasps 29 adapted for engagement with the pins 30 at the outer edge of the opening 31 to thereby prevent the opaquing table 28 from being pulled out completely from the cabinet; and further to allow the table to be lowered to rest upon the upper edge of the blanket frame indicated at 20'.

Frames 20 and 24 form together a vacuum contact printing unit between which the sensitized plate and the negative are interposed, both frames being first pivoted to vertical position before printing.

The source of illumination therefor consists of a plurality of rows of horizontally arranged lamps 32 which may be turned on by a suitable timing switch hereafter described.

However for opaquing work the source of light is the same i. e. the lamps 32, whereby illumination passing through the glass frame 24 is supplied to the surface of the opaquing table shown in the position 28', whereby the negative thereon may be suitably opaqued or touched up where required.

After opaquing the negative the opaquing table 28 is then slid back into horizontal position within opening 31 in cabinet 11, and also the blanket frame 20 is tilted back into vertical position.

A plate whirler 33 is encased in the drawer 34 within cabinet 11, or may be installed on a swivel table; but in any event is adapted to be slid or swiveled forward outside of the cabinet for receiving the metal plate.

Said metal plate is flowed or covered with a suitable sensitizer and then returned to its initial position within the cabinet, where it is properly whirled to evenly spread the sensitizer and to thoroughly dry the same upon the plate. Thereafter the whirler is brought forward to remove the plate, and immediately returned to its initial position out of the way within the cabinet. Also attached to plate whirler 33 is a rheostat for variable speed, and an electric heating element to dry the solution.

The blanket frames 20 and 24 are lowered to horizontal position by means of hinges 21 and the glass section 24 is separately raised on its hinges 26 and held in position by the slide bracket 27. The metal plate is then placed on the blanket 22 and the negative properly positioned upon the now sensitized surface of said plate. The glass frame 24 is again lowered until its glass portion contacts the rectangular beading 23 thereby providing an air tight seal between the two frames.

A vacuum producing source generally indicated at 35 is provided within the cabinet with a suitable conduit 36 connected thereto and communicating with the inner surface of the blanket frame 20 whereby air between the two frames may be withdrawn causing the blanket member 22 within the blanket frame 20 to tightly engage the glass frame and to also bring the metal plate into contact throughout with the surface of the negative therein.

After the vacuum is applied between the two frames, both are raised to a vertical position with the glass frame being disposed directly in front of the lamps 32. Said lamps are then turned on by a suitable switch for a sufficient time to obtain a print from the negative upon the metal plate. Thereafter both frames are lowered to horizontal positions, the glass frame opened and the plate removed. Both frames 20 and 24 may

then be again moved back to vertical position to be disposed out of the way and entirely within cabinet 11.

The metal plate is then placed upon the ink-up table 37 and developing ink applied thereto. The top of the ink-up table is made of Vitro-lite, marble, non-rust metal, or other similar material.

Referring to Fig. 1 a suitable working space A is provided intermediate the ink-up table and portion B of the cabinet 11 upon which the developing containers 15, 16 and 17 rest. Illumination of this space is provided by the lamp 38 depending downwardly from the portion B of cabinet 11.

Space A within cabinet 11 also provides access to the plate developing sink 39 within which the printed plate after inking-up is placed for water flushing thereon until fully developed. After development the plate is dried, processed and then it is ready to be used in a printing press for lithographic printing.

The plate making sink is made of selected wood or non-rust metal, and has provisioned adjacent its rear upper edge a suitable flushing pipe 40, perforated throughout its length as indicated at 41 to provide a continuous water supply cascading down over the printed metal plate lying upon the inclined water rack 42 within the developing sink 39. Water is supplied through the pipe 43 from a suitable exterior source for fluid communication with flushing pipe 40, there being a suitable manually operable quick acting gate valve interposed at 44.

An instrument panel board 45, shown in Fig. 1 on the front of cabinet 11 between the printing frame 20 and plate whirler 33, is exterior to the dark room 13 with an electric interval timer 46 for the vacuum printer. It is understood that for printing from the negative upon a sensitized plate within the printing frames, that the lights 32 are on only for a short predetermined interval. Timer 46 provides manual means for regulating this interval of exposure.

A three-way manual valve 47 is shown for engaging and releasing the vacuum from the vacuum source 35 to the blanket frame 20 through conduit 36. It will be understood that vacuum is required only after the blanket frame 20 and glass frame 24 are brought together with the sensitized plate and negative disposed therebetween. Valve 47 also permits a quick release of the vacuum after the printing operation by allowing air to rush in between the blanket frame and the printing frame, whereby said printing frames may be quickly opened, saving considerable time heretofore lost.

A manual switch 48 is shown on the panel board for operating vacuum pump 35 as and when desired. Likewise a manual switch 49 is shown for turning on and off printing lamps 32 within the cabinet 11 which are disposed in parallel relation directly behind the glass printing frame 24.

The vacuum gauge 50 is indicated for visual measurement of the amount of vacuum desired for the printing operation, and for determining whether said vacuum is maintained throughout said operation.

The film developing sink B with trays 15, 16 and 17 has been previously referred to as temperature regulated by refrigerator as well as heating means. The refrigerator unit is generally indicated diagrammatically at 51 within the storage compartment 52 in the bottom of cabinet 11, and is suitably connected by conduits 53 to the flat refrigerator coils 54 which are soldered

or otherwise secured to the under surface of sink B, providing an intimate heat conducting contact therewith whereby a temperature regulated fluid may be circulated to maintain a predetermined temperature of the water within sink B within which the developing and fixing trays are partially immersed.

A separate electrical heating cable 55, preferably a lead covered wire, is also provisioned in coils against the bottom surface of sink B between and co-extensive with the refrigerator coils 54, where, by thermostatic control, the temperature of the water within sink B can be accurately maintained.

Insulating material 56 preferably cork and rock wool is then provisioned entirely around sink B, being disposed within the compartment member 57.

The central wash tray 16 is supplied continuously, when in use, with a fresh water source 58, there being an overflow stand pipe 59 within said tray 16 for maintaining the level of water therein. Said stand pipe is threaded into the extension pipe 60 which downwardly depends below tray 16 to be removably inserted within the sink stand pipe 61.

Stand pipe 59 is removable permitting flushing and cleaning of tray 16. Its extension 60 is adapted to provide a fluid drain connection with the sink stand pipe so as not to disturb the cooled water in sink B. It will be noted also that stand pipe 61 is removable permitting flushing out of sink B when desired.

A drain connecting pipe 63 is adapted for threaded connection with the sink drain pipe 62, pipe 62 extending through the insulating compartment 56 for communication with a suitable sewer drain 63.

Thermostatic controls 64 and 65 are shown on instrument panel 45 for operating and regulating the refrigerator and heating units respectively whereby the developing sink B may be constantly maintained at any desired predetermined temperature. For instance in a warm climate thermostat control 64 may be set to warm the water within sink B to approximately 65 degrees F., and so adjusted as to actuate the refrigerator unit 35 if the temperature of the fluid sink B rises to, for example 67 degrees F.

On the other hand in a cool or cold climate thermostat switch 65 may be set also for maintaining the water in sink B at approximately 65 degrees F., being set to operate when the temperature drops to approximately 63 degrees F.

It will be noted that both thermostats are so coupled together that by a suitable shaft or lever a temperature adjustment of one automatically adjusts the other for the same temperature. This guarantees that only one unit, refrigerating or heating, will be operative at one time. Further such a coupling between the two thermostats eliminates the trouble and difficulty of separately adjusting both. So arranged, an adjustment of one, causes an automatic temperature setting of the other.

The cabinet housing 11 therefore provides a compact lithograph film developing and plate making unit, and is intended essentially for conserving floor space, time, and numerous steps.

Heretofore any one of the units above described, as for instance the negative developing sink, or the plate developing sink, or the printing mechanism occupied the space now occupied by the entire cabinet, effecting a space saving of approximately 80 percent. This feature is im-

portant particularly when the unit is employed on ships or upon or adjacent the battle field.

A storage compartment 66 is shown in Fig. 1 which may be accessible from both sides of the cabinet. An additional film storage compartment 67 is shown within the lower portion of the cabinet 11 accessible from the dark room.

It will be noted that the dark room partition or wall 12 is built snugly around the sink so that while the film developing sink B is entirely within the dark room, the plate making units above described are accessible from the room exterior thereto.

For one man operation all apparatus could be installed within housing cabinet 11 to open outwardly below the front section of said sink but entirely within the dark room whereby all processing could be accomplished therein conveniently.

It will be seen from the drawings that all apparatus above described is enclosed within the cabinet flush with either the front or rear thereof so that when not in use, suitable doors, not shown in the drawings, may be closed to keep all apparatus clean, and further to present a neat appearing cabinet occupying a very minimum of space.

Having described my invention, reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. Apparatus for processing lithographic printing plates from developed film comprising a cabinet housing, a vertically disposed blanket frame hingedly mounted and nested within said housing and adapted to be pivoted outwardly, a glass frame nested within said housing hingedly mounted on said blanket frame to tilt therewith, and with respect thereto, a bracket member interconnecting said frames for limiting relative tilting movement, a vacuum producing source within said housing, a conduit connecting said source and the top surface of said blanket frame adjacent said glass frame, a translucent opaquing table horizontally and slidably disposed within said housing adapted to tilt downwardly angularly when withdrawn therefrom, said blanket frame being adapted to tilt outwardly at an angle independent of said glass frame to form a rest for the outer end of said opaquing table.

2. Apparatus for processing lithographic printing plates from developed film comprising a cabinet housing, a vertically disposed blanket frame hingedly mounted and nested within said housing and adapted to be pivoted outwardly, a glass frame nested within said housing hingedly mounted on said blanket frame to tilt therewith, and with respect thereto, a bracket member interconnecting said frames for limiting relative tilting movement, a vacuum producing source within said housing, a conduit connecting said source and the top surface of said blanket frame adjacent said glass frame, a translucent opaquing table horizontally and slidably disposed within said housing adapted to tilt downwardly angularly when withdrawn therefrom, said blanket frame being adapted to tilt outwardly at an angle independent of said glass frame to form a rest for the outer end of said opaquing table, latching means on the inner end of said table, and means on said cabinet cooperable with said latching means adapted to limit outward movement of said table, at the same time permitting tilting thereof.

JAMES T. CAMPBELL