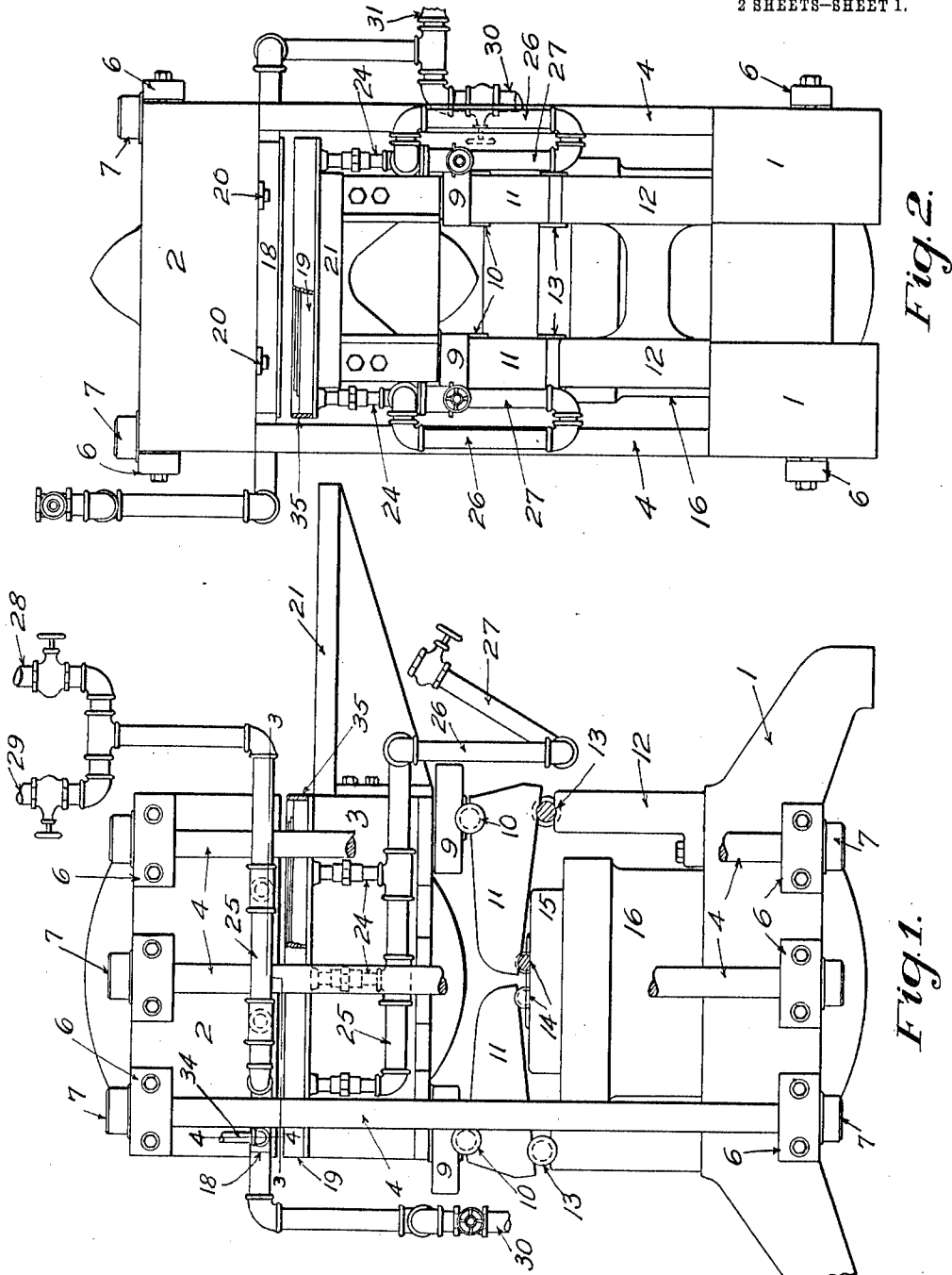


M. A. DROITCOUR.
METHOD OF MAKING PRINTING PLATES.
APPLICATION FILED MAY 26, 1910.

1,064,134.

Patented June 10, 1913.

2 SHEETS—SHEET 1.



WITNESSES
Stephen Mack.
W. S. Wadman

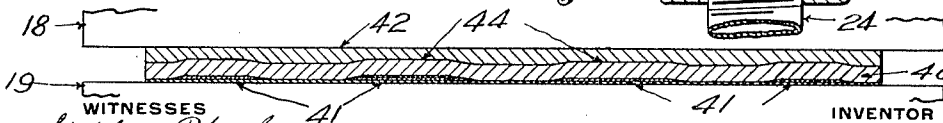
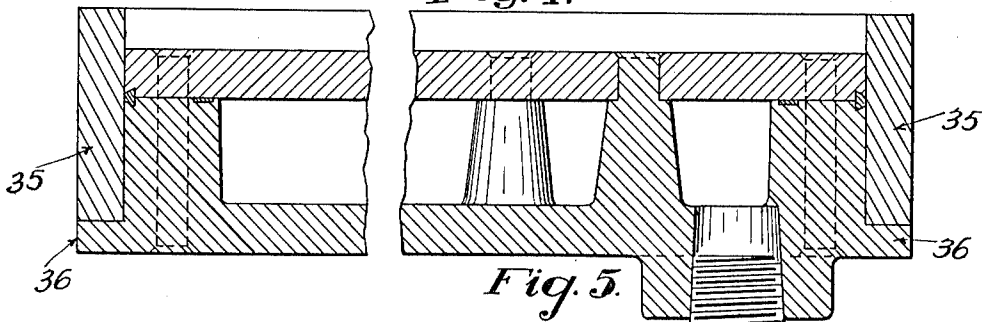
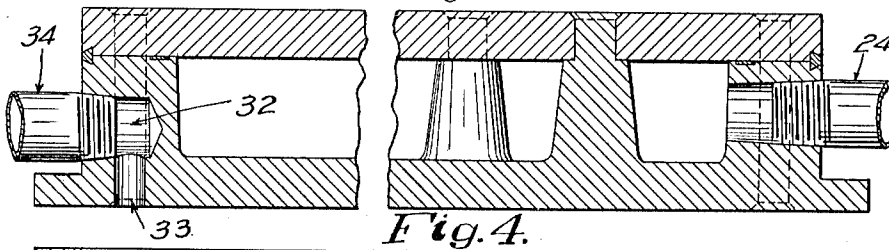
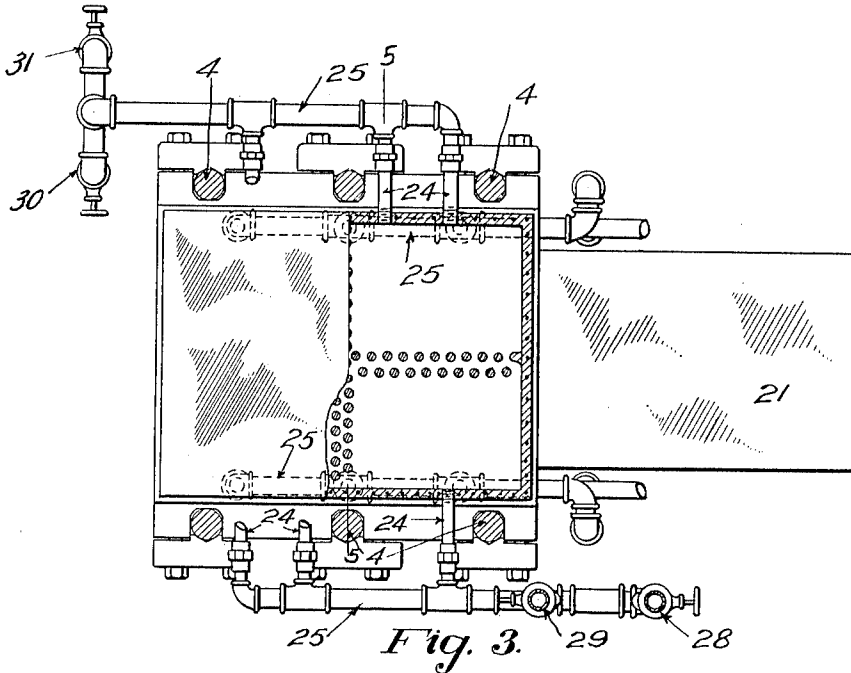
INVENTOR
Michael A. Droitcour,
By Fredk W. Winter
Attorney.

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2 SHEETS—SHEET 2.



WITNESSES
Stephen Mach.
Jas. F. W. W. W.

Michael A. Droitcour
By Frank W. Winter
Attorney.

UNITED STATES PATENT OFFICE.

MICHAEL A. DROITCOUR, OF OAK PARK, ILLINOIS.

METHOD OF MAKING PRINTING-PLATES.

1,064,134.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed May 26, 1910. Serial No. 563,617.

To all whom it may concern:

Be it known that I, MICHAEL A. DROITCOUR, a resident of Oak Park, in the county of Cook and State of Illinois, have invented
5 a new and useful Improvement in Methods of Making Printing-Plates, of which the following is a specification.

This invention relates to a method of making printing plates from celluloid or
10 other plastic substances.

The object of the invention is to provide a method of making such plates whereby the plates are made of uniform thickness throughout so that it will not be necessary
15 to shave or otherwise treat the rear face thereof in order to make the same even, smooth, and of uniform thickness.

The invention, generally stated, consists in pressing the material while heated into
20 a matrix between rigid flat plates or pressure surfaces which are positively guided so as to press the plastic material down to uniform thickness throughout, and while so pressing the plate exhausting the air from
25 the space between the pressure plates and the celluloid sheet and other parts so as to prevent the trapping of air bubbles in any part which would render the plate non-uniform in thickness.

30 In the accompanying drawings I have shown a press suitable for carrying out the method.

In said drawings Figure 1 is a side elevation partly broken out of a press embodying
35 my invention; Fig. 2 is an end elevation of the same; Fig. 3 is a horizontal section on the line 3—3, Fig. 1; Figs. 4 and 5 are enlarged detail vertical sections through the hollow press plates, taken respectively on
40 the lines 4—4, Fig. 1 and 5—5, Fig. 3; and Fig. 6 is an exaggerated sectional view illustrating the effect of the make-ready.

The press illustrated in the drawings comprises a suitable base 1, head or upper pressure
45 member 2, a table or lower pressure member 3, and suitable connections and actuating mechanism. The pressure members 2 and 3 are perfectly rigid and are arranged for relative approximation and
50 separation in exact parallelism to each other. It is obvious that either or both of said members may be movable. As shown, the lower member is movable and the upper member stationary. To this end the upper
55 member or head 2 and base 1 are connected by the tie rods or columns 4, which fit in

notches in the edges of said head and base, are held therein by means of removable caps 6, and are provided on their ends with heads or nuts 7, all as will be readily understood
60 without detailed description.

The lower pressure member 3 may be reciprocated vertically by any suitable mechanism. As shown bearing against the lower
65 face of same member are shoes 9 provided with concave seats for receiving circular pins 10 which rest in similar seats in the arms of lever 11, which are fulcrumed on
70 suitable standards 12 by means of the circular pins 13 fitting concave seats in said levers and standards respectively. The inner ends of the levers are provided with
75 concave seats resting upon the pins 14 which in turn rest upon the piston 15 of a suitable power cylinder 16 secured to or formed in
80 the base 1 and provided with suitable valve controlled inlets and outlets for the pressure medium, which may be either compressed air or water, preferably the former. The
85 arrangement shown gives a very powerful uplift to the lower pressure member 3, in exact parallelism to the press head, but gives only a limited stroke or travel.

Coöperating with the upper and lower pressure members are suitable hollow plates
85 marked 18 and 19 respectively, which are substantially duplicates of each other, and which constitute the platens or pressure faces of the press between which the matrix and the plastic sheet are pressed to form the
90 printing plate. These platens are hollow in order to have admitted thereto steam for heating and rendering plastic the celluloid sheet, and also to have admitted thereto
95 water for the purpose of cooling the same when the pressing is finished. Any form of hollow plates or platens will answer the purpose. Those shown are of special built
100 up construction but this is not essential, as they may be cored out castings. They are preferably brass and of light construction in order to quickly heat and cool when the steam and water respectively are admitted thereto. It is not necessary that they have
105 any great strength, as they are backed by the rigid pressure members, which prevent them from being strained or getting out of true. Their faces are perfectly smooth and flat and true, and they must have sufficient
110 strength not to collapse or yield under the pressure. The lower platen rests loosely on the lower pressure member so that it can

be readily shoved into the press and pulled out, which is necessary, as the press does not open sufficiently for the convenient placing and adjustment of the work between the pressure members. The upper platen, however, must be attached to the press head. This may be done in various ways. As shown, the platen is held by means of bolts 20 extending through the lugs on the platen and into the press head. A table 21 with its top on a level with the top of the lower pressure member when in its lowermost position is provided for receiving the bottom platen when the latter is withdrawn from the press to receive the work or permit its removal when finished. This table may be secured to the press frame, but is shown secured to the lower pressure member 3.

For the admission of steam and water to the hollow platens or pressure plates they have connected thereto pipe members 24 leading to trunks or headers 25, which in turn have connected thereto the supply and exhaust pipes. The connections to the lower or movable platen include the pipe members 26 and 27 connected by swivel joints and so arranged as to permit vertical and lateral movement of the platen without breaking the connections, so as to permit the platen to be moved into and out of the press, as will be readily understood. The pipe connections on one side of the press are provided with two supply branches, to wit, a branch 28 for steam and a branch 29 for water, while the pipe connections on the other side of the press are provided with two exhaust branches, to wit, a branch 30 for the water leading to a sewer or the like, and a branch 31 for the exhaust steam leading to a steam trap or the like. One of the presser plates or platens, such as the upper presser plate or platen 18, is also provided with a horizontal tapped hole 32 communicating with a vertical hole 33 which leads through said plate to the space between the two presser plates. To the hole 33 is connected a pipe or hose member 34 which leads to a suitable source of vacuum, such as a suction pump or a reservoir or tank in which pressure less than atmospheric pressure is maintained. During the pressing operation the matrix and plastic sheet are entirely inclosed in an air tight chamber from which the air is exhausted through the connection 34. This is effected by providing a seal such as a rubber or similar ring or wall 35 between the two pressure members, said sealing member being shown as supported on a flange 36 on the lower platen 19 and surrounding the presser face thereof and arranged to contact with the top platen and of sufficient height so that when the platens are nearly closed this rubber seal is compressed to provide a sealed chamber in which the work is inclosed. The rubber ring or wall

does not contact with the work, but the edges of the latter are entirely clear so that the air can readily escape from between the matrix, celluloid sheet and other parts. The pressing is effected while exhausting air from the chamber, thereby preventing the accumulation of air between the matrix and celluloid sheet or between the celluloid sheet and presser plates or platens, and preventing the trapping of air which would cause bubbles and unevenness of the celluloid sheet or plate.

In carrying out the method by the foregoing or any other suitable apparatus the matrix 40 with a make-ready 41, if the plate is to be for half tone or other high grade printing, and the celluloid sheet or plate 42 are assembled either side up, upon the platen 19 while the latter is on the table 21. The seal 35 is then placed on the platen and the whole shoved into the press. The cylinder 16 is then actuated to elevate the lower pressure member 3. A slight approximation of the presser plates or platens puts pressure upon the rubber ring 35, thereby absolutely sealing the space inclosed thereby. The connection 34 to the vacuum producing apparatus or means is then opened so that the air in the space between the presser plates or platens and the rubber ring 35 is reduced below atmospheric pressure, thereby withdrawing the air from between the several sheets comprising the work and also between the presser plate or platen and the celluloid sheet so that in the pressing of the parts air bubbles are not trapped between the presser plate and the celluloid sheet. The steam connections to both platens are also opened in order that the presser plates or platens may be heated to soften the celluloid and render it plastic. After a sufficient length of time, about 90 seconds, the celluloid sheet is sufficiently plastic and the press is then fully closed by admitting more fluid to the cylinder 16 and the celluloid is pressed well into the matrix. The steam is then shut off and water admitted to the hollow plates to cool the same and harden or set the celluloid plate. When sufficiently hardened the water connections are closed, the cylinder 16 released, and the lower platen pulled out of the press in order that the printing plate can be readily removed and a fresh sheet put in place. During the entire time of pressing the work is in a chamber under less than atmospheric pressure.

For high grade printing those portions of the plate-face which are to give the "solid" parts of the impression must be higher than those portions which produce the "high lights" of the impression. These results are secured in my method by underlaying the matrix at the points where the light portions of the plate are derived, by the make-ready 41 which is so built up as to have the great-

est thickness at the points where the high lights are to be most pronounced. This underlay elevates the face of the matrix at those points, as at 44, so that when the celluloid sheet is pressed into the matrix said sheet will be thinner at those points. Consequently, the celluloid plate will have its face of varying heights, as desired, but at the same time its back, on account of the positive pressure of the flat rigid platen, is perfectly smooth and flat so as to dispense with shaving or other operation to render the back smooth and even, as is the case where a yielding pressure element or medium is used. A more perfect plate is also formed, as the shaving operation does not always produce regularity in thickness. The preferred make ready is made up of varying thicknesses of paper sheets and is secured as a whole to the back of the matrix by pasting at the corners only.

The presser plates or platens have absolutely flat faces and the press is so constructed that these flat faces are brought together in perfect parallelism to each other. Consequently the celluloid sheet is gradually formed to uniform thickness from end to end and side to side, thereby giving a plate which is more perfect than when made by fluid pressure acting directly upon the face of the celluloid as has heretofore been proposed. The absence of all air bubbles between the presser plate and platen and the celluloid sheet leaves the back of the celluloid plate perfectly flat. As a consequence celluloid plates can be made by this process so perfect that they do not need to be ground or shaved off on the back in order to render the same smooth and even.

The process is intended primarily for making printing plates from celluloid, but obviously it is adapted for making such plates from other suitable plastic material.

What I claim is:

1. The method of making printing plates from substances which can be rendered plastic, consisting in inclosing the plate forming material and matrix in a sealed space, exhausting air from said space, and while exhausting air from said space forcing the plate forming material into the matrix by means of rigid pressure surfaces contacting directly with the matrix and plate forming material and having movement of approximation in perfect parallelism.

2. The method of making printing plates from celluloid consisting in inclosing a sheet of celluloid and a matrix in a sealed space, exhausting air from said space, applying heat to soften the celluloid, while exhausting air from the space forcing the celluloid sheet into the matrix by means of rigid pressure surfaces contacting directly with the matrix and celluloid sheet and by pres-

sure acting normal to the matrix face, and then cooling the plate to set the same.

3. The method of making printing plates from plastic substances, consisting in pressing the plastic substance into the matrix by direct contact of rigid pressure surfaces having movement of approximation in perfect parallelism, and simultaneously therewith holding the same under partial vacuum to remove the air and gases from between the plastic substance, the matrix, and the pressure elements.

4. The method of making printing plates from substances which can be rendered plastic, consisting in pressing the plastic substance into a matrix by direct contact of rigid pressure surfaces acting normal to the matrix face and having movement of approximation in perfect parallelism, and simultaneously therewith holding the same under partial vacuum to remove air from between the celluloid sheet and the pressure element.

5. The method of making printing plates consisting in taking a celluloid sheet, simultaneously heating the same and pressing the same into the matrix by means of direct contact of rigid pressure surfaces acting normal to the matrix face and having movement of approximation in perfect parallelism, and simultaneously therewith holding the same under partial vacuum to remove the air from between the celluloid sheet and the pressure element.

6. The method of making printing plates consisting in pressing in a sealed chamber having a pressure less than atmospheric a plastic substance by means of a member with a flat surface against the back of such substance into a matrix underlaid with reverse make-ready, thereby providing tones in the face of the printing plate and simultaneously providing such plate with a flat back, substantially as described.

7. The method of making printing plates consisting in pressing in a sealed chamber having a pressure less than atmospheric a substance capable of being rendered plastic by means of a member with a flat surface against the back of such substance into a matrix underlaid with reverse make-ready and simultaneously heating such substance to render it plastic, thereby producing tones in the face of the printing plate and simultaneously providing the latter with a flat back, substantially as described.

8. The method of making a printing plate from a plastic substance in a sealed chamber consisting of pressing such substance by means of a member with a flat surface against the back of such substance into a matrix underlaid with reverse make-ready and simultaneously withdrawing gaseous contents from said chamber, thereby producing tones in the face of the printing plate

and at the same time providing such plate with a flat back, substantially as described.

9. The method of making printing plates in a sealed chamber consisting in pressing a substance capable of being rendered plastic by heat, by means of a member with a flat surface, against the back of such substance into a matrix underlaid with reverse make-ready, simultaneously heating such substance to render it plastic and simultaneously withdrawing gaseous contents from said chamber, thereby producing tones in the face of the printing plate and at the same time providing such plate with a flat back, substantially as described.

10. The method of making a printing plate in a sealed vacuum chamber from a substance capable of being rendered plastic by heat, consisting in pressing such substance by means of a member with a flat surface against the back of such substance into a matrix underlaid with reverse make-ready, simultaneously heating such substance to render it plastic, and subsequently cooling the printing plate thus produced, thereby producing a toned printing face in said plate and at the same time providing such plate with a flat back, substantially as described.

11. The method of making a printing plate in a sealed vacuum chamber from a substance capable of being rendered plastic by heat, consisting in pressing such substance by means of a member with a flat surface against the back of such substance into a matrix underlaid with a reverse make-ready, simultaneously heating both sides of such substance to render it plastic, and subsequently cooling the printing plate thus produced, thereby producing a toned printing face in said plate and at the same time providing such plate with a flat back, substantially as described.

12. The method of making a printing plate in a sealed vacuum chamber from a substance capable of being rendered plastic

by heat, consisting in pressing such substance by means of a member with a flat surface against the back of such substance into a matrix underlaid with reverse make-ready, simultaneously heating such substance to render it plastic, and subsequently cooling both sides of the printing plate thus produced, thereby producing a toned printing face in said plate and at the same time providing such plate with a flat back, substantially as described.

13. The method of making printing plates from substances which can be rendered plastic, consisting in forming a suitable matrix, applying to the back of the matrix at the desired points underlays or a make-ready, then pressing a blank of the plastic material into the face of the matrix by means of rigid pressure surfaces acting normally to the matrix face and having movement of approximation in perfect parallelism, whereby a plate with a flat even back and with a make-ready face is produced, and holding the plate under such pressure until the plastic material is set, substantially as described.

14. The method of making printing plates from substances which can be rendered plastic, consisting in forming a suitable matrix, applying to the back of the matrix at the desired points underlays or a make-ready, then pressing the plastic substance into the matrix face by direct contact of rigid pressure surfaces acting normal to the matrix face and having movement of approximation in perfect parallelism, and simultaneously therewith holding the same under partial vacuum to remove the air from between the plastic substance and the pressure element, substantially as described.

In testimony whereof, I have hereunto set my hand.

MICHAEL A. DROITCOUR.

Witnesses:

E. HASSMANN,

E. W. WINTER.