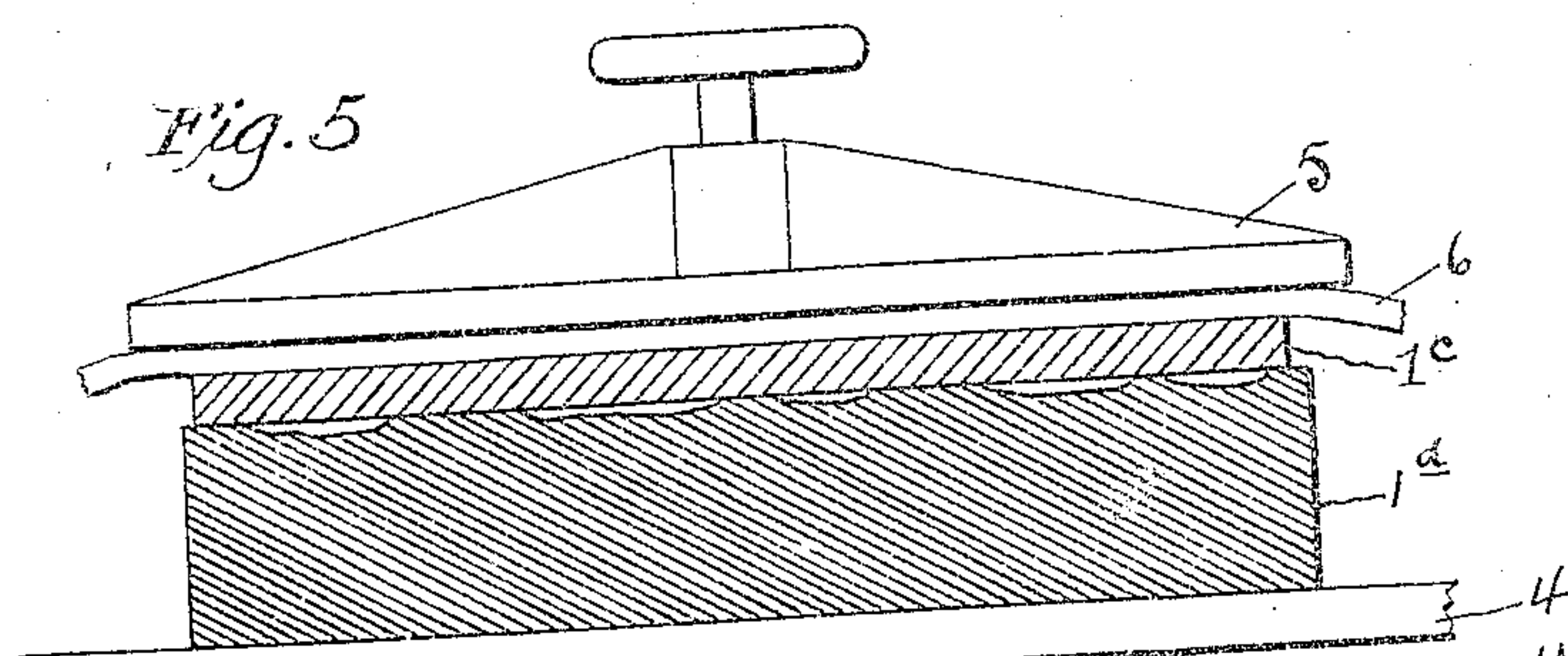
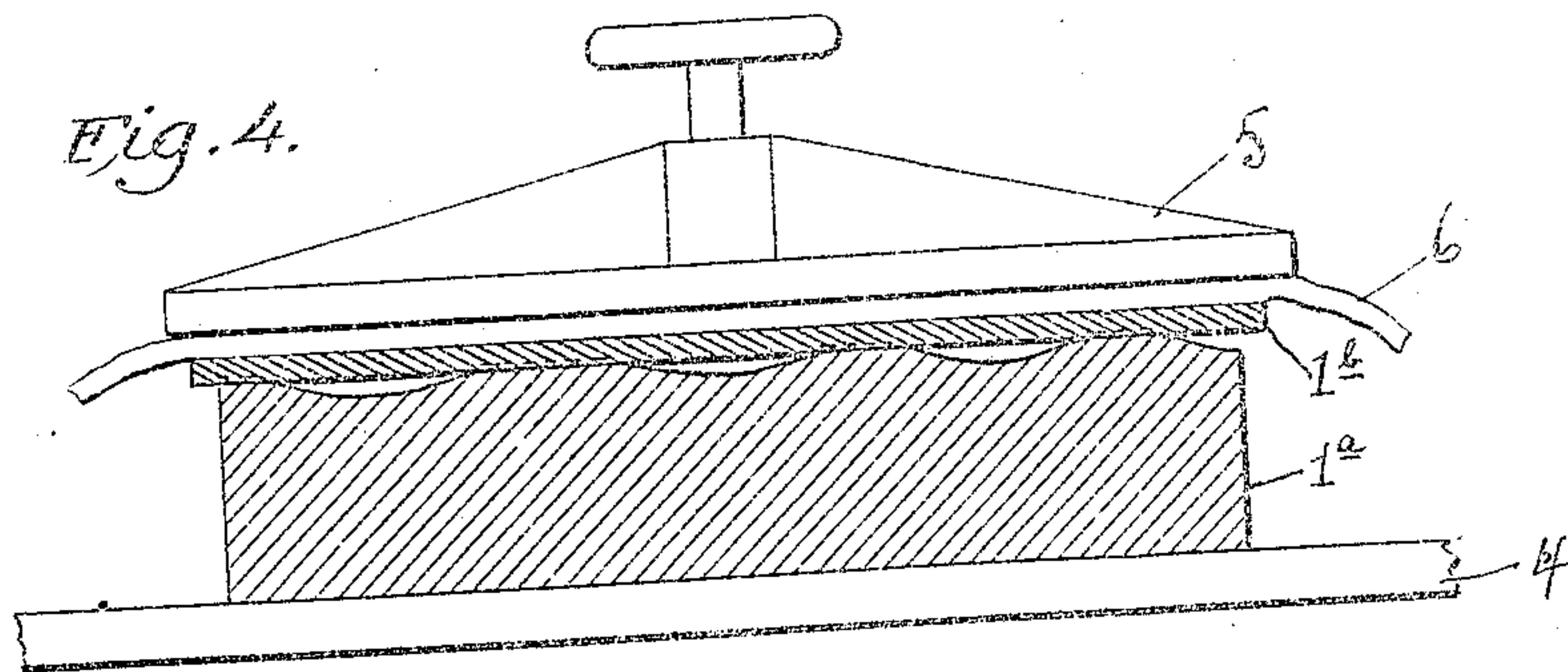
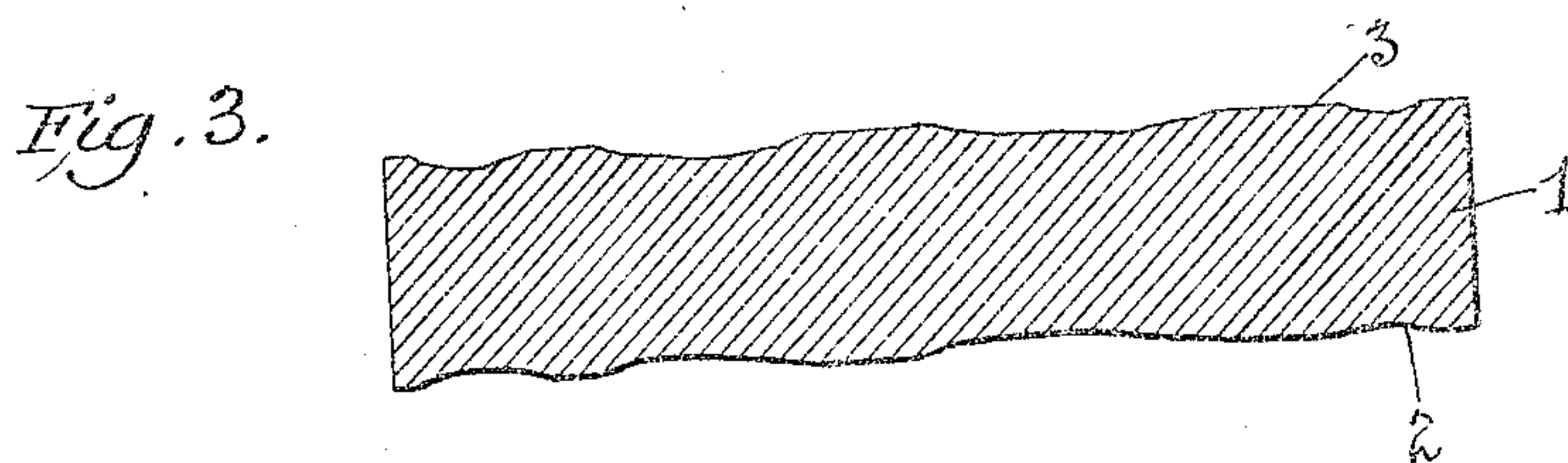
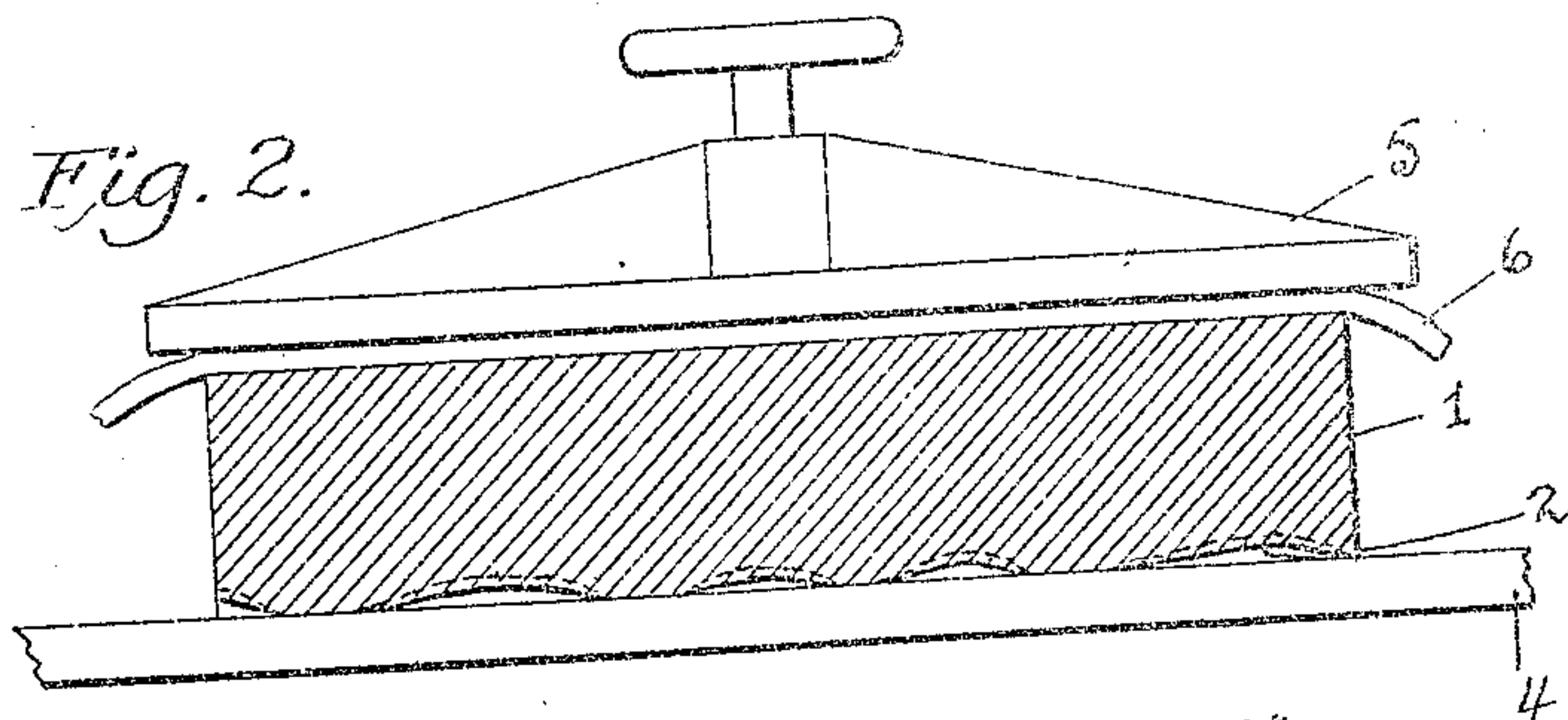
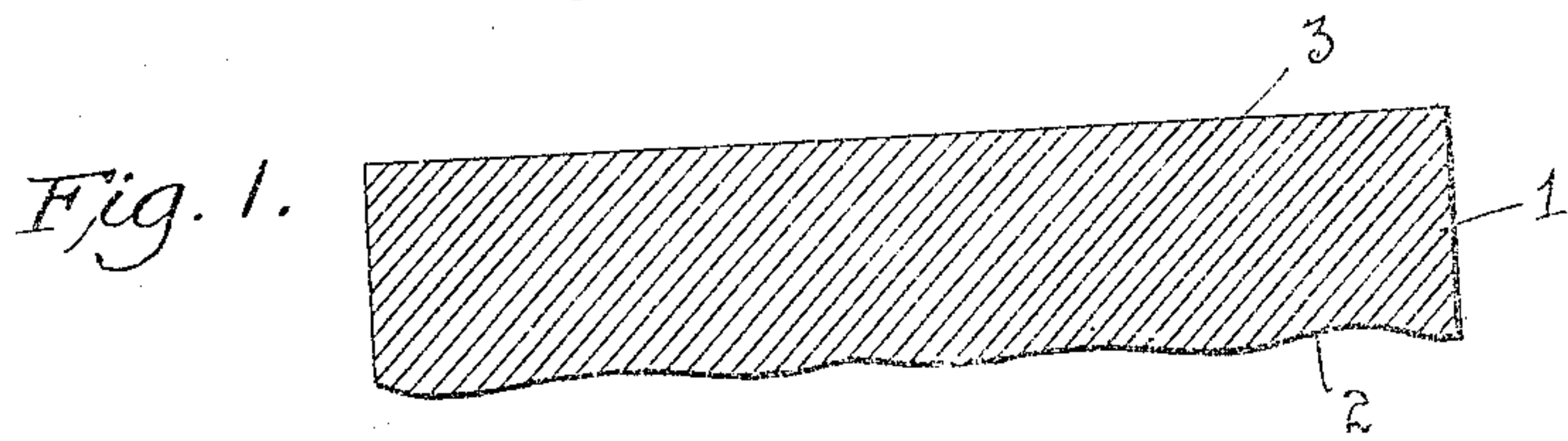


No. 897,051.

PATENTED AUG. 25, 1908.

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PROCESS OF MANUFACTURE OF HALF TONE PRINTING BLOCKS.
APPLICATION FILED DEC. 1, 1906.



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PROCESS OF MANUFACTURE OF HALF-TONE PRINTING-BLOCKS.

No. 897,051.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed December 1, 1906. Serial No. 345,900.

To all whom it may concern:

Be it known that we, WILLIAM BELL and HARRY BRYCE BELL, subjects of the King of Great Britain and Ireland, and residents, respectively, of Redan street, Mosman, near Sydney, in the State of New South Wales, Commonwealth of Australia, and Cowles Road, Mosman, near Sydney aforesaid, have invented an Improved Process of Manufacture of Half-Tone Printing-Blocks, of which the following is a specification.

This invention relates to an improved manufacture of "half tone" printing blocks and has for its object the production of a block whose surface is formed in relief by the use of which the "overlay" or "make ready" for printing is almost if not entirely dispensed with. In the manufacture of such a block a smaller amount of skilled labor is required in the fine etching than has heretofore been found necessary in the production of blocks for a similar purpose.

This invention mainly consists in forming the printing surface of a block in relief by subjecting it to a yielding pressure obtained by using a plastic sheet such as lead, leather, or gutta percha in a pressure press, the "back" of the block having previously been prepared and weakened on certain predetermined parts corresponding to the "high lights" and "half tones" on the printed surface to permit of the buckling or depressing of these weakened parts, or by subjecting to pressure a comparatively thin shell of metal—upon which a print has been developed and burned in—superposed upon a mold or die the surface of which is formed with depressions corresponding to the "high lights" and "half tones" of the superposed plate into which depressions the overlying portions of the thin plate are forced.

In the carrying out of this invention the production of the printing block entails the treatment, in one instance, of both surfaces of the plate, in another, of one surface only of two metal plates, and in a third, the treatment of one metal plate and one gelatin sheet. That surface which is ultimately used as the printing surface is hereinafter referred to as the "face" and the other which is not used for printing is referred to as the "back".

The invention is illustrated in the accompanying drawing, wherein,

Figure 1 is a vertical sectional view of a

printing block showing the back thereof etched; Fig. 2 is a view illustrating the block with its etched back resting upon the bed plate of a pressure press; Fig. 3 is a vertical sectional view of the block after both its face and back have been treated according to the present invention; Fig. 4 is a view illustrating the production of a printing block from two sheets of metal of different thicknesses; and Fig. 5 is a view illustrating the production of a printing block from a sheet of metal and a gelatin sheet.

In referring to the operation in which both surfaces of a plate are treated, a photographic negative of the object to be reproduced is taken in the ordinary way through the usual lined, Levy, mezzograph, or other similar screen. The negative is then stripped onto a thin celluloid film and allowed to dry thereon. By stripping onto a celluloid film is meant stripping the actual collodion film from its glass or other original support in a way well-known to photographers or photo-engravers. As this film is too delicate to be used alone as a negative it must be mounted upon a support, but as it is required to be printed through from either side in the separate treatment of the back and front sides of the plate, the support used must be very thin, otherwise the light would be dispersed too much when the remounted film is used with sensitized face outward. A thin sheet of celluloid acts sufficiently as a mount. Accordingly, the collodion film which has been stripped from the original support used in the camera is squeezed down into a thin sheet of transparent celluloid and allowed to dry thereon, and when dry the mounted film is thus used as a negative. Theoretically, the collodion film could be used without remounting on the celluloid mount, but such is not commercially practicable except in very rare cases. The metal plate 1—preferably copper or zinc—which is to be used for the production of the block, is sensitized upon its "back" 2 with any of the well known sensitizing solutions, preferably fish glue and bichromate of potash or ammonia, and a print is then taken upon it from the celluloid mounted filament by placing the celluloid "face" thereof in contact with the sensitized surface of the metal in a printing frame and exposing it to light in the usual way. The "back" of the plate is then developed, namely, washed in water soaked in an ani-

lin dye, the soluble glue washed out and the print upon it "burned in". The plate is then placed in a mordant or acid bath and the "back" thereof deeply etched for a period
 5 of time sufficient to secure the required weakening of the plate upon those portions representing the "high lights" and "half tones", the face 3 meanwhile being protected by being coated with an acid resisting substance or
 10 material. In this part of the operation very little skill is required to effect the correct etching.

The plate is withdrawn from the bath when the required depth has been obtained.
 15 The "face" is sensitized and a print taken upon it from the same celluloid backed negative. In this case, however, the collodion film on the celluloid mounting is placed in contact with the "face" of the plate. Care
 20 must be exercised in the placing of the film on the "face" so as to insure the accurately registering or coinciding of the prints on the back and front of the plate. The "face" is then developed, the print "burned in" and
 25 the plate while still hot is placed upon a hard metal slab 4 in a pressure press 5 with its deeply etched surface or "back" resting upon the slab and a sheet of lead 6 placed upon its upper surface or "face". Sufficient pressure
 30 is then applied through the lead sheet to cause the thinned or weakened portions to be forced downward to a degree corresponding to the amount of the weakening the plate has been subjected to at these parts;
 35 thus those portions which represent the "high lights" or "whites" and which have been most deeply etched, are forced downward the most, whereas those representing the "half" or "middle" tones do not sink
 40 so far, while those portions representing the darker shades or blacks do not compress. Should the plate be allowed to cool after the "burning in" process is completed it may be
 45 reheated to soften it prior to embossing it in the press. Should it be found inconvenient, however, to submit the plate to pressure while hot, this operation may be carried out when it has cooled, in which case a sheet of gutta percha, leather or lead may be used to
 50 effect compression in the pressure press. Greater pressure, however, is required in this case. The "face" or printing surface of the plate when removed from the press presents an embossed surface. It is then subjected
 55 to the action of a mordant or acid bath to etch the "face", the "back" meanwhile being protected by an acid resist. Owing to its embossed surface the plate requires comparatively little fine etching to produce a
 60 clean sharp printing surface, thus the time at present employed to effect the fine etching of a "half tone" plate is reduced. The plate is now ready for "proving" and is mounted in the usual manner.

65 To produce the best effects in printing

with a block made as above described a soft backing on the cylinder or platen of the printing machine may be dispensed with and a hard backing substituted. It will also be found that a printing block made as above
 70 described may be used with good results in a worn printing press where slackness of the working parts causes "play", for the reason that the block does not require to "register" with a "make ready". Owing to the
 75 "high lights" being well beneath the surface they are protected largely from contact with the ink rollers thus minimizing the danger of clogging and so obviating frequent stoppages of the machine to allow for washing of
 80 the plate.

Although we have described the mounting of the negative on a thin sheet of celluloid and using both surfaces to obtain prints therefrom, it is obvious that the same result
 85 is obtainable by making two negatives, one being reversed and the other not reversed. In this case the collodion surface of each is applied to the sensitized surfaces of the metal. The former procedure is preferable as it is
 90 less costly than the latter. In the case in which two sheets of metal—preferably of copper or zinc—are used, one 1^a is comparatively thick and the other 1^b comparatively
 95 thin. Both are sensitized and printed upon on one surface only, directly from the collodion film, which need not in this case be stripped from its backing as the film is in each case placed in contact with the sensitized face of each sheet of metal. The
 100 prints are then developed and "burned in" in the usual manner. The thick plate is then deeply etched in a similar manner to that described before, and on removal from the bath is coated with some suitable glue,
 105 preferably with a preparation known as "Chatterton's Compound" which consists of Stockholm tar—one part, resin—one part, and gutta percha—three parts, by weight. The lighter plate is then superposed upon
 110 the heavier plate, with its printed surface uppermost, care being taken that the prints on both plates accurately register. The two plates are placed in a pressure press with a
 115 sheet 6 of lead, gutta percha, or leather superposed upon the printed surface of the thinner plate. Pressure is then applied.

Under the compressing action of the press those portions of the thin plate which are unsupported by lying immediately above the
 120 deeply etched portions of the thick plate are forced downwards into these depressions, the depth of these indentations corresponding to the varying depths of the more or less deeply etched surface. The glue firmly holds the
 125 two plates together. The face of the thin plate is etched and the block is mounted and is then ready for printing purposes. In place of using two sheets of metal a thin
 130 metal plate 1^c and a backing or die 1^d con-

sisting of a "wash out" gelatin relief may be used; the gelatin taking the place of the thick sheet. In this case the surface of a comparatively thick sheet of bichromatized gelatin is printed upon and those parts not acted upon by light are washed out in the usual way with hot water. The surface of the thin plate—preferably copper or zinc—is prepared by being sensitized and printed upon and the print developed and "burned in." Upon the cooling of the plate it is superposed upon the gelatin sheet; the back of the metal plate being placed in contact with the printed or "relieved" surface of the gelatin. The block is then submitted to pressure, a sheet of lead, leather or gutta percha being placed between the "face" of the metal plate and the press. On removal from the press the print is etched and the metal plate and the gelatin sheet mounted as one block in the usual manner.

It is obvious that electrotypes or stereotypes taken from "half tone" printing blocks made according to this invention possess the printing advantages obtainable by the use of such blocks.

What we claim as our invention, and desire to secure by Letters Patent, is:—

1. The process of producing an etched half tone printing plate which consists in (1) printing the face, (2) etching the back through a print corresponding and registering with the face print, (3) pressing the plate to sink the face above the "high lights" of the etching on the back thereof, (4) etching the face.

2. The process of producing an embossed etched half tone printing plate which consists in printing the front and the back of same in register from the one negative, etching the back, pressing the plate with a resilient follower against a rigid back plate so as to bring the "blacks" of the face into relief, and finally etching the face.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM BELL.
HARRY B. BELL.

Witnesses:

C. G. HEPBURN,
H. J. DAVIS.