

B. F. UPHAM.
METHOD OF BENDING PRINTING SURFACES.
APPLICATION FILED JAN. 8, 1908.

906,586.

Patented Dec. 15, 1908

2 SHEETS—SHEET 1

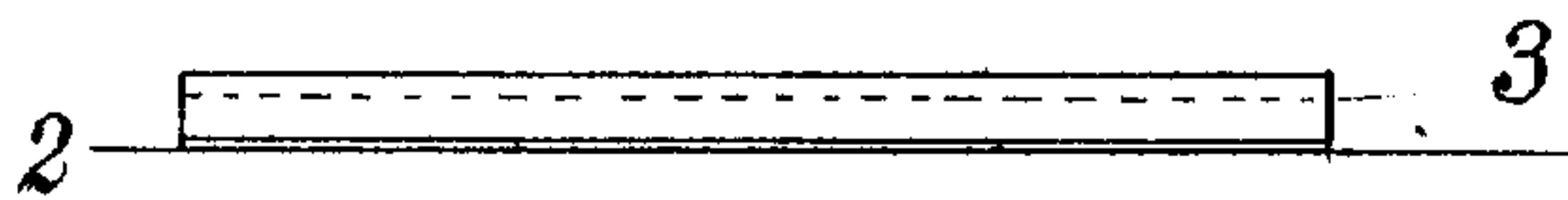


Fig. 1

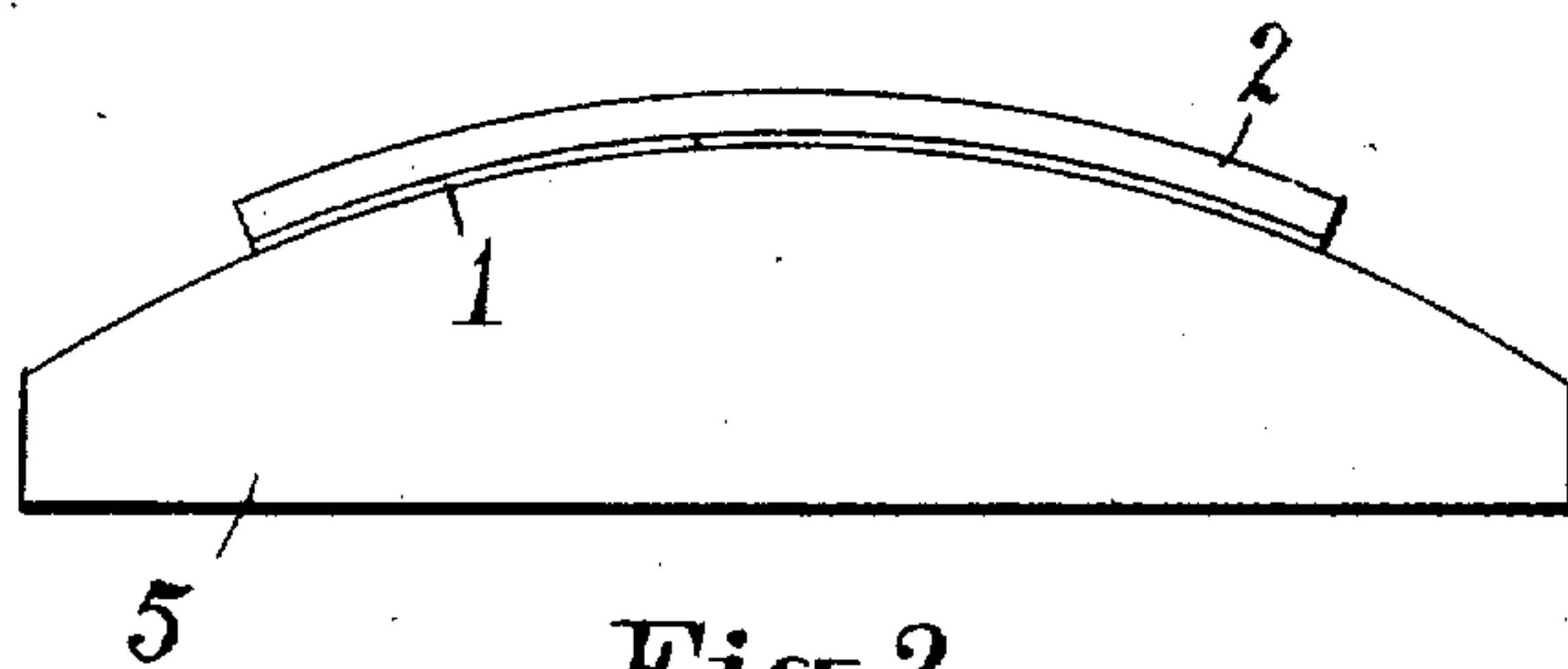


Fig. 2

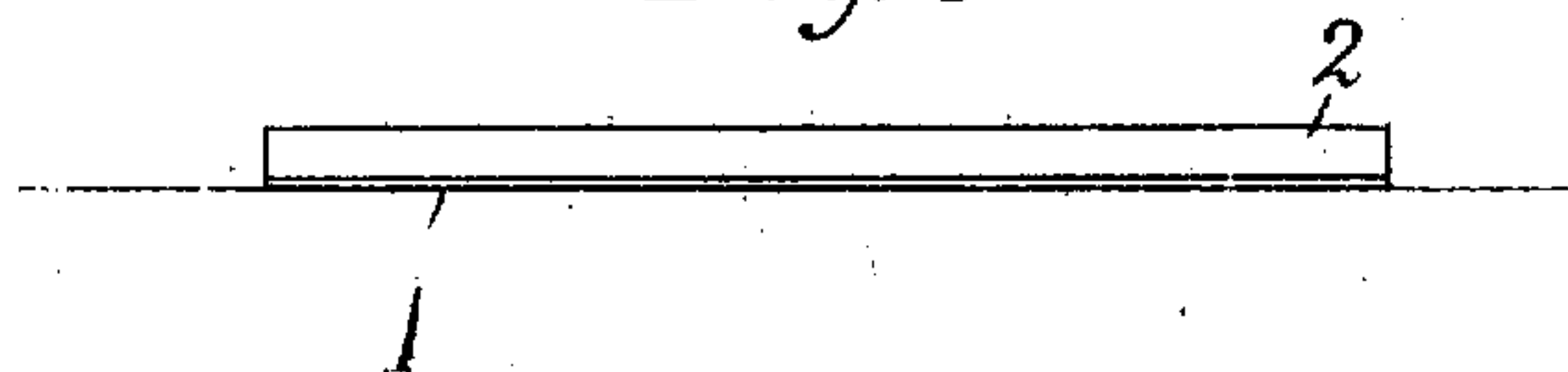


Fig. 3

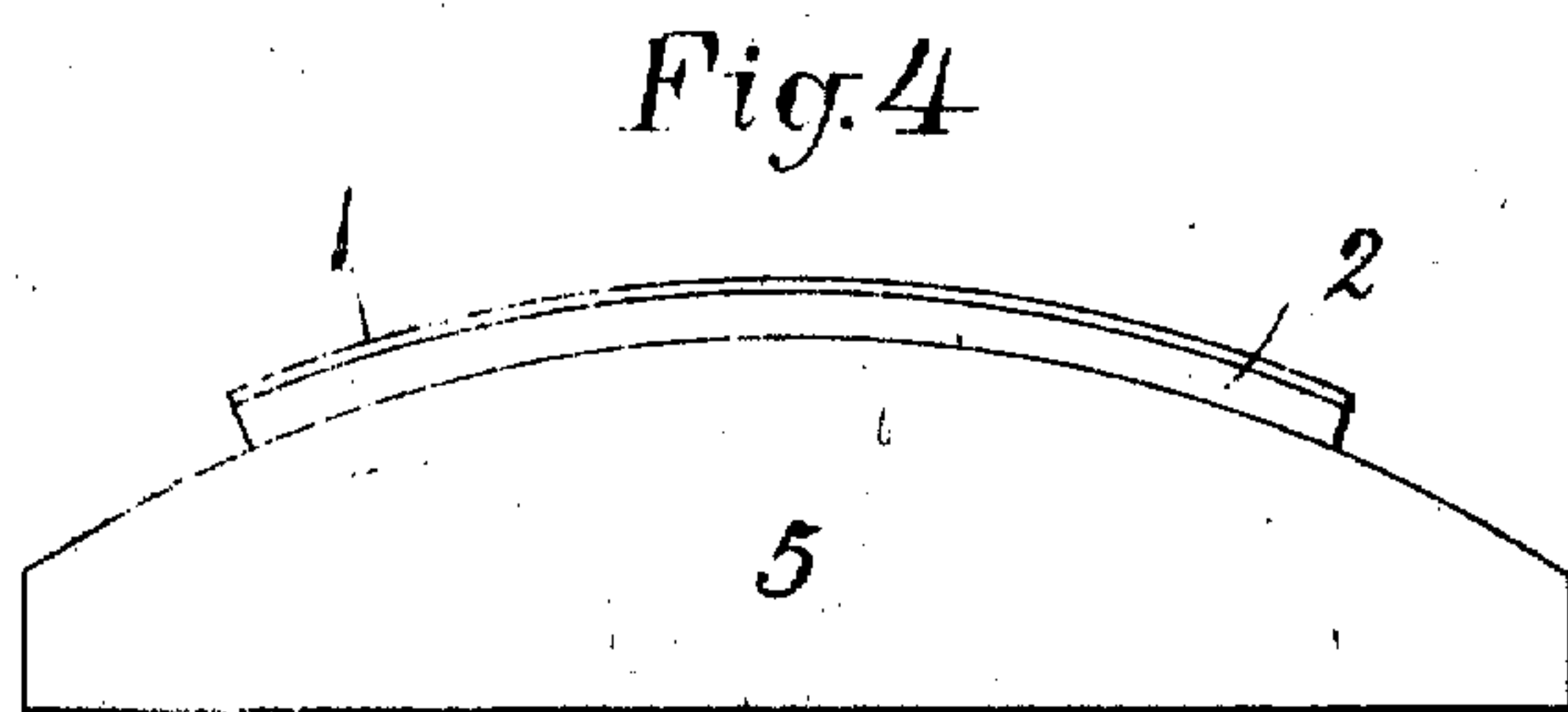


Fig. 4

Witnessed;

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2 SHEETS—SHEET 2.

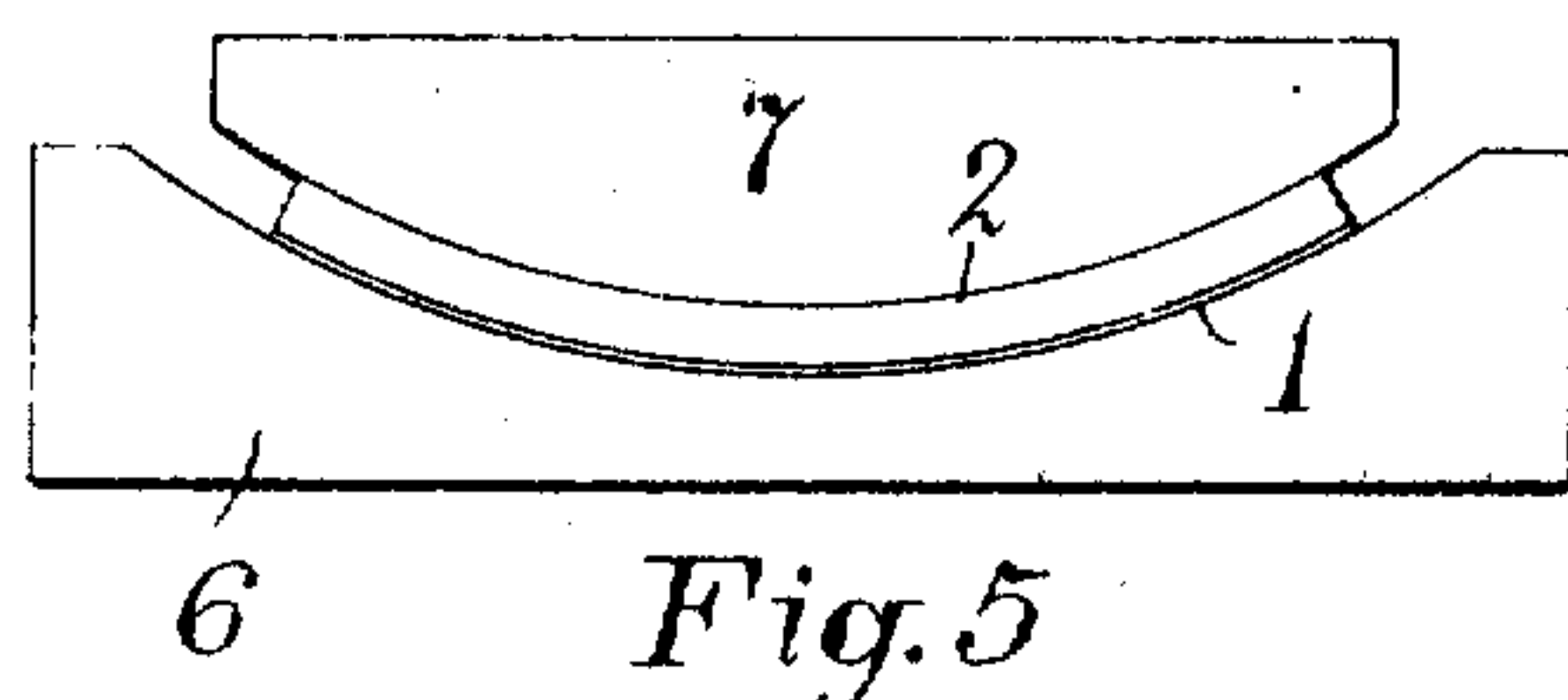


Fig. 5

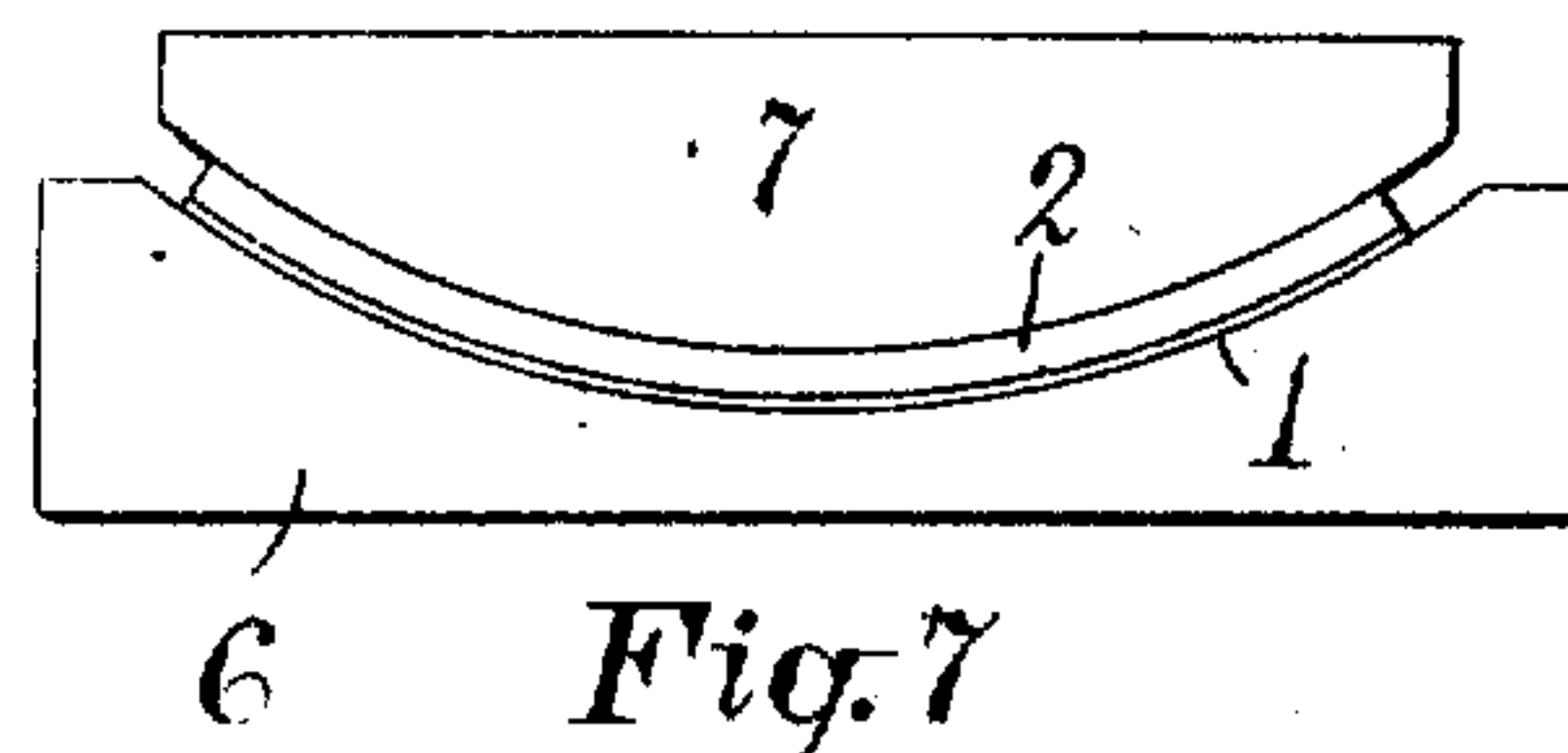


Fig. 7

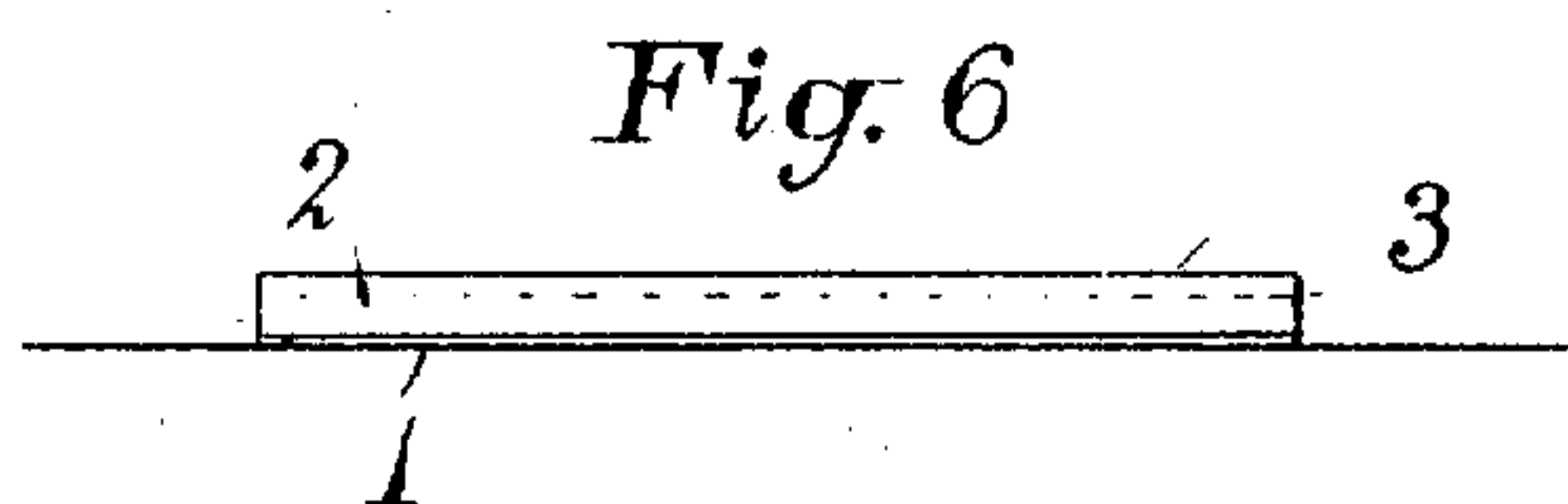


Fig. 6

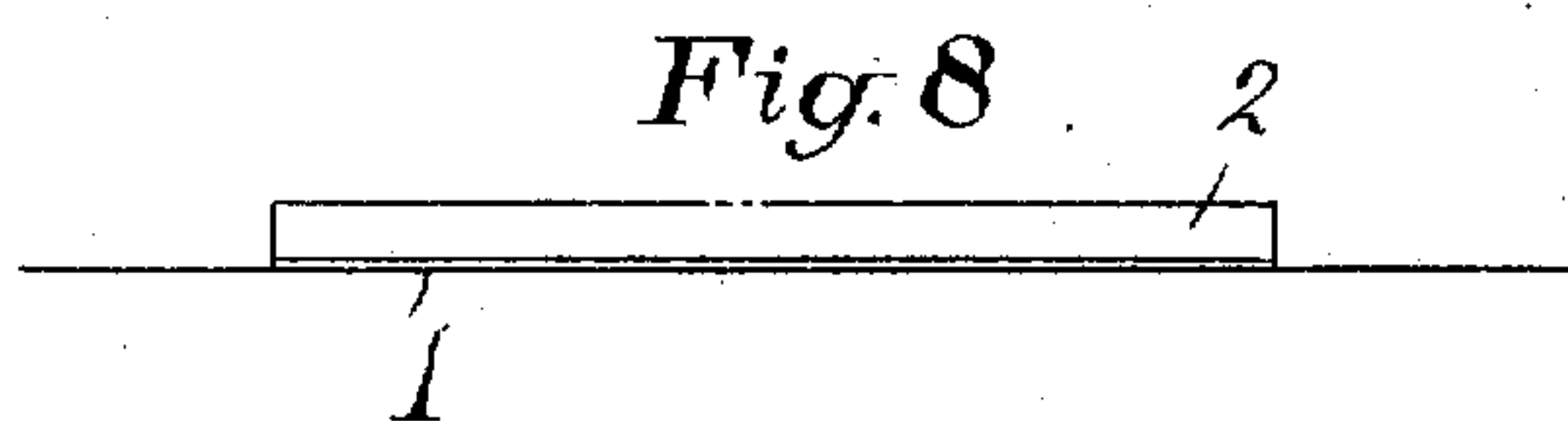


Fig. 8

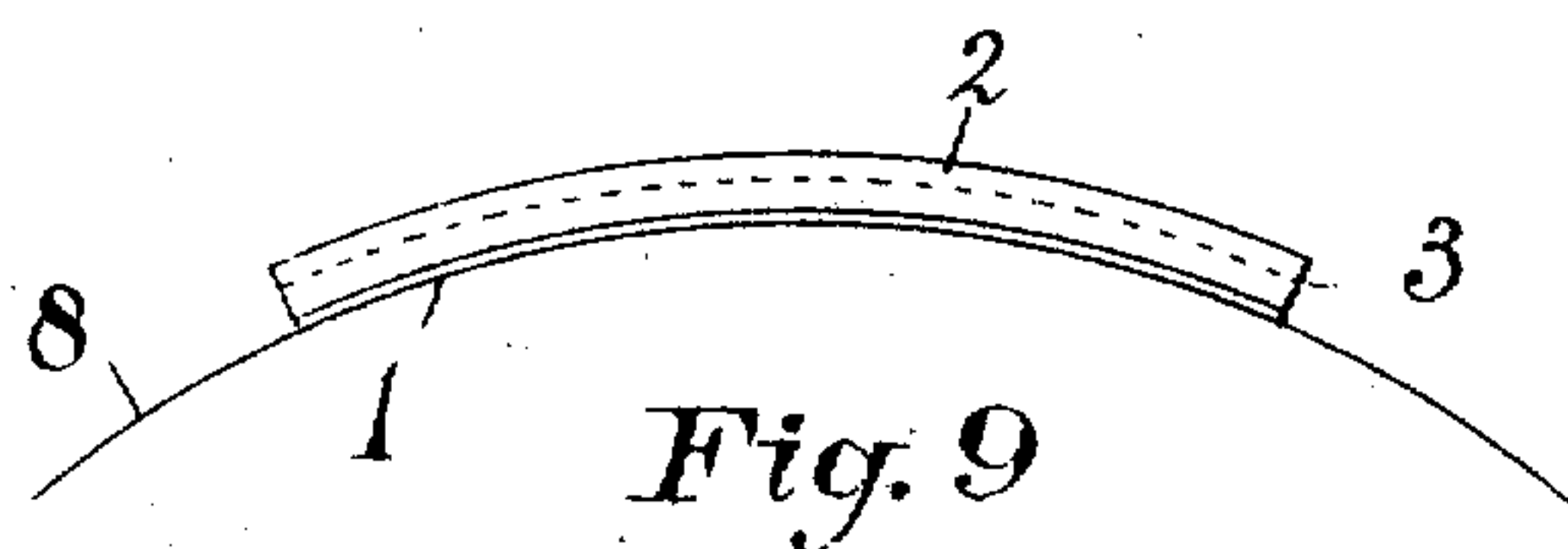


Fig. 9

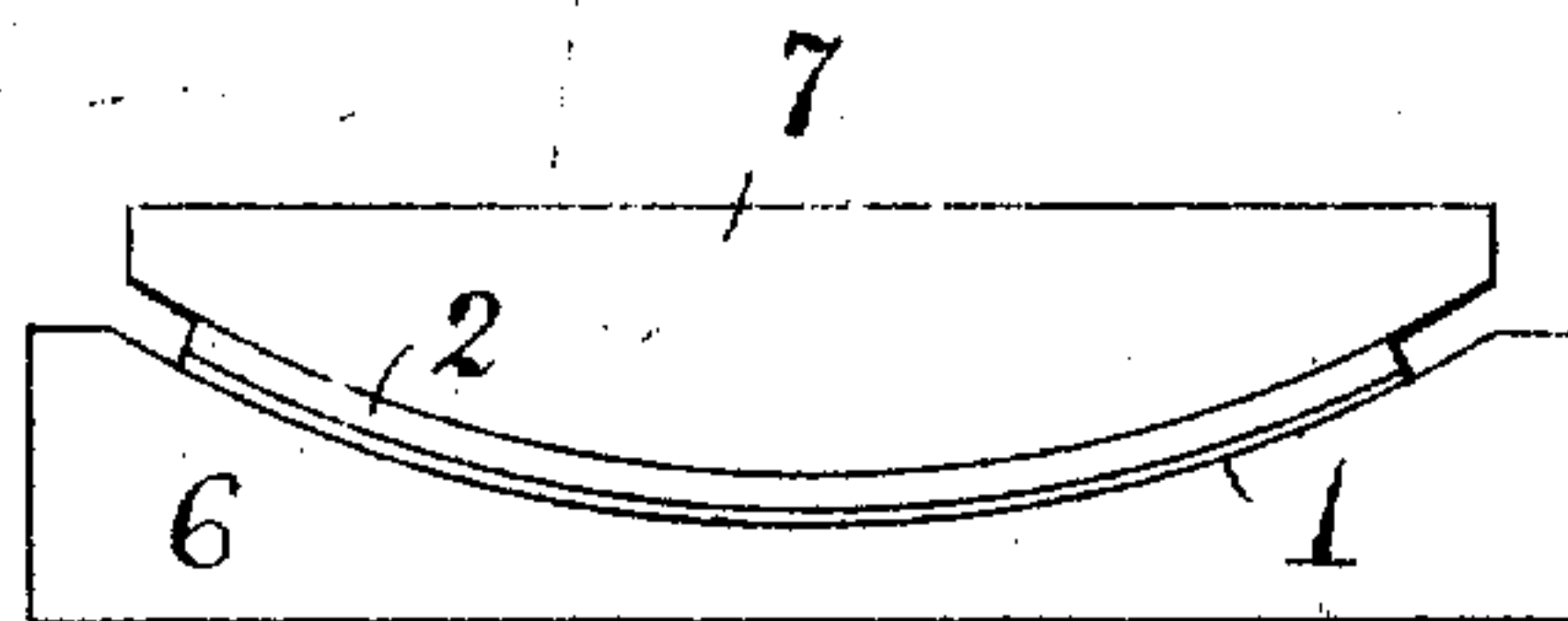


Fig. 10

Witnessed;

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UNITED STATES PATENT OFFICE.

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METHOD OF BENDING PRINTING-SURFACES.

No. 906,586.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed January 8, 1908. Serial No. 409,805.

To all whom it may concern:

Be it known that I, BURT F. UPHAM, a citizen of the United States, and a resident of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Methods of Bending Printing-Surfaces, of which the following is a specification.

In bending electrotpe plates for use upon cylinder presses, it has hitherto been practically impossible to force the same to register with the same plate uncurved, owing to the elongation of the electrotpe shell in the process. Consequently, for certain kinds of work wherein both flat and curved duplicate printing surfaces were employed, as for two-color printing, such lack of registering was fatal to their success.

The object of this invention is the production of a method of so bending electrotpe plates, and other printing surfaces, that the superficial distortion formerly inseparable therefrom shall be entirely prevented.

This process consists essentially in giving the backed printing surface two opposite bends, and between such bends so treating the same that the superficial elongation given thereto by one bend shall be eliminated by the other.

Referring to the drawings forming part of this specification, Figures 1, 2, 3 and 4 illustrate the four steps in the preferred form of my process. Figs. 5, 6 and 7 the steps in another form of my process; and Figs. 8, 9 and 10 the steps in another form thereof.

In my preferred process, an electrotpe shell, an engraved metal plate, or other printing surface 1, is laid face down upon a flat surface and backed up to an excessive thickness in the usual manner; the easily fusible alloy being customarily employed, and applied thereto in a melted condition. Such excessive backing 2 is then planed down to the proper thickness, as indicated by the dotted line 3, in Fig. 1, and the whole thing laid face down upon a form or "turtle" 5, and brought into conformity thereto, as indicated in Fig. 2. This turtle should be of substantially the same radius as the cylinder with which the electrotpe is to be finally used. By this step in the process, the face of the electrotpe is compressed, while the convex surface of the backing 2 is elongated.

While in this curved condition, sufficient heat is applied to the electrotpe to melt off

its backing 2, and the shell 1 is then laid face down upon a suitable flat surface and made to conform thereto. A second backing 2 is now given to this shell in the same manner as at first, and planed down to gage, as indicated by Fig. 3. As a final step, the electrotpe is laid face outward upon the turtle 5 which should be exactly the curve of the cylinder of the press, and bent to fit the same, as illustrated by Fig. 4. By this step, the electrotpe shell or other face of the printing surface is elongated to exactly the degree it was compressed in the other step, and consequently it accurately registers with a duplicate unbent electrotpe, and can be used upon a two-color press employing both a flat bed and a cylindrical printing surface. Moreover, in printing offices having both flat and cylinder presses, the duplicate sheets printed on both will be of exactly the same dimensions. In many offices, this will be of great value.

In the modification of my process illustrated in Figs. 5 to 7, the electrotpe shell 1 is laid upon the concave mold 6, and the melted backing-metal poured thereon to the usual thickness; the shaper 7 forcing the face and back of the backed electrotpe to be concentric, as indicated in Fig. 5. The electrotpe is then flattened, and its backing planed down to the proper level 3, as indicated in Fig. 6. By such flattening, the face 1 of the electrotpe is contracted to a substantial degree. The electrotpe is now brought to the proper curvature, as by the mold 6, and shaper 7 shown in Fig. 7, and by such bending the face or electrotpe shell 1 is elongated to an extent exactly equal to its contraction when flattened. As a result of the two opposite superficial distortions, the face of the electrotpe will perfectly register with its flat duplicate.

In the other modification of my process, the electrotpe shell is backed up flat to an excessive thickness, in the usual manner, and as illustrated in Fig. 8. It is then bent upon a convex surface 8, and the excess of backing turned or routed off. This leaves the electrotpe shell or face 1 contracted. It is then placed in a mold 6 face down, and brought to the desired final curvature, in this step losing the superficial contraction acquired in the preceding step, and made to register with its original. Of these three somewhat different processes, that first de-

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scribed is much to be preferred because of its utilization of the devices now common in electrotypes' shops, and its greater ease of operation, not to mention its increased accuracy and freedom from possibility of flaw.

Although I have described the intermediate step of this process to consist in melting off the fusible backing, it is possible with suitable appliances not to thus remove the backing, but simply to soften it by heat to a sufficient extent that it will not resist the electrotypes shell in its return to its original flat condition. Hence, when in the claims I speak of "softening the backing in order to return the printing surface to its original contour," I mean thereby both such partial softening, and a softening sufficient to cause the backing to become fluid and flow away. The same expression covers any other method of softening. For instance, the first backing might be some material like papier-mâché intimately adhering to the electrotypes shell during the first bending step, but capable of being softened and removed therefrom by moisture or steam.

While I prefer to have the outer face of the electrotypes shell outward in its first backing up, it is possible to do the work with such face next to the backing; the main objection being the difficulty of entirely removing the melted alloy from the printing surface.

What I claim as my invention and for which I desire Letters Patent is as follows, to wit:—

1. The herein described method of bending printing surfaces, consisting in giving the backed printing surface two opposite bends, and between such bends so treating the backing that the superficial distortion caused by the second bend neutralizes that caused by the first.

2. The herein described method of bending printing surfaces, consisting in giving the backed printing surface two opposite bends, and between such bends softening such backing and returning said printing surface to its

original contour without superficially distorting it, whereby the superficial distortion caused by the first bend is neutralized by that of the final bend.

3. The herein described method of bending printing surfaces, consisting in securing the same to a flexible backing, bending the whole to substantially the curve desired, removing such backing, bending said surface to its original contour, again backing it, and finally bending it to the desired curvature; the two curves being opposite to each other and so disposed that the superficial distortion given to said surface during the first bend is eliminated by the final bend.

4. The herein described method of bending printing surfaces, consisting in securing the same to a fusible backing, bending the whole to substantially the curve desired but with said surface inward, melting off such backing, bending said surface back to its original flat condition and again backing it up, and finally bending the whole to the desired curvature with said surface outward, whereby the superficial distortion given to said surface by the first bending is eliminated by the final bending.

5. The herein described method of bending electrotypes, consisting in supporting the electrotypes shell upon a flat surface and backing it with fusible metal in the usual way, then bending the whole upon a convex surface with the electrotypes shell inward, melting off the backing, flattening the electrotypes shell and again backing it in the usual manner, and finally bending the whole to the curve desired, with the electrotypes shell outward.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 7 day of January, 1908.

BURT F. UPHAM.

Witnesses:

A. B. UPHAM,
WARREN N. AKERS.