

No. 686,574.

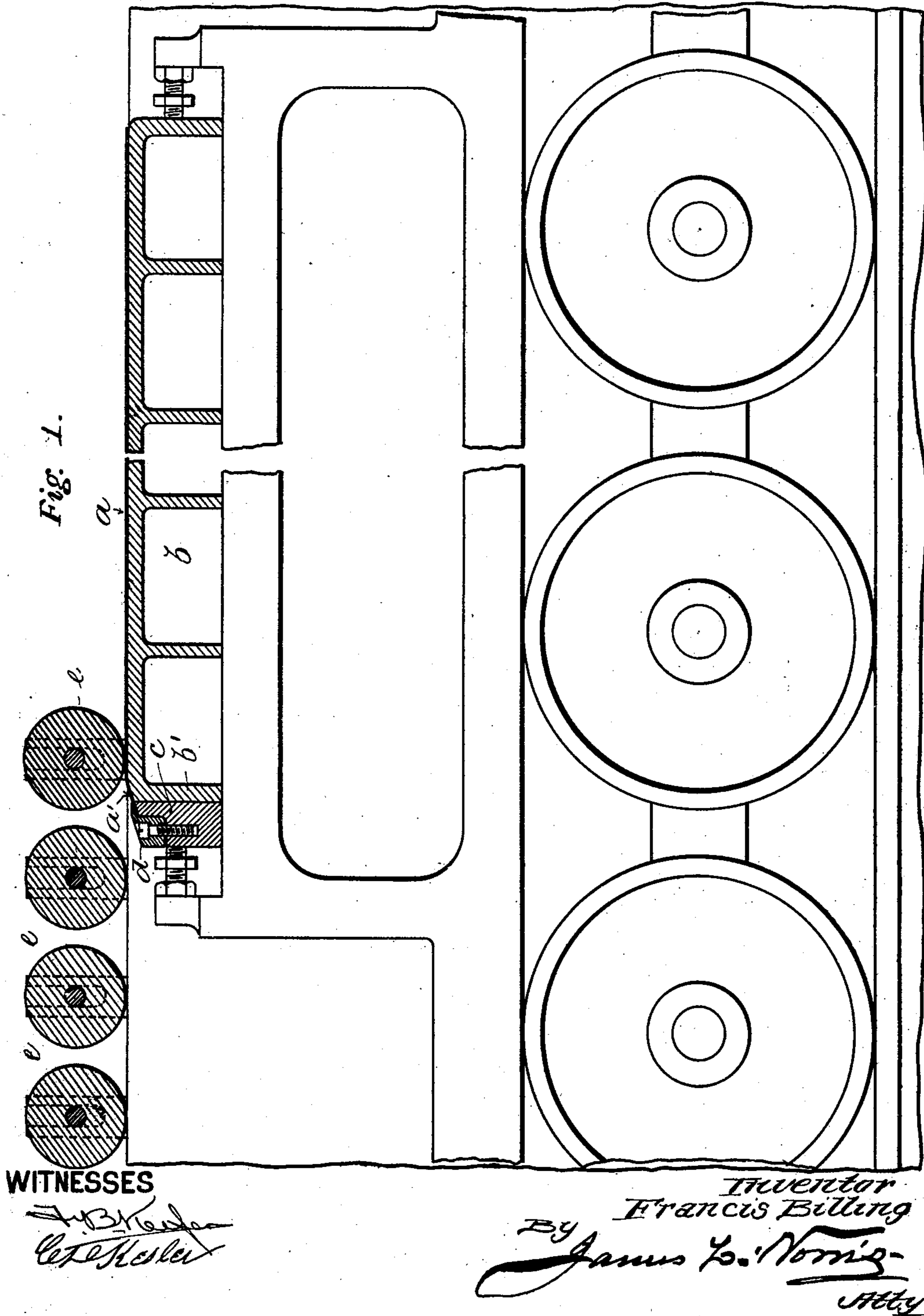
Patented Nov. 12, 1901.

F. BILLING.
LITHOGRAPHIC PRINTING.

(Application filed July 22, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

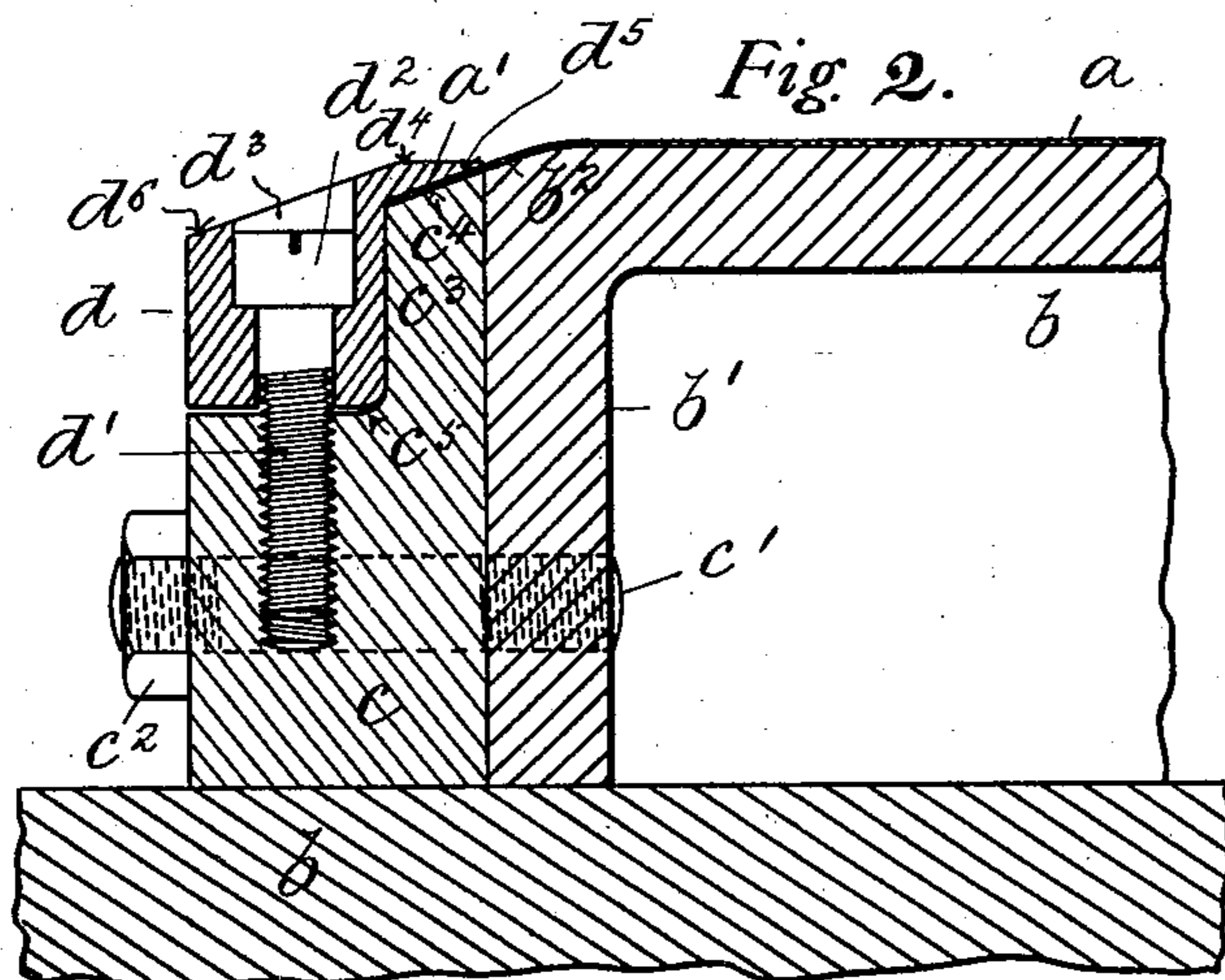
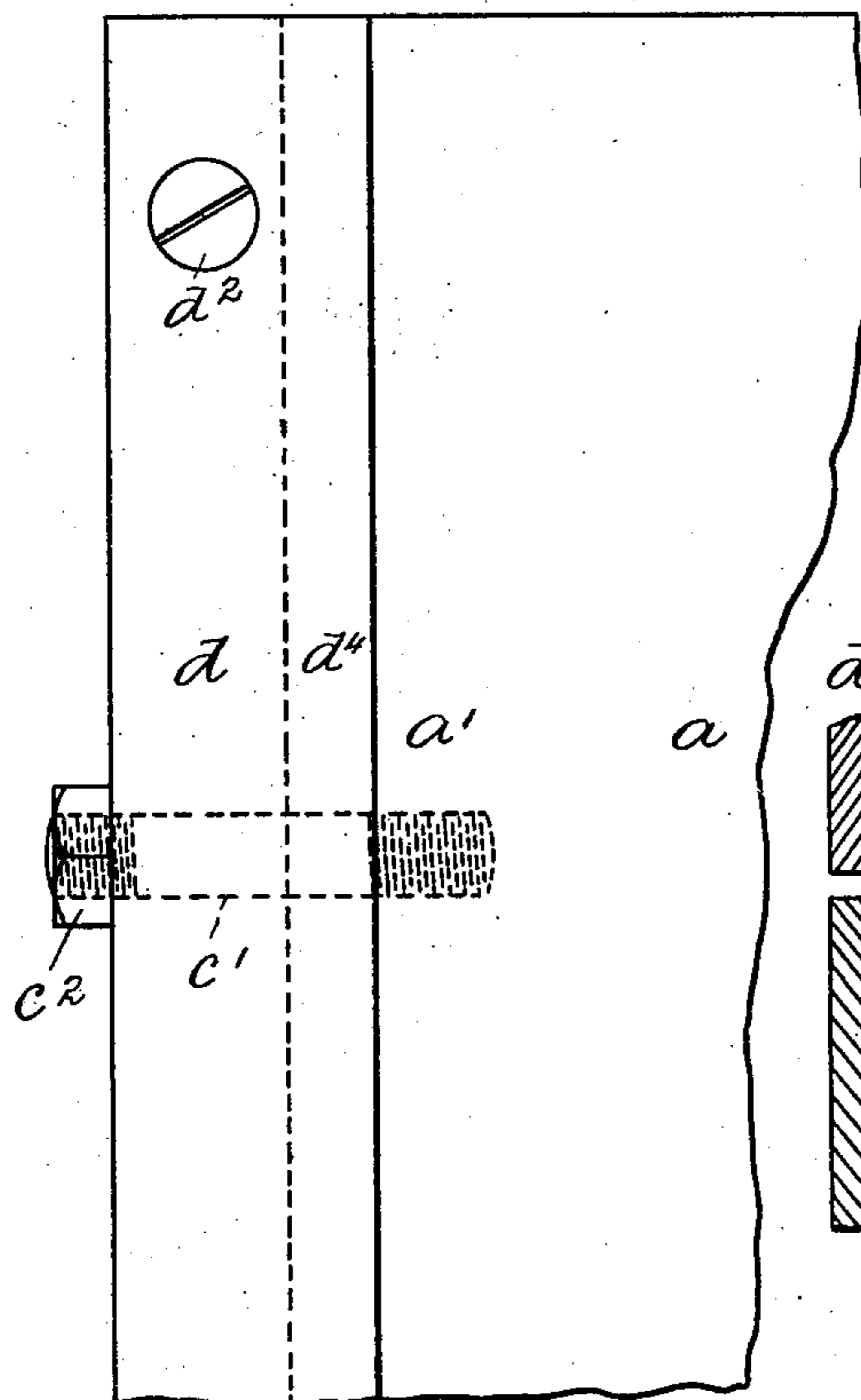


Fig. 3.



WITNESSES

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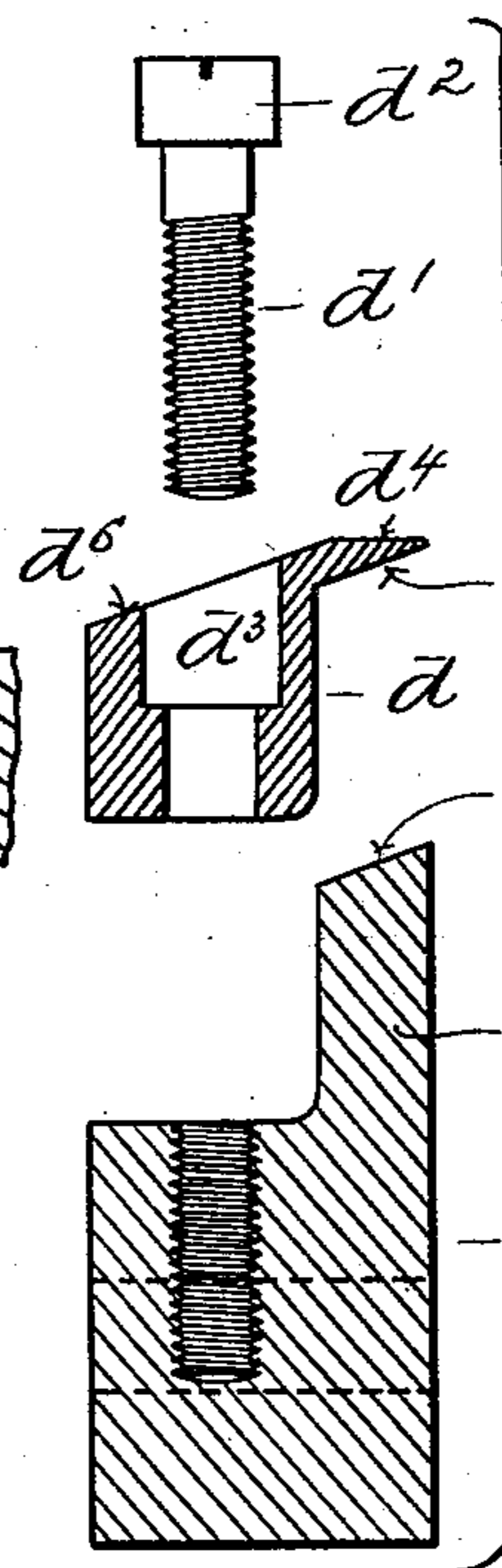


Fig. 4.

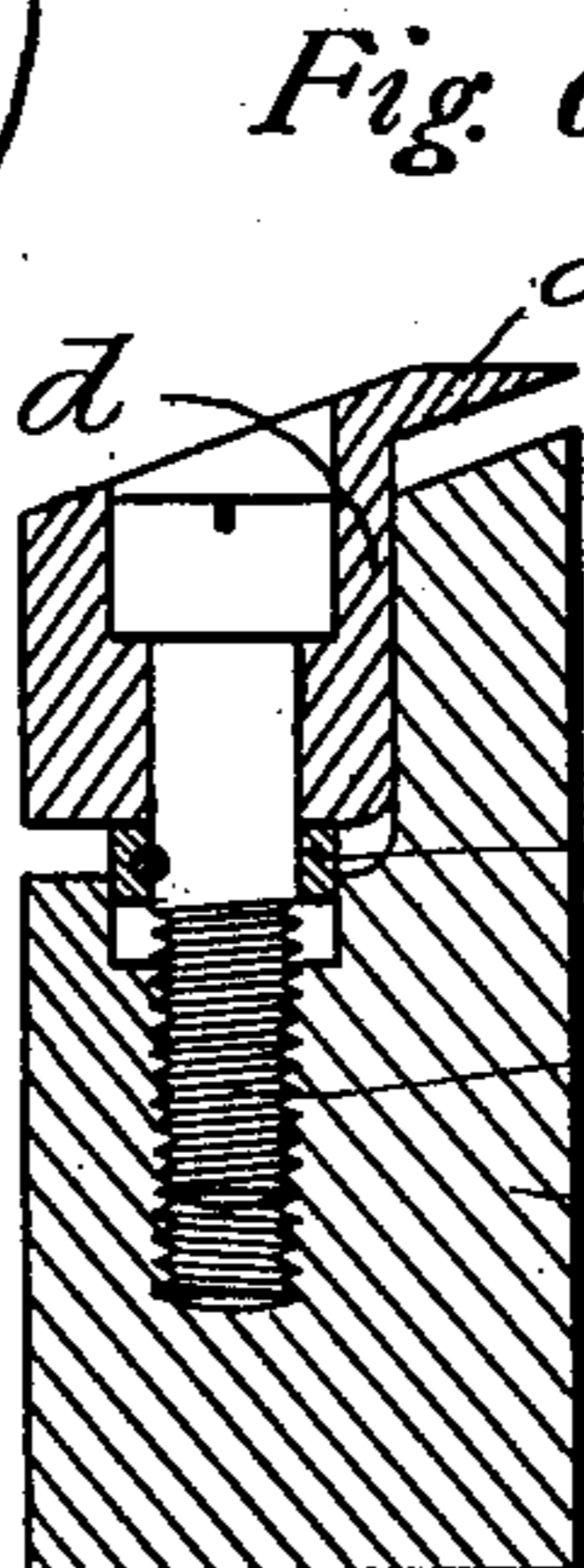


Fig. 6.

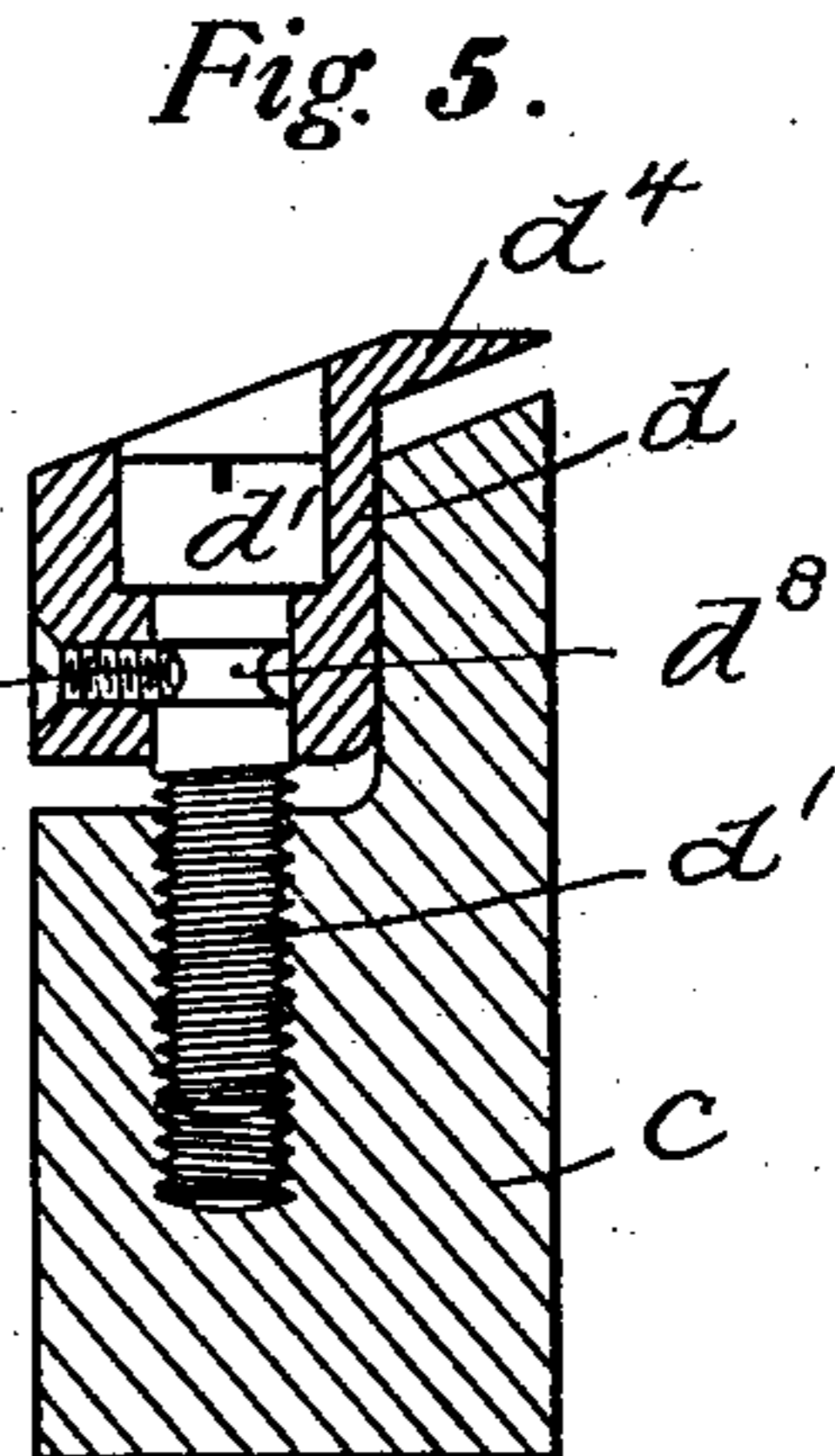


Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANCIS BILLING, OF BIRMINGHAM, ENGLAND.

LITHOGRAPHIC PRINTING.

SPECIFICATION forming part of Letters Patent No. 686,574, dated November 12, 1901.

Application filed July 22, 1901. Serial No. 69,298. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS BILLING, printer, a subject of the King of Great Britain, residing at Livery street, Birmingham, England, have invented certain new and useful Improvements in Lithographic Printing, of which the following is a specification.

This invention has reference to lithographic and other printing machines, but principally to lithographic-printing machines in which prepared zinc plates are used for printing from instead of the ordinary stones. Heretofore it has been the practice in securing such zinc plates in position upon the traveling bed of the machine to fasten them down at both ends and also to bend one or both edges of the same over at a right angle to the surface of the plate and then fasten each such bent-over part between an edge of the said traveling bed and a detachable clamping-bar; but this method has several drawbacks in practice, the principal defect being that in consequence of the metal at the angle between the printing-surface and the bent edge striking against the inking-cylinders every time the bed is passed under them the metal at this point rapidly wears away and cracks, and thus the plate soon becomes useless. Further, in consequence of both ends of the prepared plate being fixed or secured to the traveling machine-bed by clamping devices which grip the end edges when the forward end of the plate passes under the inking or other cylinders the pressure of the said cylinders forces this part of the plate flat down onto the surface of the bed, and as the other end is held and confined by its gripper, and therefore unable to yield or give longitudinally in obedience to such pressure, the middle parts of the plate are caused to buckle or "cockle up," which is detrimental to the results obtained in printing from such plates, and, further, is apt to cause them to crack or break through and so become useless.

According to my invention I propose to fix the plate to the bed at one end only—viz., that end which passes first under the cylinders in the forward travel of the machine—while the other end is unrestrained and left free to give or yield longitudinally, and thus the tendency to buckle or cockle is neutralized or obviated. Further, by leaving an end of

the plate loose, as described, it admits of the whole superficial area of the said plate being kept flat upon the bed when not actually passing the cylinders by atmospheric pressure from above. I also propose to secure the plate at the forward or fixed end without having to bend over the edge at a right angle and by improved clamping means arranged in such a manner that the said plate is prevented from being worn away or broken in use, whereby the life of the same is very materially increased and considerable economy is effected.

Figure 1 of the accompanying drawings represents a part of a lithographic-printing machine, to the traveling bed of which a prepared zinc plate is secured at one end only in the manner and by the special means constituting the present invention. In this view the top of the bed, the plate-clamping attachment, and the inking-cylinders are shown in section, while the base of the traveling bed and the rollers over which it runs are shown in elevation. Fig. 2 represents, upon an enlarged scale and in longitudinal vertical section, the said bed and the attachment for securing the zinc plate thereto along one end, the other being left free or unrestrained to yield under the flattening pressure of the cylinders in the opposite direction to the forward travel of the bed and plate under the said cylinders. Fig. 3 is a plan of a part of Fig. 2, while Fig. 4 represents the component parts of the clamping attachment separated from one another and in section. Figs. 5 and 6 are respectively transverse sectional views of the clamping-bars, illustrating slightly-modified means for swiveling the screw-bolts to the top clamping-bar.

The same letters of reference indicate corresponding parts in the several figures of the drawings.

The improved clamping or gripping attachment by which the zinc plate *a* is secured to the forward end of the top side of the bed *b* consists of a pair of metal bars *c* and *d*, of suitable strength and of a length about equaling the width of the said traveling bed *b*. The bottom bar or base *c* of the attachment is secured either by bolts and nuts, such as *c'* *c*², or by other suitable means to the front edge *b'* of the bed—viz., that edge which

passes first under the inking-cylinders *e* in traveling forward—while the top clamping-bar *d* is secured to the bottom one by a series of screw-bolts *d'*, the heads *d²* of which preferably lie within sinkings *d³* in the bar, so as to present no upstanding or projecting parts liable to damage the inking-cylinders, although any other convenient connecting devices may be used to connect the two bars *c* and *d* together, with the forward edge *a'* of the zinc plate *a* gripped between them.

The bottom bar *c* is somewhat of an angular or L section, the vertical web *c³* being rather less in height than the bed, and its top edge, which comes below the plane of the said bed, is beveled or inclined at *c⁴*, with the slope running slowly upward toward the bed-surface, whose front edge is also beveled at *b²*, with the bevel forming a flush continuation of the inclined top edge of the bar *c*. The body part of the other bar *d* of the attachment may be of any section that will fit or lie within the space *c⁵* comprehended by the angle of the bottom bar. The said top bar *d* has an overhanging extension or lip *d⁴* preferably running throughout its whole length and beveled at *d⁵* upon its under side to correspond with the inclined edge *c⁴* of the bottom bar, and it is between these two beveled surfaces that the edge of the plate is gripped and held in a plane slightly below that of the bed. The top surface of the upper clamping-bar is also arranged in a plane slightly lower than that of the said bed, so as to insure it clearing the inking-cylinders when traveling to and fro with the bed, and its forward edge is preferably inclined or chamfered at *d⁶* to any desired extent, so as to be quite clear of the said rollers. By this arrangement the edge of the plate is firmly gripped or held without being bent at a considerable angle or otherwise weakened.

The two bars may be secured or locked together with the plate between them by any other means than those described. The clamping attachment is secured to the bed adjustably or otherwise by set-pins *f*, as usual, or by any other suitable means, or the edge of the bed may be furnished with a permanent fixture or be formed with a part corresponding in shape to the bevel-edged bottom bar or base part previously described.

The application of my improvements to other printing-machines in which metal plates are used in printing from differs in no essential respect from its application to a zinc-plate litho-machine, as herein described.

The attachment-screws *d'* of the clamping-bar *d* may be swivelly connected to the said bar, so that when they are rotated for withdrawal they lift the bar with them sufficiently to liberate the plate and permit of its removal without having to completely detach the said bar, which makes the said attachment easier to manipulate. This swiveling of the screws may be obtained by the employment of a confining-collar *d⁷*, as represented in Fig. 5, or by forming a circumferential groove *d⁸* around the neck of the screw, with which the point of a keeper-screw *d⁹* passed through the bar engages, as represented in Fig. 6, thus confining the screw to the bar, while still leaving it free to rotate.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. In a lithographic-printing machine, the combination with the traveling bed for supporting the printing-plate and the cylinders under which the bed is arranged to travel, of means arranged contiguous to the forward edge of the bed and below the plane of the latter for affixing one end only of the plate to the bed, the other end of the bed being constructed to support the free and unattached end of the plate, substantially as described.

2. In lithographic printing from prepared zinc or other metal plates; a clamping attachment for securing to the traveling bed, only that end of the plate which passes first under the cylinders, the other end being left free or loose; consisting of a bottom bar such as *c*, fixed to the bed, and a top bar such as *d*, detachably connected to the bottom bar, with beveled or inclined gripping-surfaces *c⁴* *d⁵*, between which the said edge of the plate is gripped in a plane slightly below the top of the bed, as and for the purposes set forth.

3. In a clamping attachment for securing the one end of a metallic plate to the traveling bed of a lithographic-printing machine; the combination with the fixed bottom bar *c* and the detachable top bar *d* having beveled gripping-surfaces *c⁴* *d⁵*, of swiveling connection-screws *d'*; confined to the bar *d* but free to rotate therein, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRANCIS BILLING.

Witnesses:

ARTHUR T. SADLER,
GAVIN RALSTON.