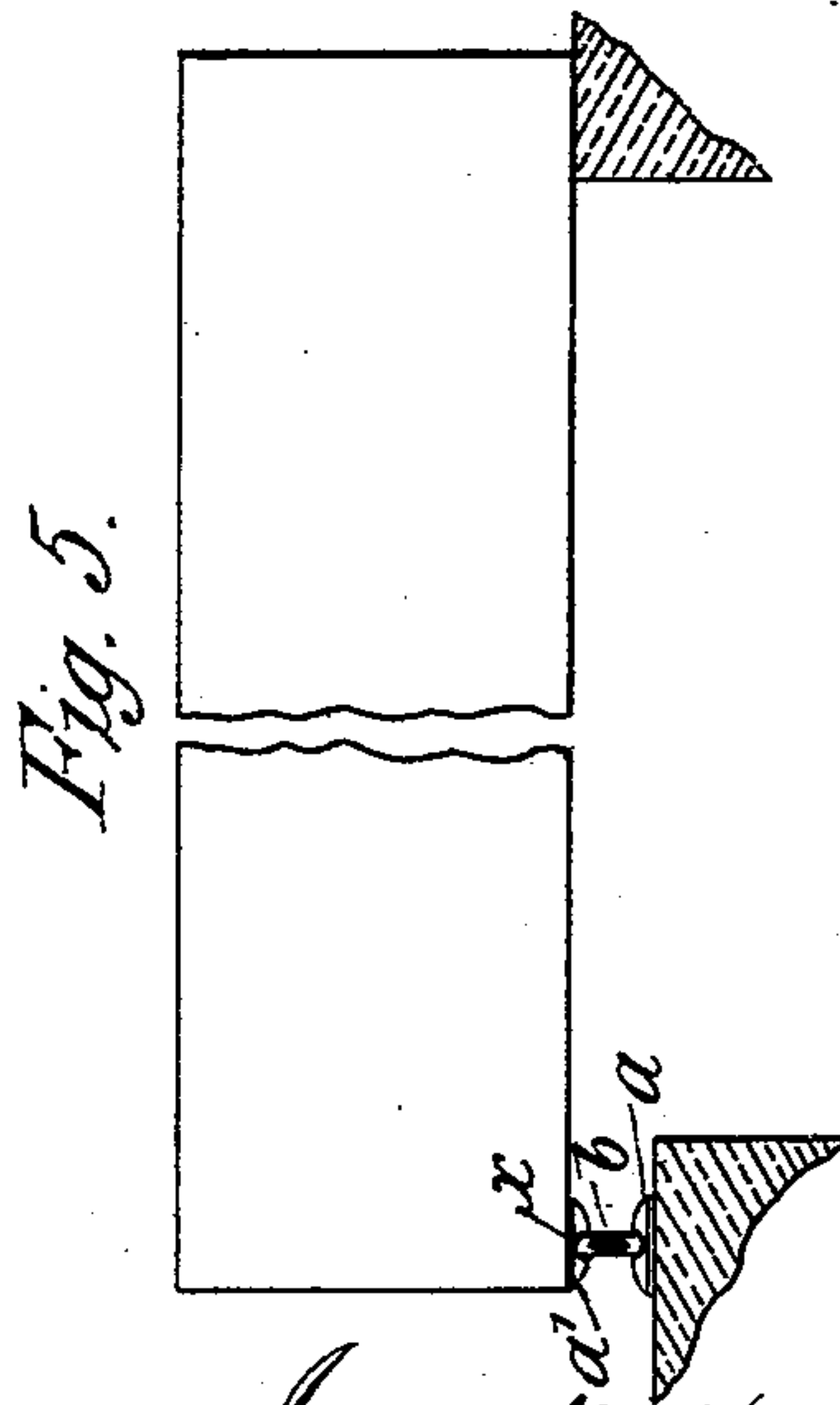
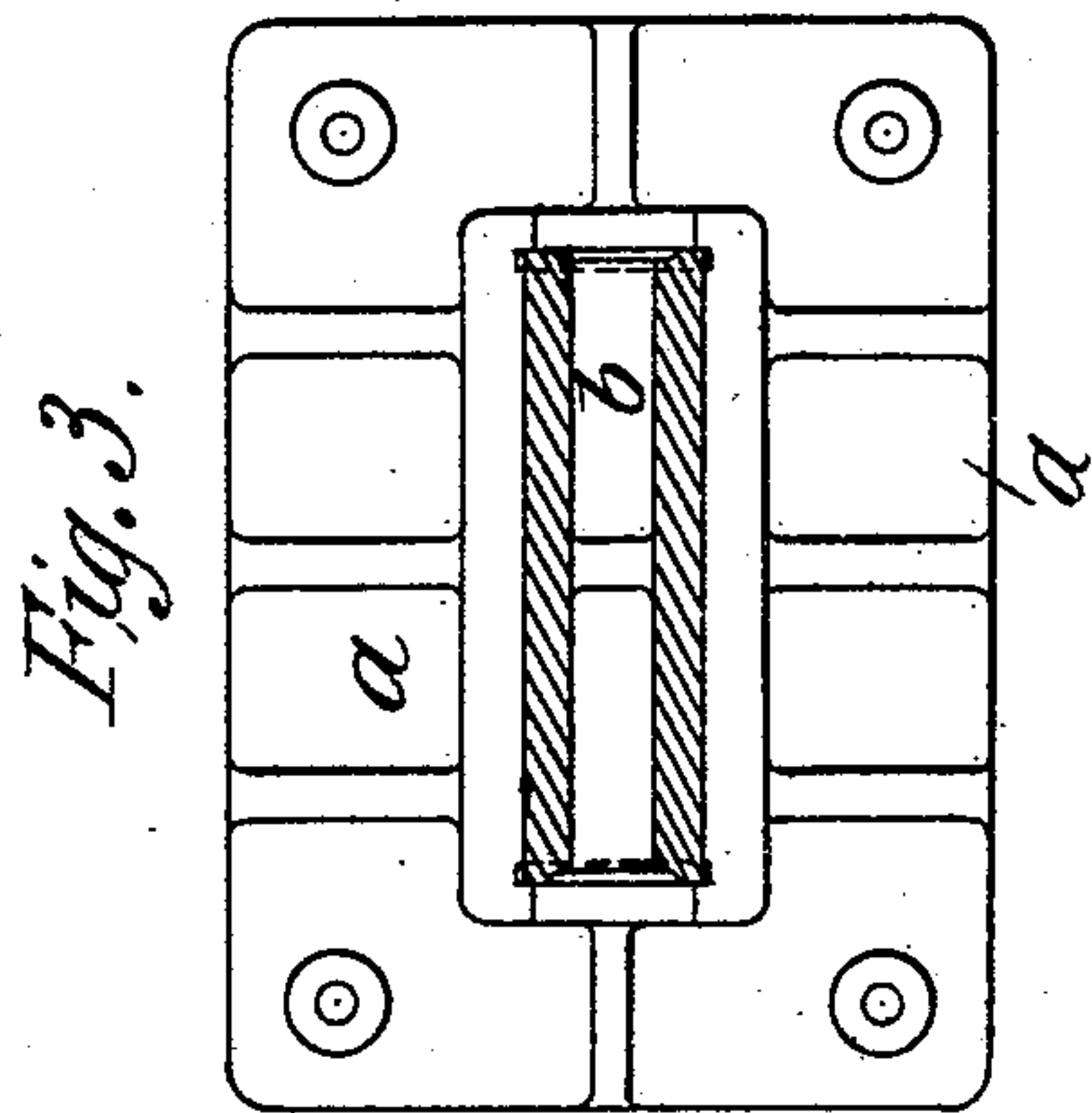
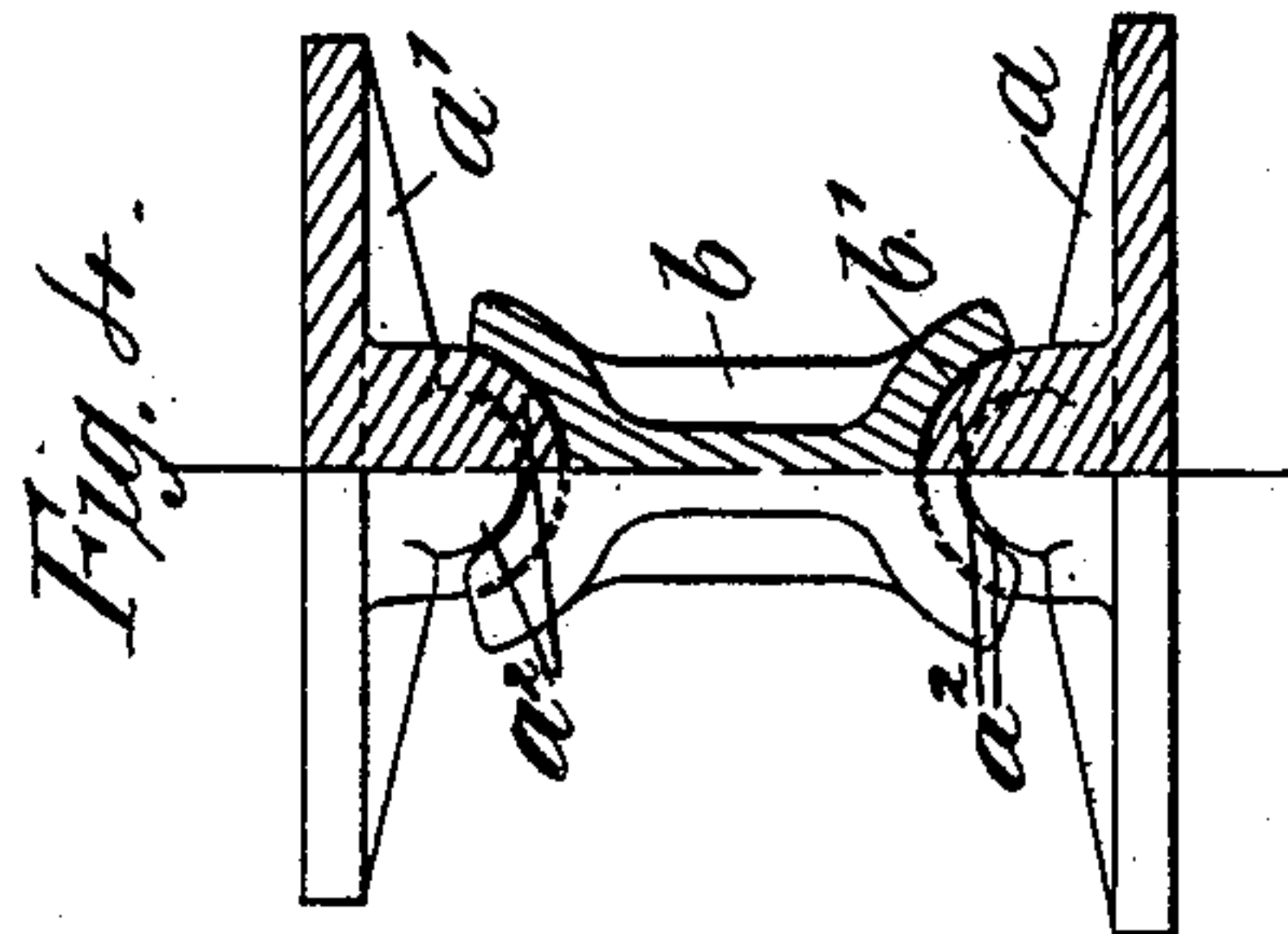
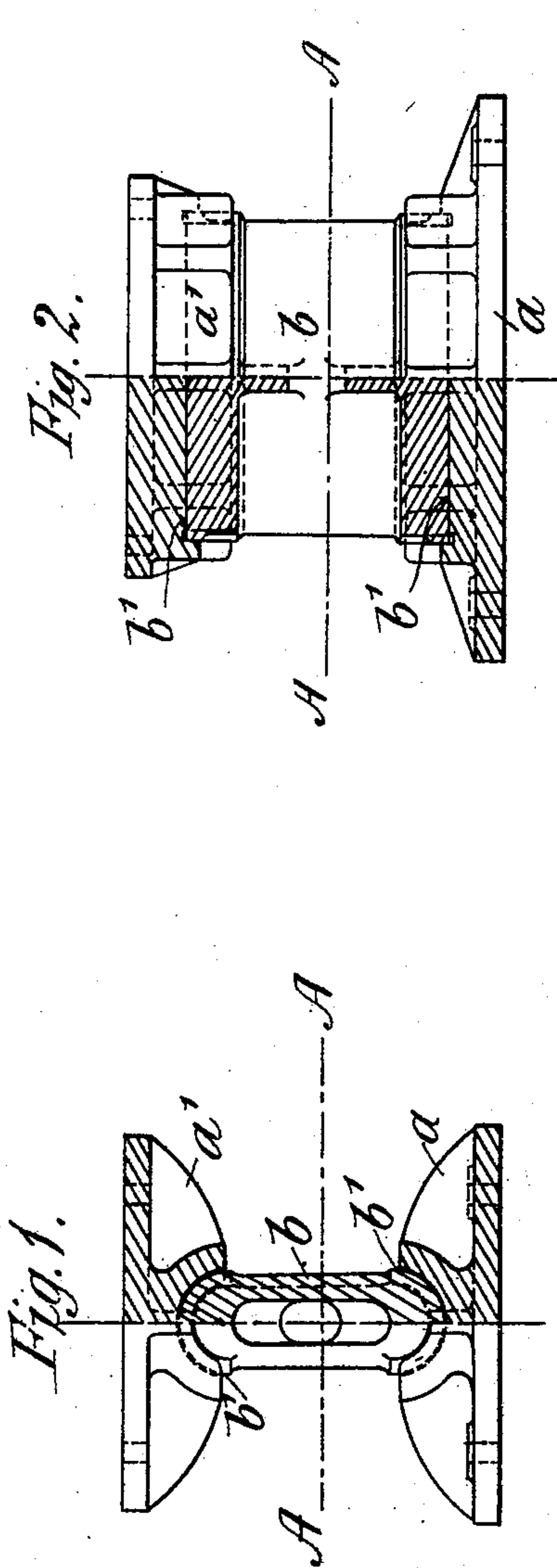


(No Model.)

C. J. WESTWOOD & H. RIGBY.  
HINGED EXPANSION GEAR FOR BRIDGES.

No. 480,863.

Patented Aug. 16, 1892.



Witnesses:  
H. B. Kingsberg  
C. J. Northrup

Inventors:  
Charles J. Westwood,  
Harry Rigby,  
by William C. Boulter attorney.



# UNITED STATES PATENT OFFICE.

CHARLES JOHN WESTWOOD AND HARRY RIGBY, OF MILLWALL, ENGLAND.

## HINGED EXPANSION-GEAR FOR BRIDGES.

SPECIFICATION forming part of Letters Patent No. 480,863, dated August 16, 1892.

Application filed July 23, 1891. Renewed June 4, 1892. Serial No. 435,503. (No model.) Patented in England November 12, 1889, No. 18,054.

*To all whom it may concern:*

Be it known that we, CHARLES JOHN WESTWOOD and HARRY RIGBY, civil engineers, subjects of the Queen of Great Britain and Ireland, residing at Napier Yard, Millwall, in the county of Middlesex, England, have invented a new or Improved Hinged Expansion-Gear for Bridges, Piers, Girder-Work, Roofing, and such like Purposes, (for which Letters Patent have been obtained in Great Britain, No. 18,054, dated November 12, 1889,) of which the following is a specification.

This invention relates to certain new or improved hinged expansion-gear for bridges, piers, girder-work, roofing, and such like purposes, the objects being, first, to prevent the bearing at the expansion end of the structure from becoming oxidized, silted up, concreted, or fixed in any way by the action of blown dust, rubbish, oxidation, or chemical action, as of the atmosphere or sea-water or such like foreign or corrosive matter, as is found to be the case and taking place where roller-gear or sliding bed and bearing plates are used; second, to give a perfectly-free scope for expansion or contraction to the structure, and, third, to reduce the cost in material, fitting, and for repairs, as compared with the generally-accepted roller-gear or sliding plates, and reducing the bearing or machined surfaces to about one-fourth of the usual area.

In carrying out the invention there is to be employed a hinged or articulated bearing, consisting of plates with intermediate block or link piece or pieces, as will hereinafter more particularly be described. These plates and block or link hinged bearings may be arranged in sets, two or more in line.

In order that this invention may be well understood, there is annexed hereto a sheet of drawings illustrative of the construction and showing how the invention is carried into practical effect, similar letters of reference being used to indicate like parts in all the drawings.

Figure 1 is an elevation, partly in section, showing construction of the gear or fitting according to this invention. Fig. 2 is a sectional side view of the construction shown in Fig. 1. Fig. 3 is a sectional plan on lines A A of Figs. 1 and 2. Fig. 4 represents in a view similar

to Fig. 1 a modification of the construction of the hinge or articulation. Fig. 5 shows in diagram the gear fitted to the "expansion" end  $x$  of a girder.

$a a'$  are lower and upper saddle-plates fitted to the double-ended knuckle-block  $b$  employed and set in between the two saddle-plates, so forming what is substantially a free and double hinge or articulation. The top and bottom bearing-surfaces  $b'$  of the knuckle-block are rounded and machined, as also are the receiving-saddles, correspondingly.

In using this improved gear the lower or bed saddle-plate  $a$  will be fixed to the pier, abutment, or whatever attachment is provided, and the upper saddle-plate  $a'$  will be attached to the main girders of the bridge or such structure, and the double knuckle-block  $b$  will be disposed between the two oppositely-arranged saddle-plate bearings  $a a'$ . Under the effect of expansion or contraction the double knuckle-block  $b$  will then work forward or backward to the extent necessary and following the variations of temperature, which will affect the structure.

In "setting" this gear in, say, low temperature, the knuckle-block  $b$  will be set with its central line out of the perpendicular and with the proper inclination of said central line toward the fixed end of the structure, and in a temperature higher than the normal one the setting will be reversely done—that is, with the central line of the knuckle-block or hinge inclined from the perpendicular away from the fixed end of the structure.

Although this expansion-gear and fitting has thus far been described in this specification in a certain manner, it may be varied in construction, material employed, or design of detail provided the double hinge or articulation construction be preserved.

There is shown in Fig. 4 a modification, according to which construction the hinge-piece  $b$  is machined at its top and bottom surfaces  $b'$  to receive the machined portions  $a^2$  of the gear-plates  $a a'$ . Again, the hinge piece or pieces  $b$  may be made as a link or links, standing between a lower and upper plate  $a a'$ , having bearing-surfaces corresponding to the link-pieces, and having provided side plates of the capping portions of the plates  $a a'$ ,



and with the said cap-plates pins or studs may then be provided, engaging with or taking into holes or dwells, thereby forming joints or articulation to or with the intermediate link  
5 piece or pieces and the capping-plates, so that the upper plate *a'* may ride above the lower fixed plate *a* of the construction, according to the expansion or contraction.

What we claim, and desire to secure by Letters Patent, is—

The herein-described gear for use as described, consisting in the combination, with the lower and upper saddle-plates *a a'*, provided in their opposing faces with curved or  
15 semicircular machined bearing-recesses, as described, of the link *b*, located intermediate

to the saddle-plates and provided with rounded or semicircular machined ends *b'*, fitting within the bearing-recesses of the saddle-plates and adapted to have a rocking movement therein, as and for the purpose specified. 20

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

CHARLES JOHN WESTWOOD.  
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