

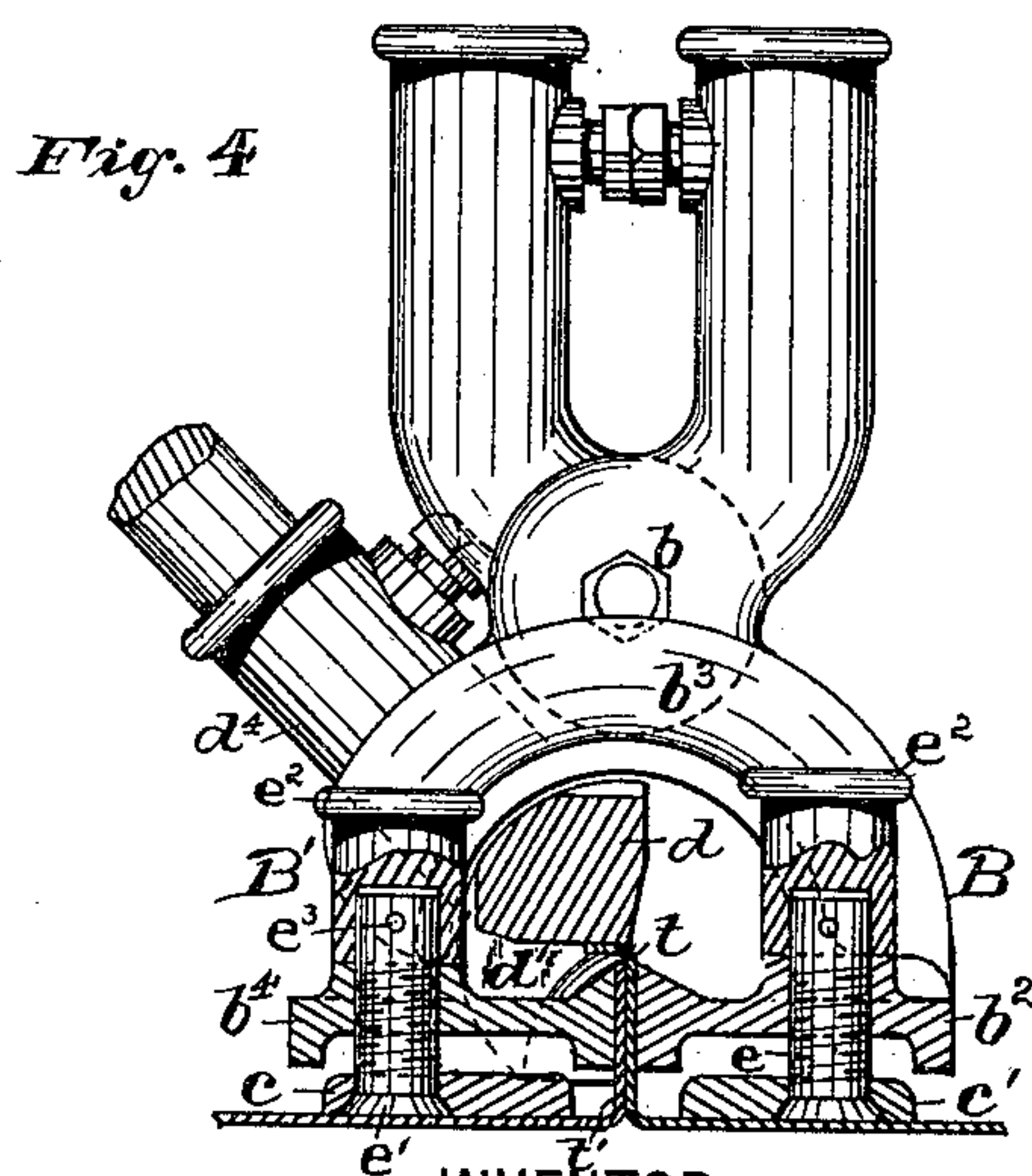
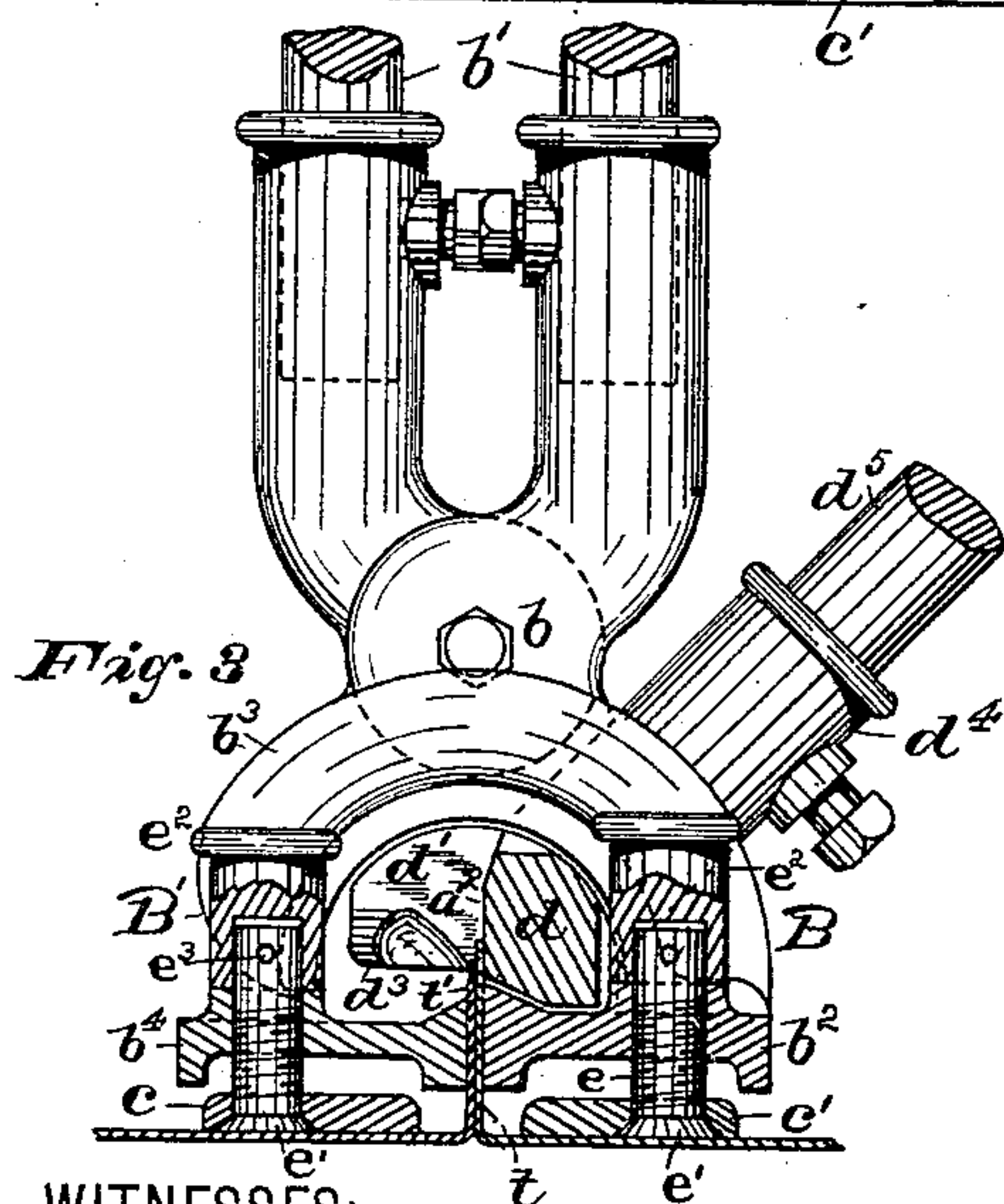
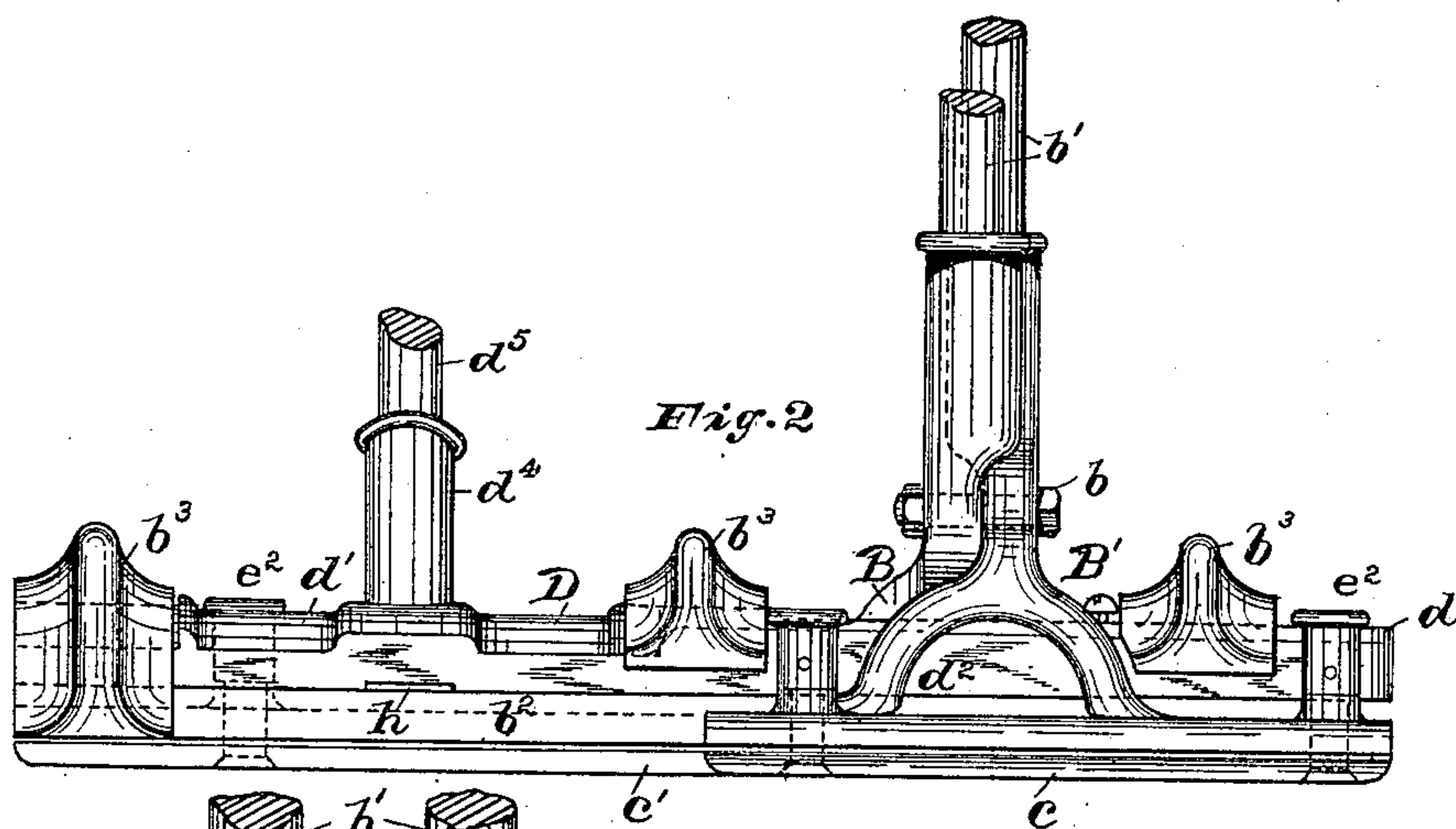
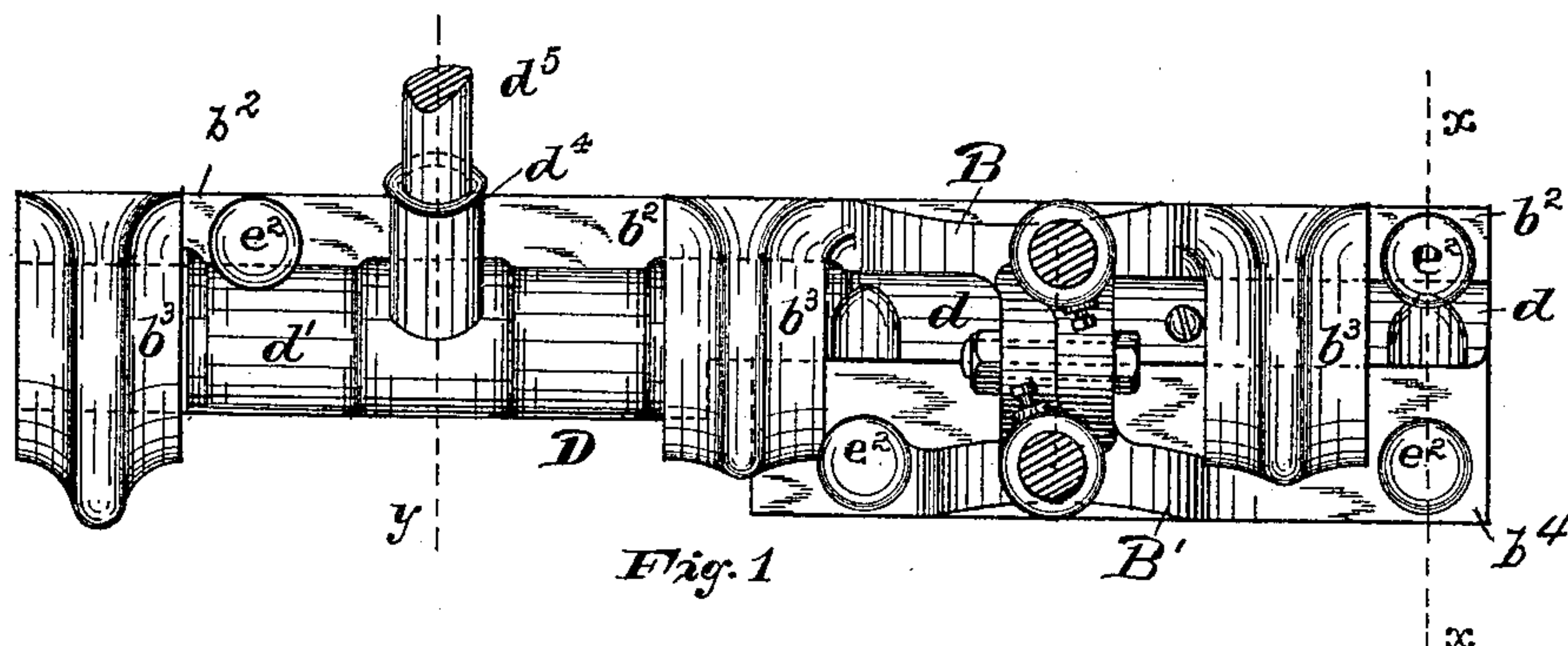
(No Model.)

2 Sheets—Sheet 1.

W. E. SPANGLER.
DOUBLE SEAMING MACHINE.

No. 371,391.

Patented Oct. 11, 1887.



WITNESSES:

J. A. Bontine.
J. L. Trussell Jr.

INVENTOR:

Washington E. Spangler

BY *Combs & Co.* ATT'YS.

2 Sheets—Sheet 2.

No. 371,391.

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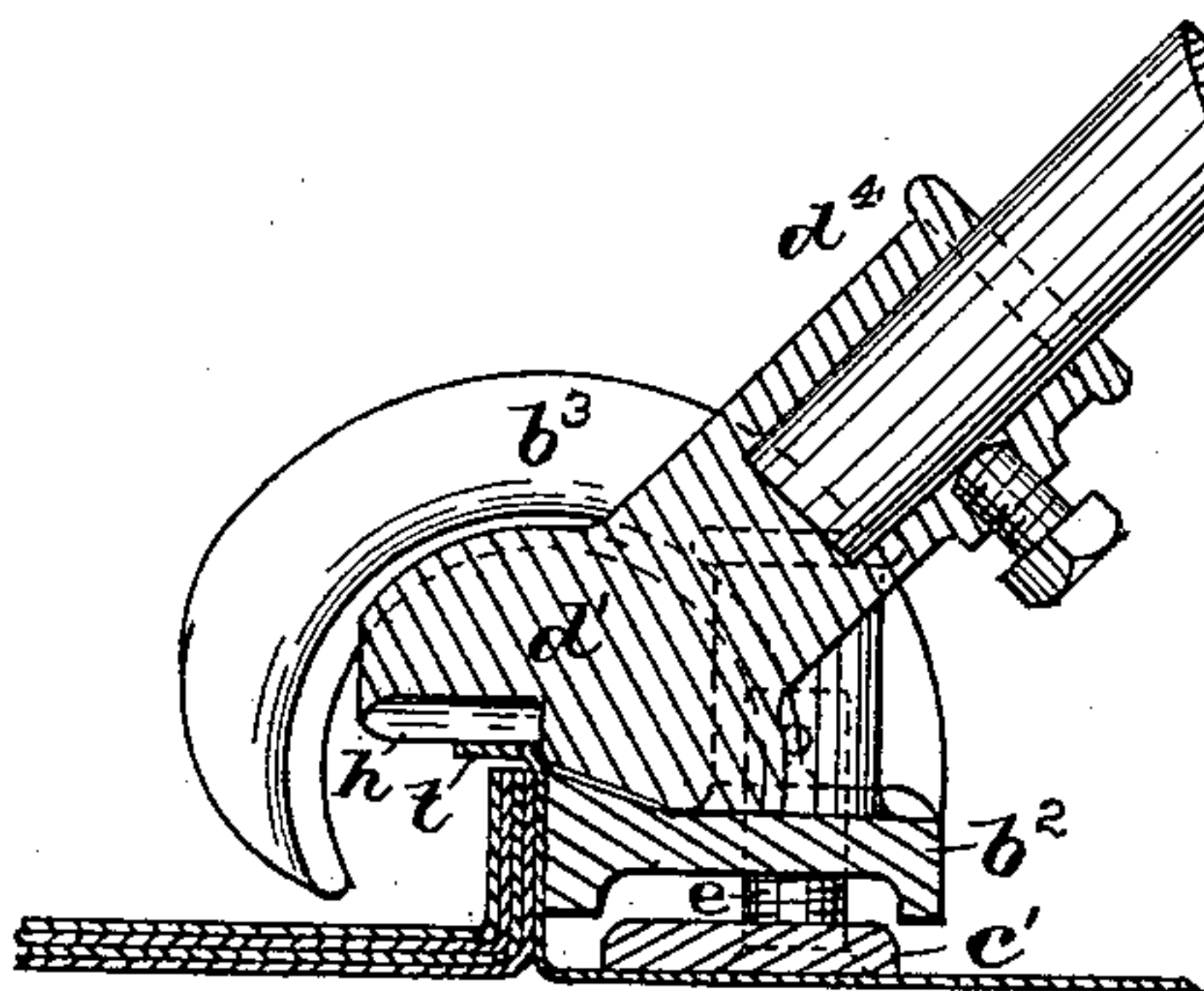


Fig. 5

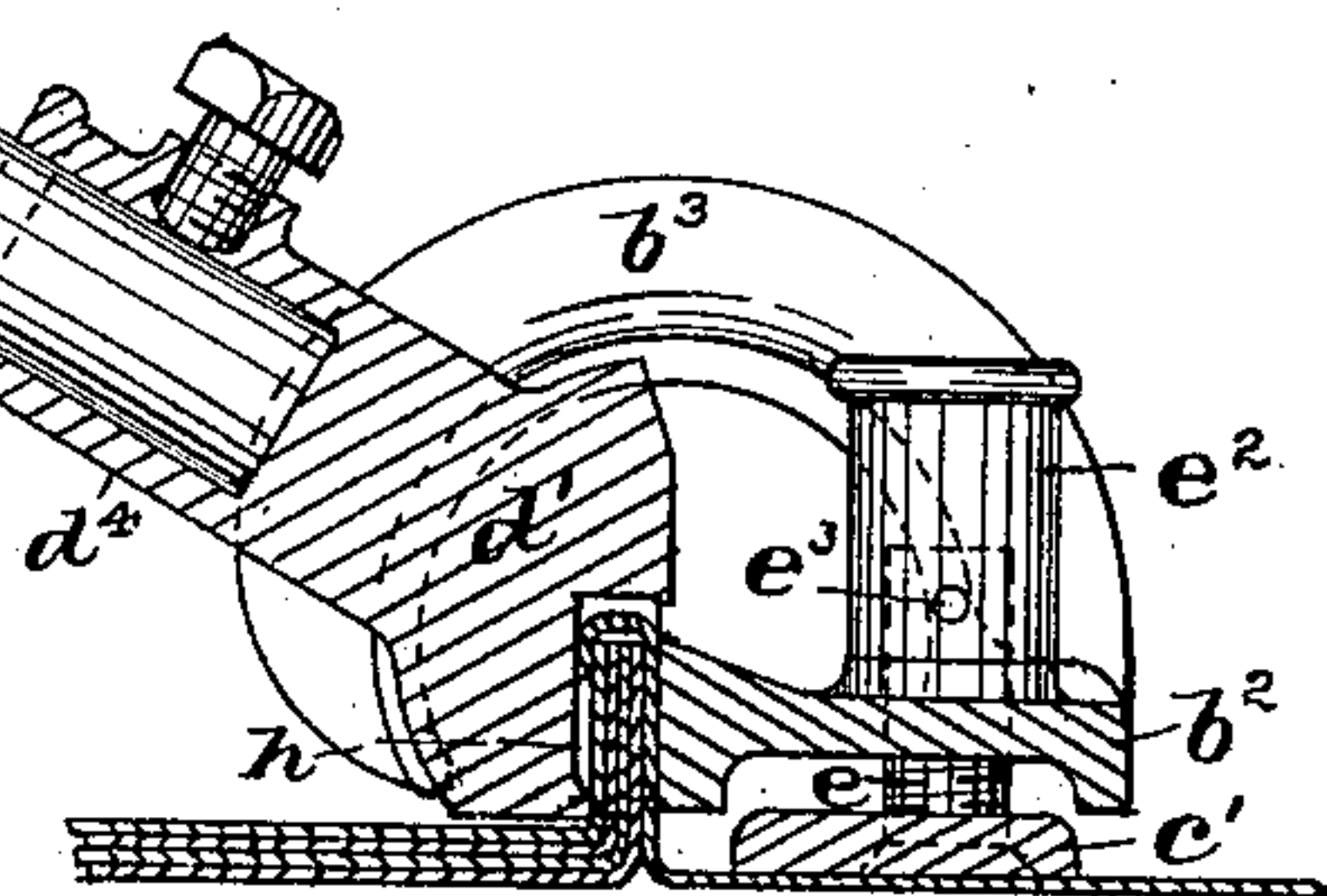


Fig. 6

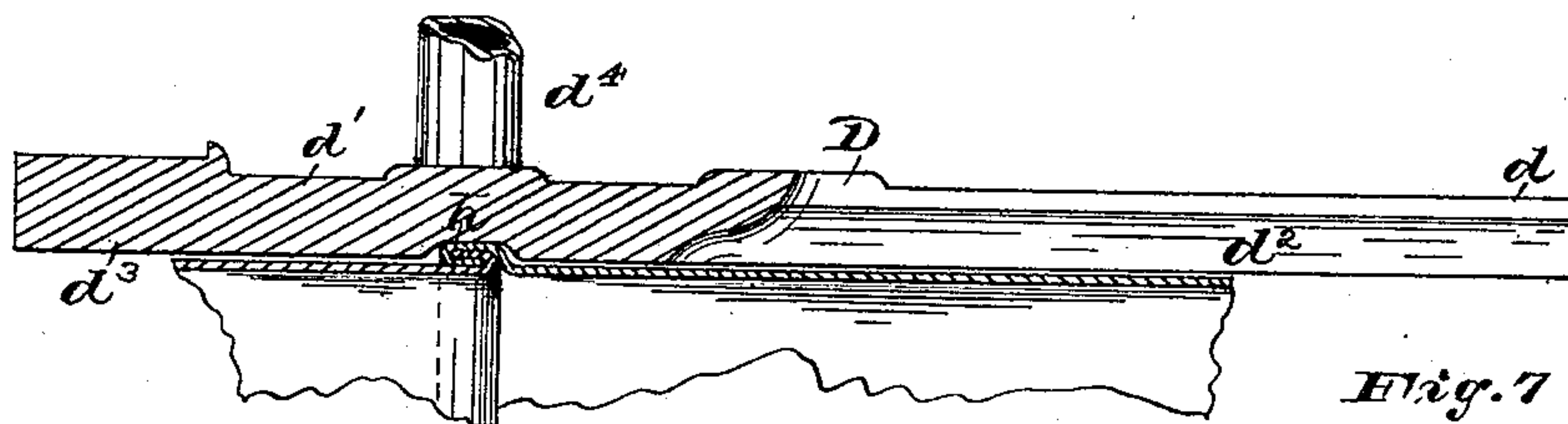


Fig. 7

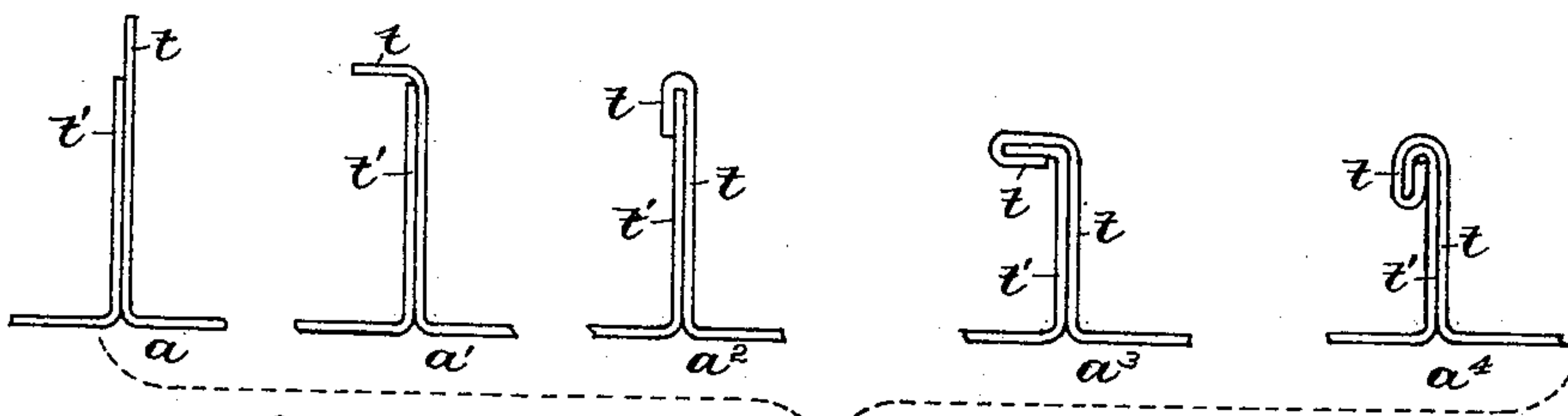


Fig. 8

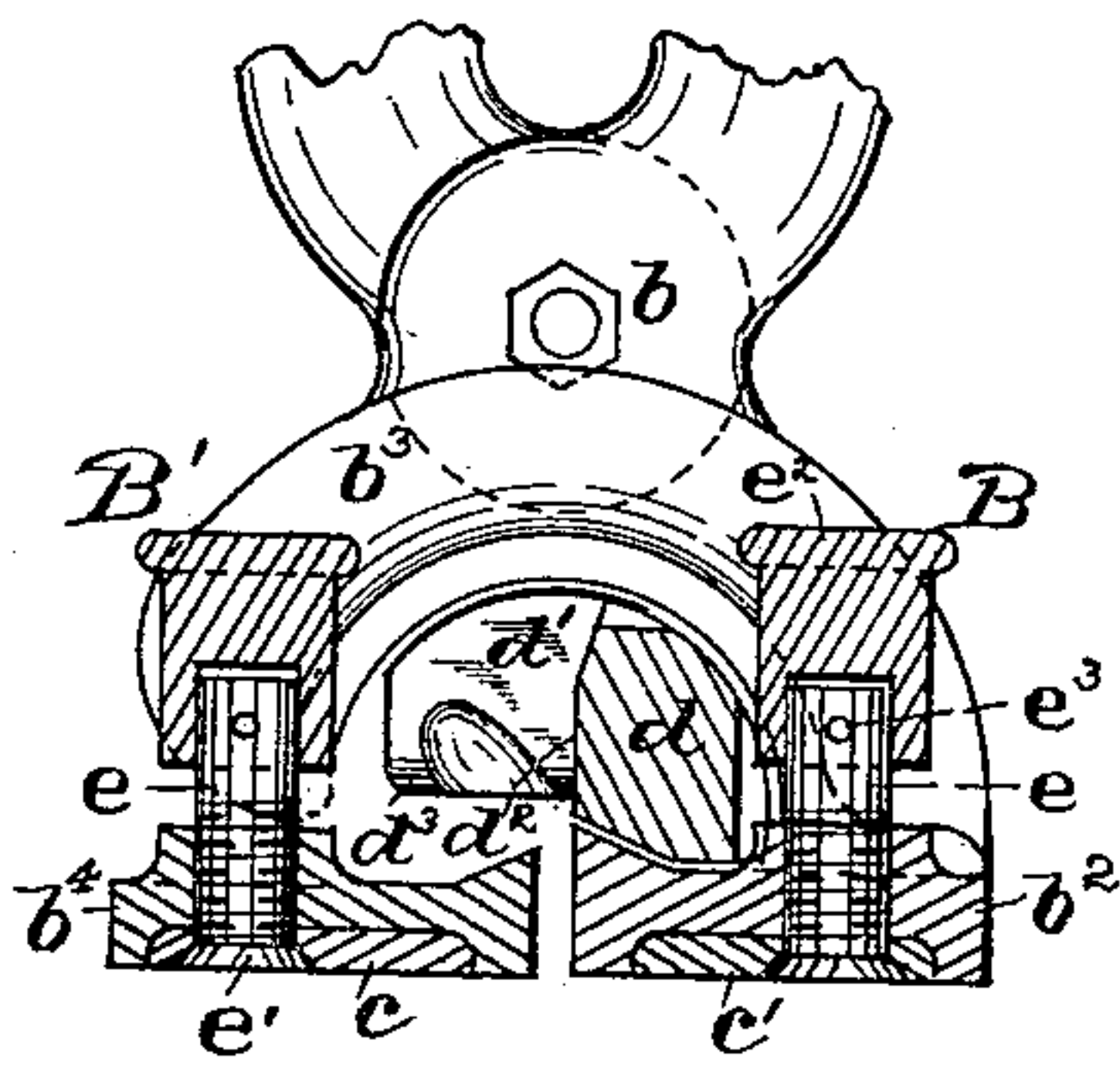


Fig. 9

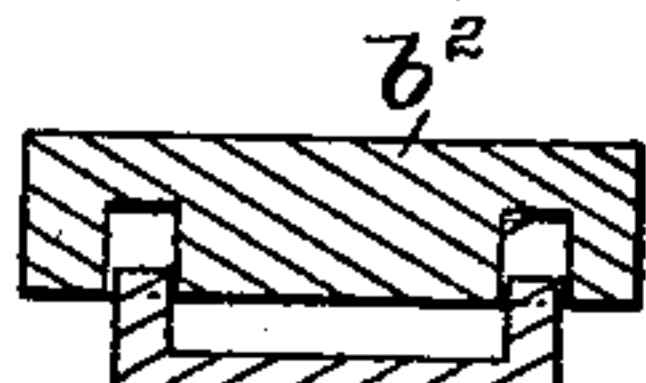


Fig. 12

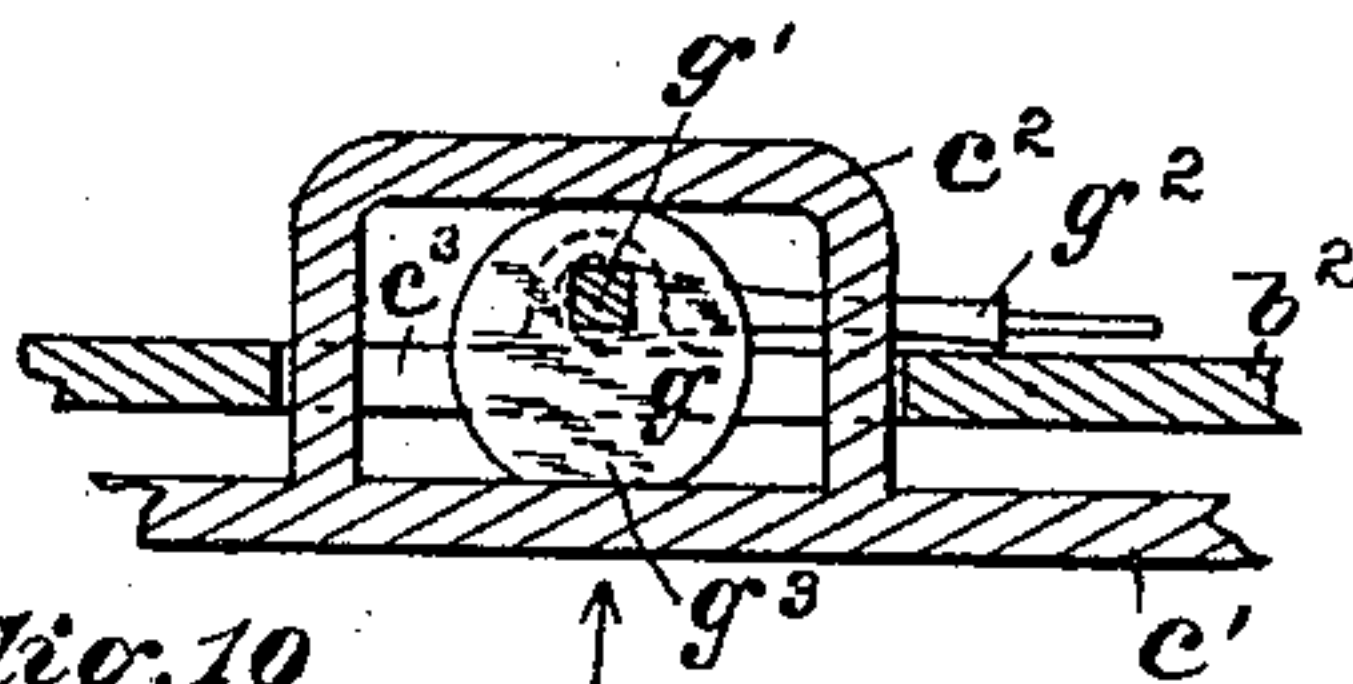


Fig. 10

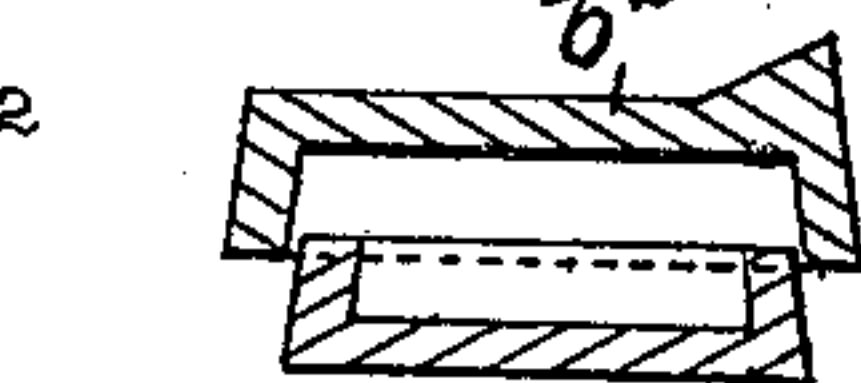


Fig. 13

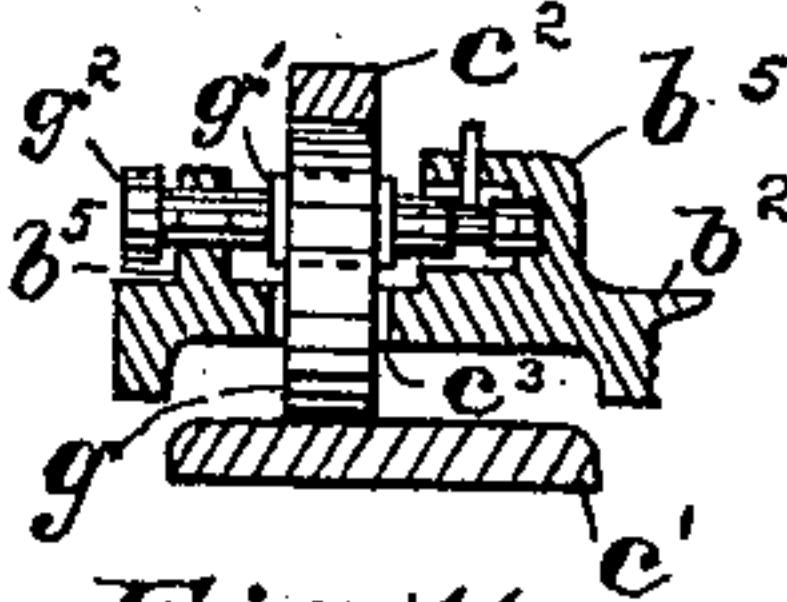


Fig. 11

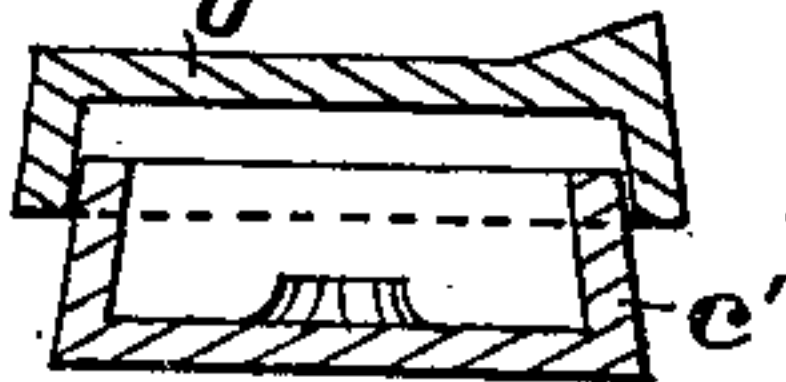


Fig. 14

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INVENTOR

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UNITED STATES PATENT OFFICE.

WASHINGTON E. SPANGLER, OF NEWARK, NEW JERSEY.

DOUBLE-SEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 371,391, dated October 11, 1887.

Application filed April 25, 1887. Serial No. 236,032. (No model.)

To all whom it may concern:

Be it known that I, WASHINGTON E. SPANGLER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Double-Seaming Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The purpose of this invention is to provide a machine by means of which the seams on tin roofing having standing seams formed by upsetting and interlocking the edges of the metal sheets may be rapidly and accurately made, performing in one operation what has heretofore required several operations to accomplish.

The invention is further designed to secure a more perfect union of the metal sheets at the cross or intersecting seams, and also to enable the machine to be readily and quickly adjusted to the decreasing height of the seam as it is in process of formation.

In the accompanying sheets of drawings, in which like letters of reference indicate corresponding parts in each of the several views, Figure 1 is a plan of the double-seaming machine, the handles thereof being broken away. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are sectional views, taken through x , Fig. 1, showing the position of the machine before and at the close of the first operation thereof in forming the seams. Figs. 5 and 6 are similar views taken through y , Fig. 1, indicating the relation of the parts before and at the close of the second operation of the machine. Fig. 7 is a view of the rotating bending-down bar, partly in section, and a section of the tin at one of the cross-seams. Fig. 8 illustrates the several steps in the process of forming the double seam. Fig. 9 is a view similar to Fig. 3, illustrating the position of the machine when adjusted to complete the operation of forming the double seam. Fig. 10 is a sectional view illustrating a modified construction of the adjusting device, and Fig.

11 is a transverse section of the same through z . Figs. 12, 13, and 14 are sectional views indicating modified forms of construction of the bed and adjustable base-plate of the machine.

In the kind of roofing in the formation of which my improved machine is intended to be used the sheets are joined together in long strips by interlocking the contiguous edges thereof, ready to be united upon the roof, forming what is known as a "standing seam tin or metal roof," in which the strips of tin are united on their long edges by bending the same at right angles, as indicated in Fig. 8, (a ,) and the upwardly-projecting edges upset until they are interlocked, as shown in the same figure at a^1 . When thus united, a series of upwardly-projecting flanges is formed extending from the ridge to the eaves on a peaked roof, or from side to side on a flat roof, which is held together without the use of solder, and is thereby capable of expanding and contracting under the influence of the sun's rays without any danger of leakage. In constructing a roof of such description the long strips of united sheets of tin are first bent up on the opposite long edges, as indicated in a , Fig. 8, by any suitable means, one of said edges, t , being somewhat higher than the other of said edges, t' , as shown. To continue the formation of the joints from this point until finished is the purpose of my improved double-seaming machine.

As indicated in the views hereinbefore described, said machine consists of clamping-jaws B B' , which are pivoted together at b , and are provided with levers or arms b' , whereby the clamping-jaws are operated. The jaw B of the machine consists of a bed-plate, b^2 , which extends the entire length of the machine, as indicated in Fig. 1, from which rise the curved journal-arms b^3 , extending over and forward of said bed, as indicated in Figs. 1 and 5. The bed-plate b^4 of the jaw B' is preferably much shorter than the jaw B , being about one-half the length thereof, as in Fig. 2, and between the inner faces of both of the bed-plates the upwardly-bent edges t t' of the tin strips are clamped, substantially as indicated in Fig. 3.

Beneath each of the bed-plates b^2 b^4 are arranged base-plates c and c' , which are adjustably secured to the bed-plates, whereby the

same may be raised and lowered to the height of the tin plates t and t' during the formation of the double seam.

In Figs. 3 and 4 is illustrated the relative position of the base and bed plates during the first operation or upsetting of the tin, and in Fig. 9 is shown the relation of the same during the second or final operation, in which the formation of the double seam is completed. Turning within the journal-arms b^3 , and extending the entire length of the machine, is the bending-down bar D, which is so arranged as to turn on and around the upper edge of the inner face of the base-plate b^2 toward and over the opposite base-plate, b^4 .

The bending-down bar is formed with the portions d and d' , which in cross-section are formed as shown in Figs. 3 and 5, the face d^2 of the portion d being in a vertical line with the inner face of the bed-plate b^2 when the said bar is in its normal position of rest. (Shown in said Fig. 3.) The portion d' of the bending-down bar is formed in cross-section, substantially as indicated in Figs. 5 and 6, the face d^3 thereof projecting at right angles from the face d^2 of the portion d , as shown in Figs. 3 and 9. A socket, d^4 , is formed in the portion d' , and secured in said socket by a set-screw is an arm or lever, d^5 , by means of which the bending-down bar is turned.

The use and operation of the machine when in use are as follows: The strips of united sheets of tin having been prepared and bent up, as shown at a , Fig. 8, the machine is applied to the same, as indicated in Fig. 3, at the beginning of the turned-up edges, which are tightly clamped between the inner faces of the base-plates b^2 and b^4 . The bending-down bar is then turned, by means of the lever d^5 , from the position indicated in Fig. 3 to that shown in Fig. 4, thereby bending the upper portion of the edge t over and at right angles to the shorter edge t' , as shown at a' , Fig. 8. Upon the return of the bending-down bar to its normal position the clamps or jaws are released and the machine moved along the upturned edges until the bent-over portion thereof is brought beneath the portion d' of the bending-down bar, and the portion d is moved alongside of the upturned edge t of the tin. When this position is reached, the bar D is turned, as above stated in the first operation, and the portion d bends the edge t , as shown in Figs. 4 and 8, (a') and at the same time and by the same movement of the bar the portion d' presses the previously-bent edge t down against the edge t' , as indicated in Fig. 8, (a^2) and in Fig. 6. In this manner the seaming-machine is moved along the upwardly-projecting edges of the tin, from one end to the other, the portion d of the bending-down bar bending over the edge t of the tin at right angles to the body of the flange, as in Fig. 8, (a') and by the same movement of the bending-down bar the portion d' closes the previously-bent edge of the tin down against the edge t' , as in a^2 , Fig. 8, and thus completes the formation of a single seam.

In forming the double seam (shown completed in a^4 , Fig. 8) the operation of the machine is identical with that previously described in making the single seam; but in order to accommodate the machine to the decreased height of the standing seam means for adjusting the same is necessary. This is effected by drawing the base-plates c and c' up to the bed-plates, as indicated in Fig. 9, whereby the standing single seam occupies the same relative position to the bending-down bar as the disunited edges did in forming said single seam. (Shown in Fig. 8, at a , a' , a^2 .)

As indicated in Fig. 2, the base-plates are of the same length as their respective bed-plates. If desirable to increase the stability of the machine, the base-plate c may be continued toward the end of the machine along beneath the portion d' of the bending-down bar.

The mechanism for adjusting the machine to the height of the standing seam (illustrated in Figs. 1, 2, 3, 4, 5, 6, 9) consists of a threaded bolt, e , having a head, e' , and passing through both the base-plate and bed-plate, the latter being threaded. To it is secured a finger-piece, e^2 , by a pin, e^3 . By turning said bolts the base-plates are moved toward and from the bed-plates as far as may be desired. As many of said bolts may be used as are necessary to provide the requisite strength and stability of the machine.

In Figs. 10 and 11 is illustrated a form of adjusting device, which is preferable because of the ease and rapidity with which it can be operated. As shown in said views, the device consists of a loop, c^2 , projecting from the base-plate c' up through a slot, c^3 , in the bed-plate, and in said slot is pivoted a plate, g , eccentrically arranged on a pin or axle, g' , which turns in bearings b^5 , formed on the base-plate.

A finger-piece or lever, g^2 , is attached to one end of said shaft or axle, by means of which the plate g is rotated. The plate g is preferably faced off at g^3 , forming a flat surface, which, when turned, bears either against the top of the plate c' or against the under surface of the loop. When the rotating plate g is placed as shown in Figs. 10 and 11, the base and bed plates are held apart at their relative position during the first operation of the machine; but in forming the double seam the said plate g is turned from its engagement with the base-plate to its engagement with the under side of the loop, thus drawing the base and bed plates close together, as in Fig. 9.

Instead of recessing the bed-plate, and so forming the base-plate as to fit up into said recess, as in Figs. 3, 4, and 9, the forms of construction shown in Figs. 12, 13, and 14 may be used. By these latter forms there is less danger of any clogging of the parts.

One of the great objections to machines heretofore made for the purpose of double-seaming standing seams on tin roofs is that whenever a cross-seam occurs the increased thickness of the metal at that point prevents the closing of

the seam properly, thereby compelling the workman to close up the joint at that point with a mallet. This, as is evident, involves a great deal of labor, as these cross-seams occur at frequent intervals, which my improved machine is intended to obviate and is capable of doing.

The operations of closing down both the single and double seams, or those shown at a^2 and a^4 , Fig. 8, are the ones in which the difficulty is most serious, and hence that performed by the portions d' of the bending-down bar in my machine. To overcome this difficulty, I have provided a recess, h , preferably in the forming or bending-down bar, which may be placed at any point therein, but is preferably placed in a line with the operating-lever d^4 , as indicated in Fig. 7. Said recess may also be formed in the face of the bed-plate b^2 , to produce the same effect.

While it is not considered as necessary to have a similar recess in the face d^2 of the portion d , still one may be formed therein, as will be understood.

The relation of the cross-seam to the bending-down bar is shown in Figs. 5, 6, and 7, from which it will be seen that the edge may be bent down close up to the seam, thereby making a perfectly tight joint at that point.

My machine, by reason of its construction, has another great advantage in that it may be used with great facility on steep roofs, the arrangement of the levers permitting the ready handling of the same, and also increasing the power exerted in working the machine.

By reference to Fig. 7 it will be seen that the bending-down bar is so formed that the folding-over portions extend out to each end of the said bar, and said bar, when in position in its bearings in the machine, extends out to each end of said machine. The advantage of this construction is that a seam can be made close up to a wall, since there is no projection on the end of the machine to prevent the folding-bar from touching the wall, and thus forming the seam close thereto.

Having thus described my invention, I desire to claim the following:

1. In a double-seaming machine, the com-

bination of the long and short clamping-jaws or bed-plates $b^2 b^4$, pivotally secured together and having levers b' , said plate b^2 having bearing-arms b^3 projecting therefrom, a forming-bar turning in said bearings centrally around the upper edge of the clamping-face of the plate b^4 and having the portions $d d'$, as set forth, and a recess, h , formed in the face of said portion d' of the forming-bar, for the purposes set forth.

2. In a double-seaming machine, a bending-down bar having the portions $d d'$, the faces of which are arranged at right angles to each other, or approximately so, the face of the portion d' being provided with a recess, h , therein, for the purposes set forth.

3. In a double-seaming machine, the combination of the pivotally-connected clamping-jaws or bed-plates $b^2 b^4$, having slots therein, base-plates $c c'$, having loops thereon projecting up through said slots in the bed-plates, and eccentrically-arranged plates journaled to said bed-plates in said slots, and operating for the purposes set forth.

4. A seaming-machine having a rotating bending-down or forming-bar and clamping-jaws and provided with a joint or seam receiving recess in that portion thereof which closes down or completes the formation of the standing seam, substantially as and for the purposes set forth.

5. In a double-seaming machine, the combination of the long and short pivotally-connected clamping-jaws, means for operating said jaws, bearing-arms projecting from said long clamping-jaw over and around the ends and center of the forming-bar and constructed substantially as set forth, and a forming-bar turning centrally around the inner edge of the long jaw in said bearing-arms and having the portions $d d'$, for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 19th day of April, 1887.

WASHINGTON E. SPANGLER.

Witnesses:

FREDK. F. CAMPBELL,
FREDK. C. FRAENTZEL.