

No. 840,091.

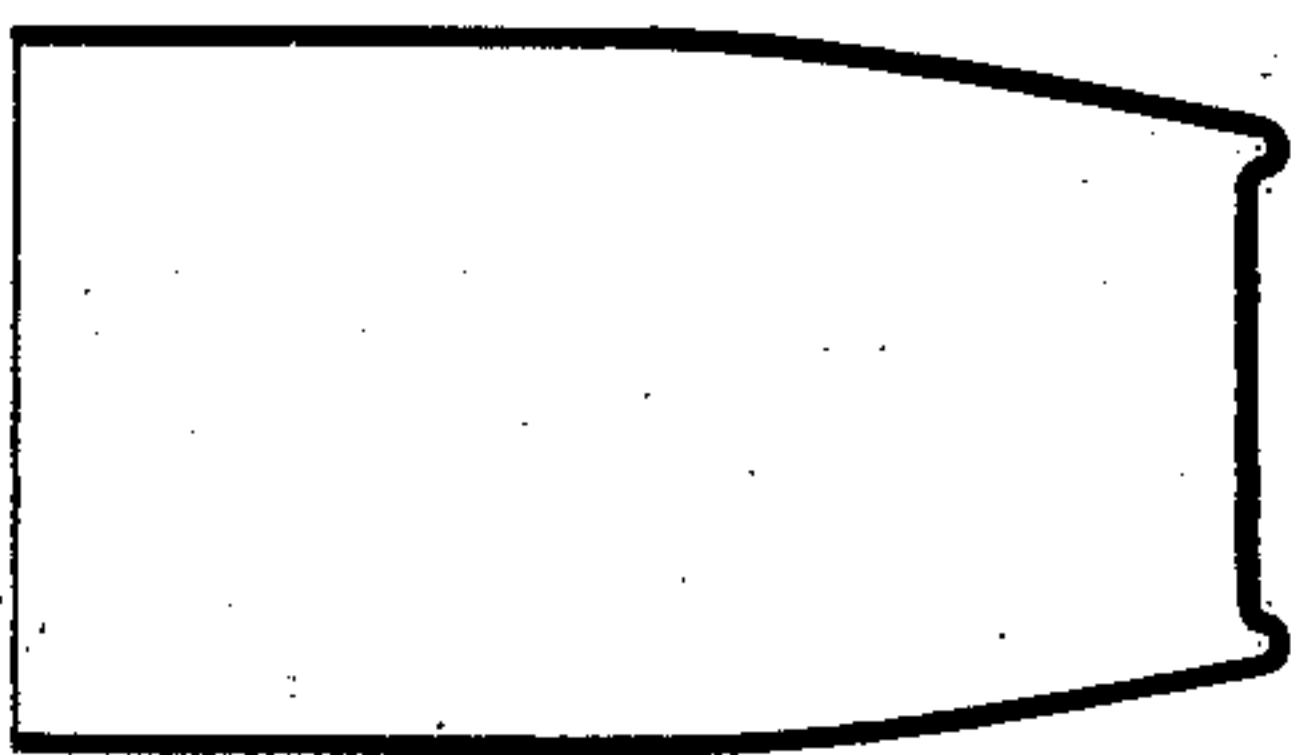
PATENTED JAN. 1, 1907.

E. SCHUMACHER & J. H. TYSON.
MEANS FOR MAKING HOLLOW METAL ARTICLES.

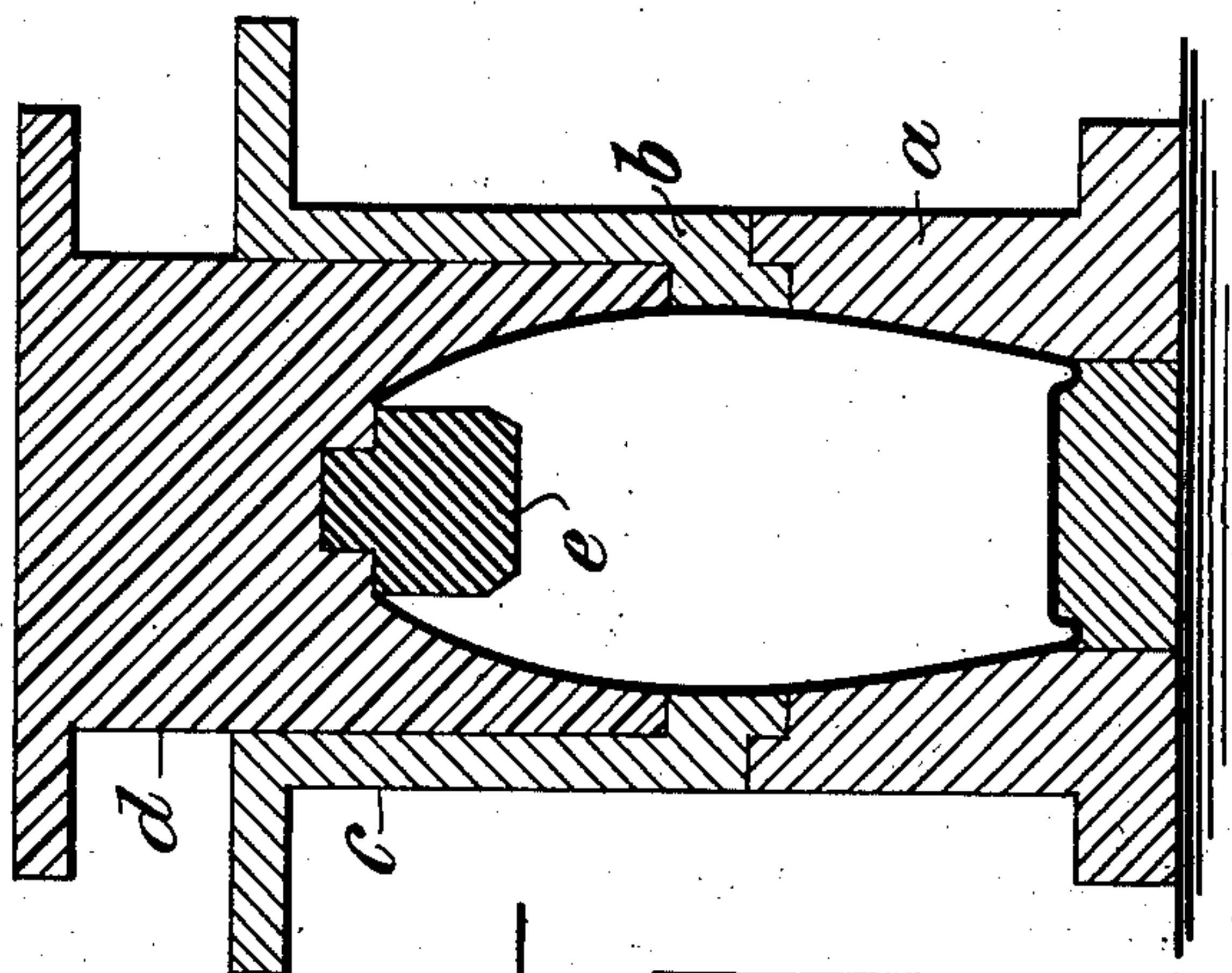
APPLICATION FILED FEB. 28, 1905.

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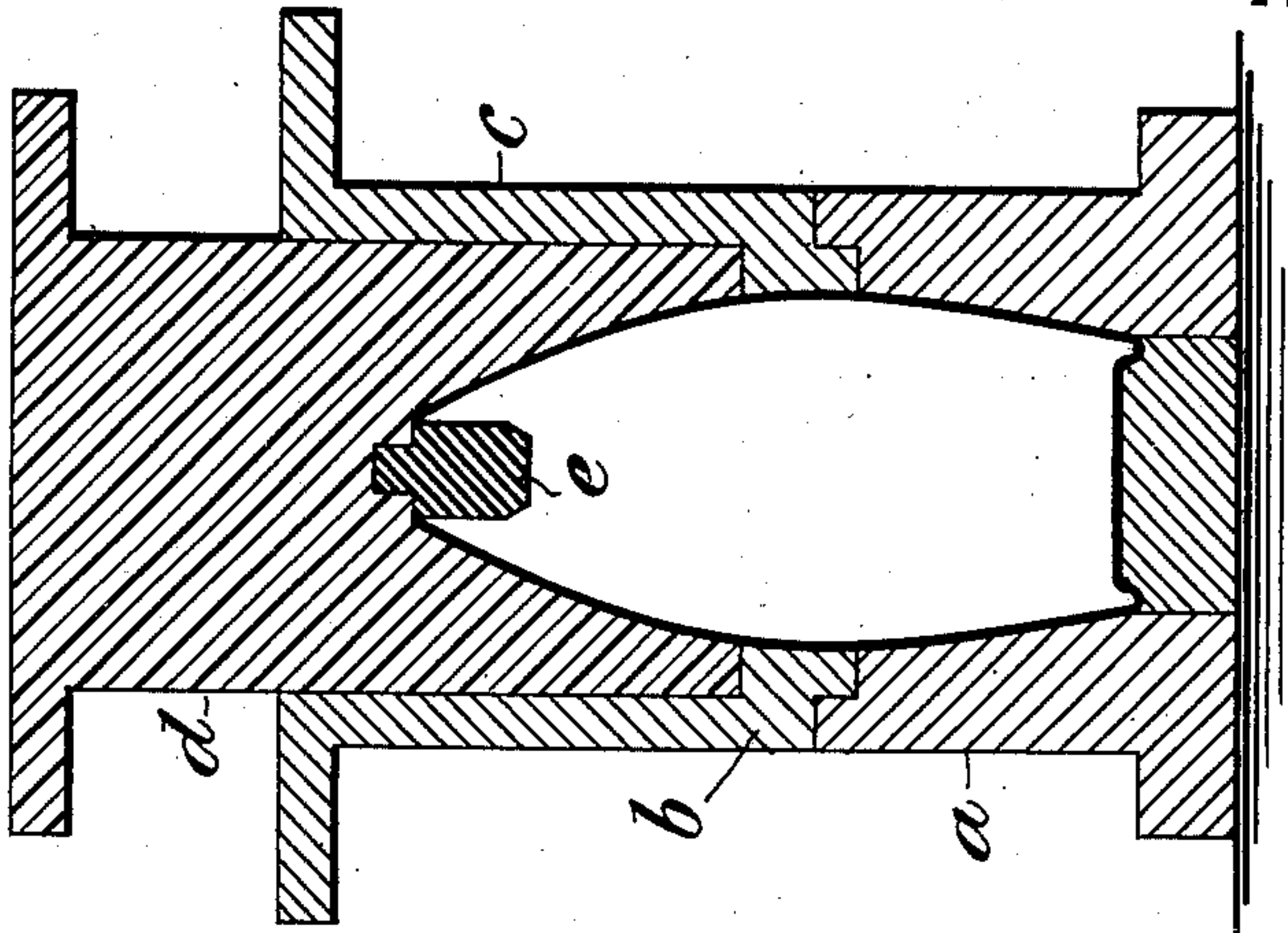
—FIG. 1.—



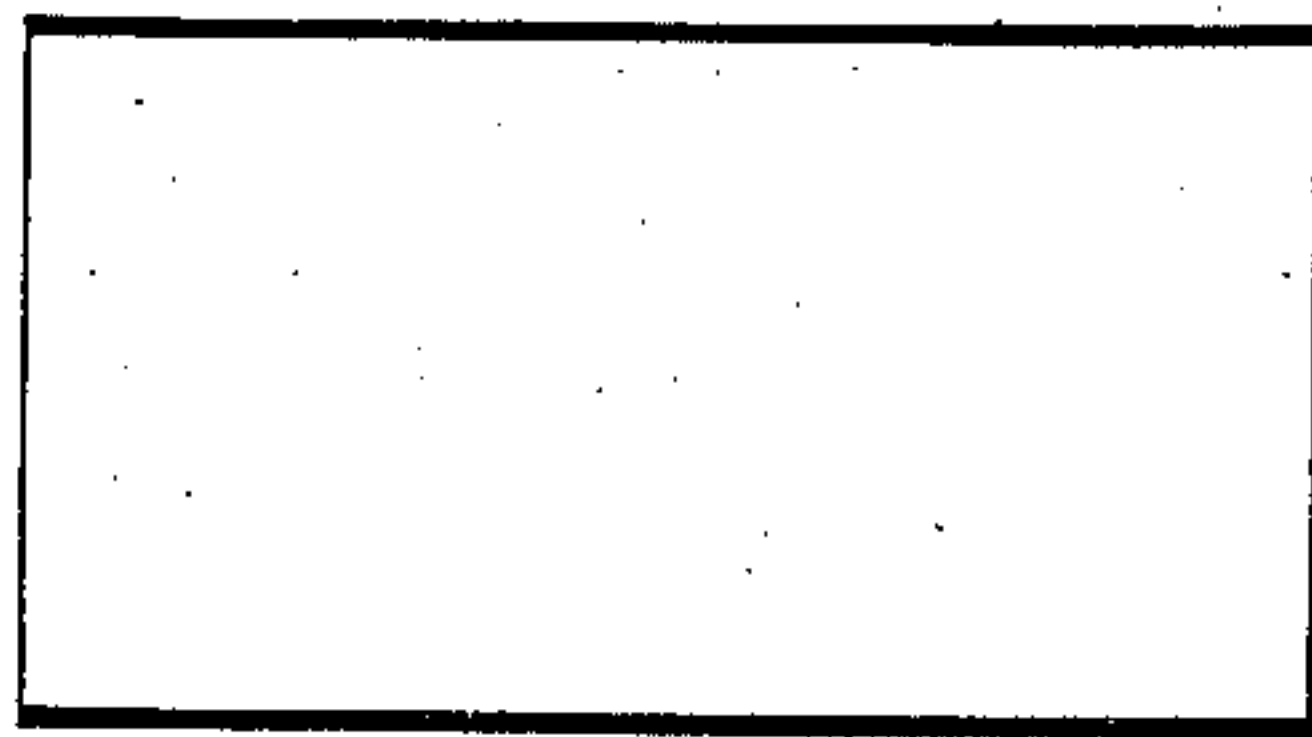
—FIG. 4.—



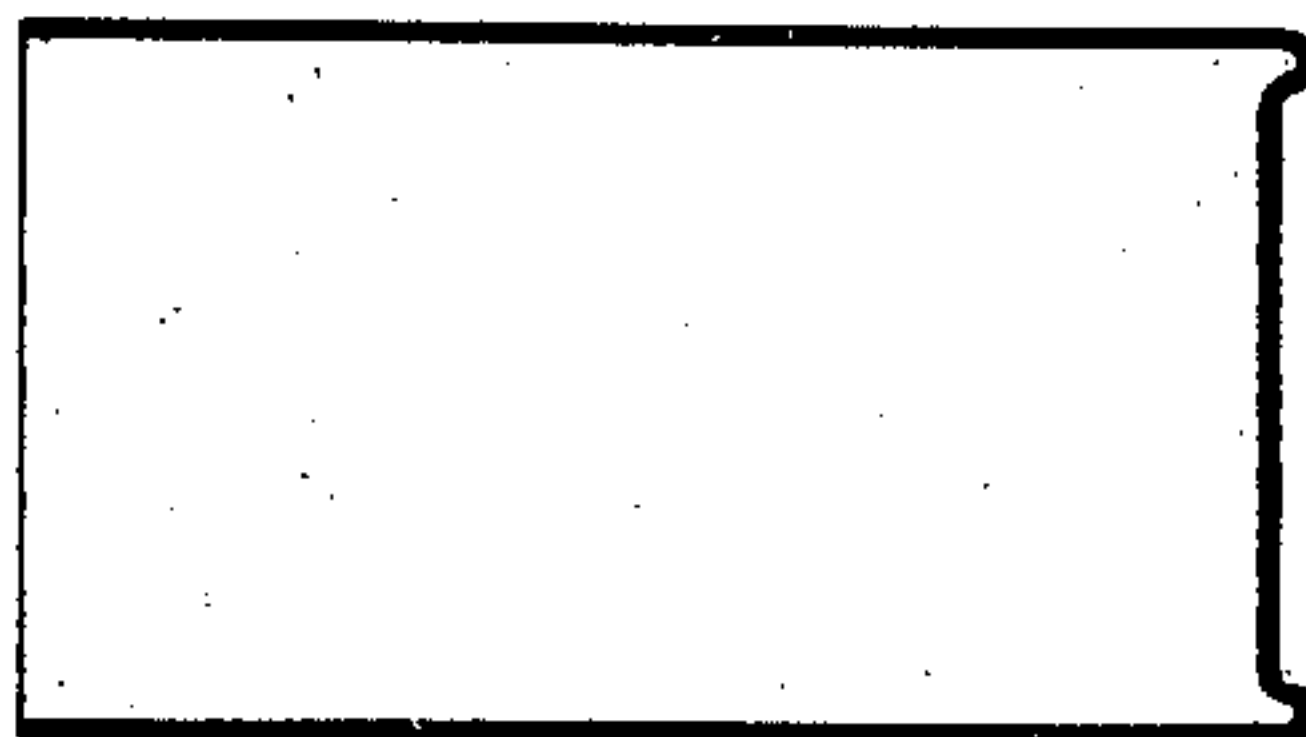
—FIG. 5.—



—FIG. 3.—



—FIG. 2.—



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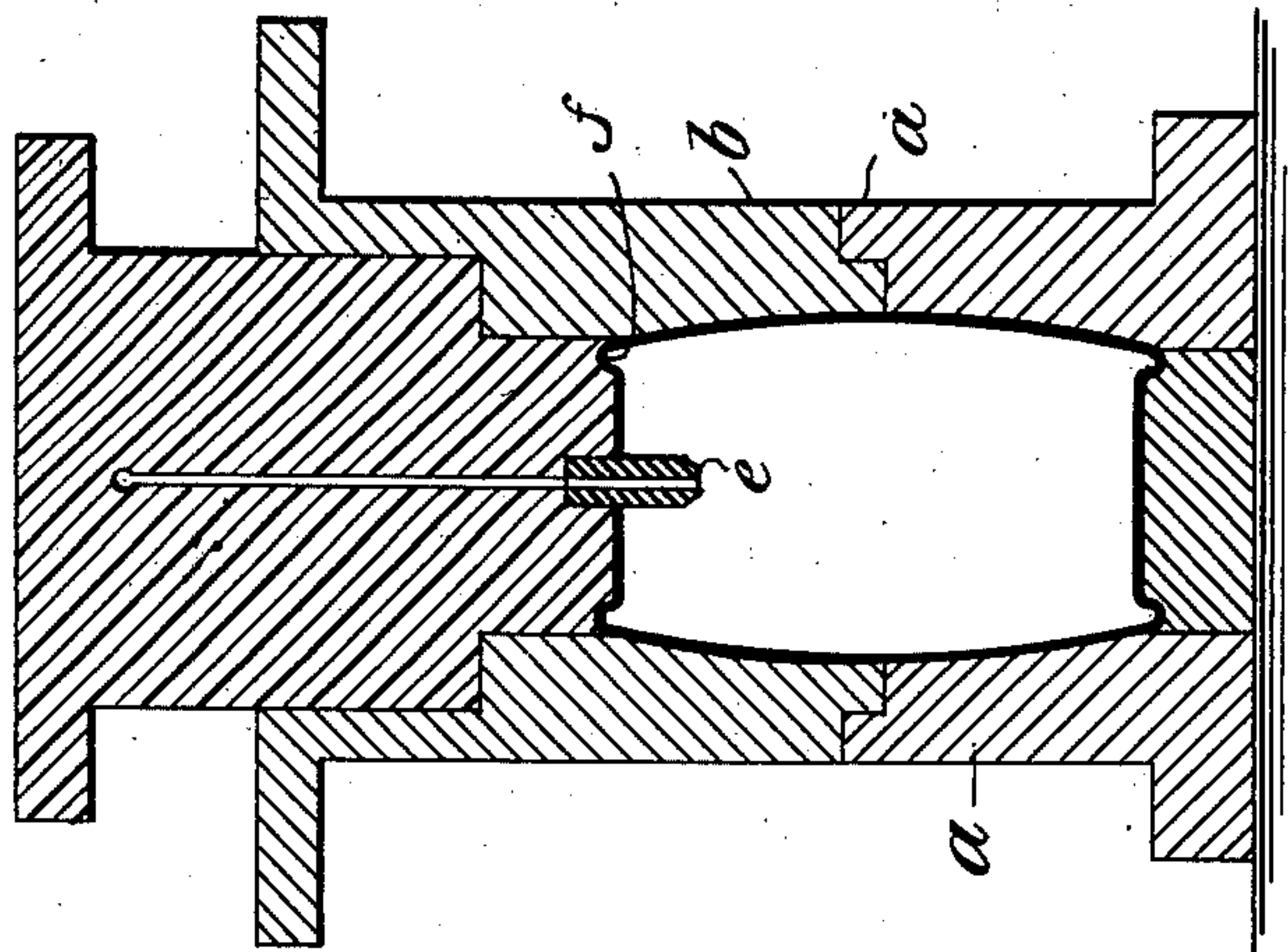
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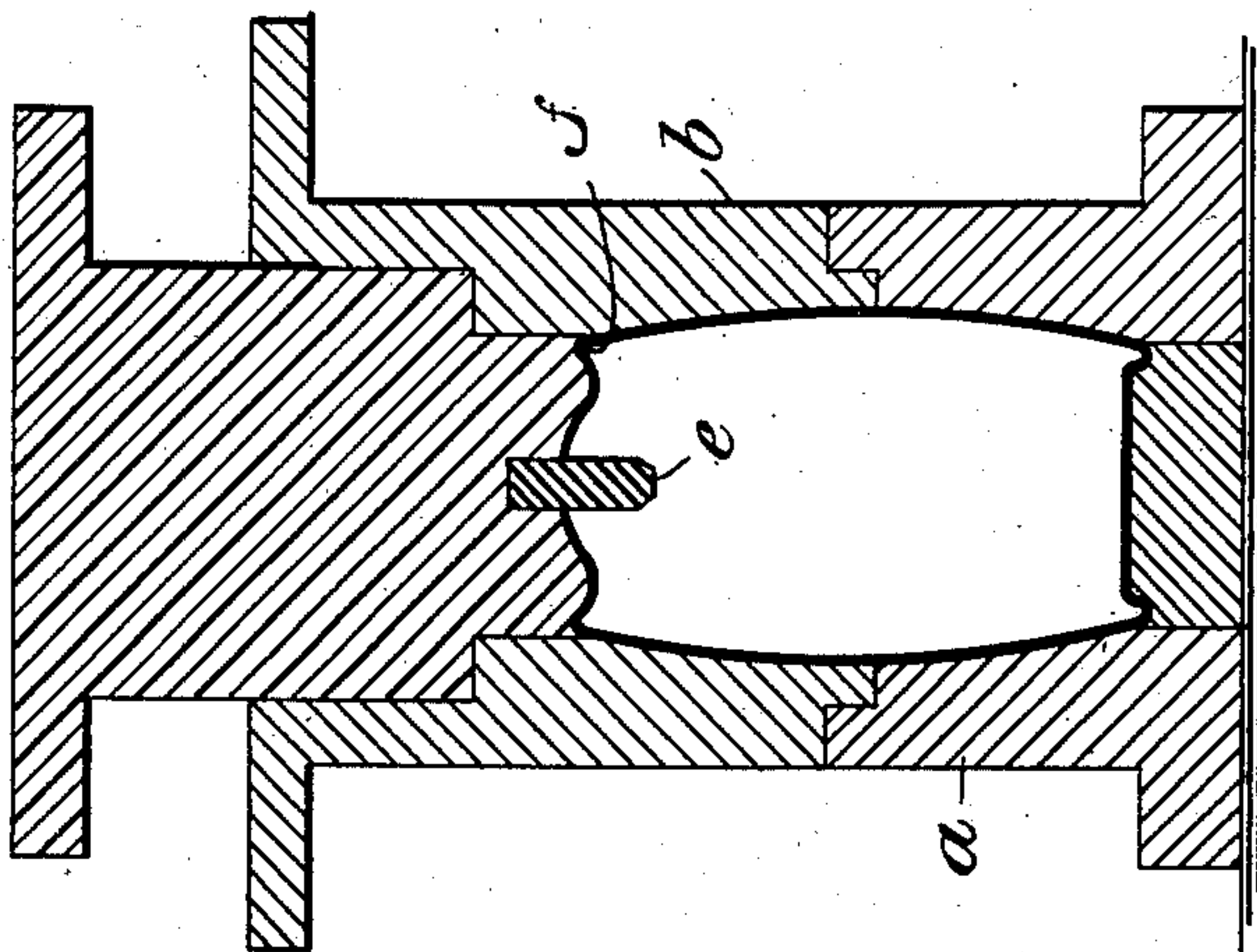
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2 SHEETS—SHEET 2.

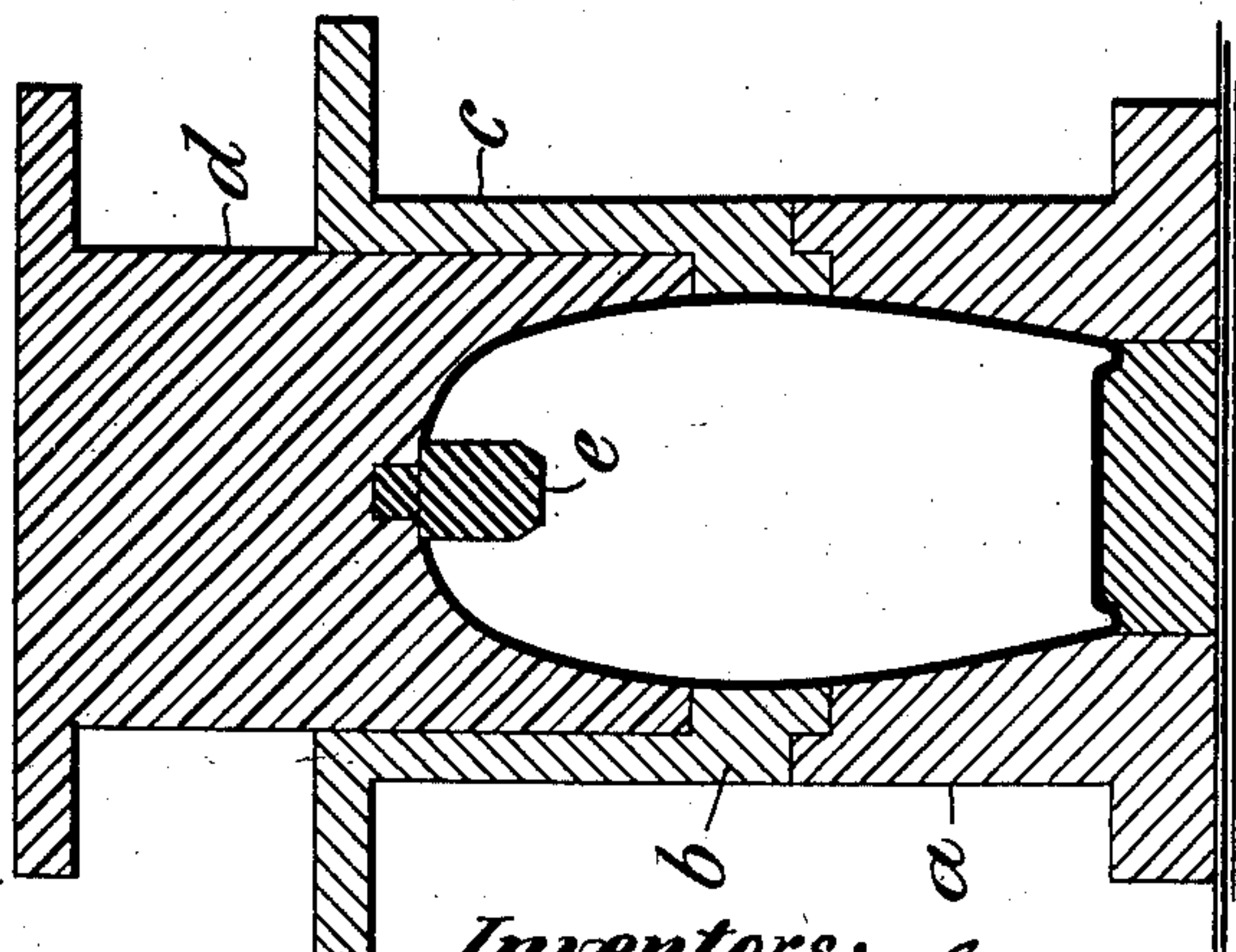
—Fig. 8—



—Fig. 7—



—Fig. 6—



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UNITED STATES PATENT OFFICE.

EBERHARD SCHUMACHER AND JOHN H. TYSON, OF DARLINGTON,
ENGLAND.

MEANS FOR MAKING HOLLOW METAL ARTICLES.

No. 840,091.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed February 28, 1905. Serial No. 247,718.

To all whom it may concern:

Be it known that we, EBERHARD SCHUMACHER, engineer, a resident of 124 Westmoreland street, and JOHN HODGSON TYSON, company's secretary, a resident of 42 Victoria Embankment, Darlington, in the county of Durham, England, subjects of the King of Great Britain, have invented certain new and useful Improvements in Means for Making Hollow Metal Articles, of which the following is a specification.

Our invention contemplates primarily means for producing hollow metal articles comprising a die, a punch fitted to and centered in said die, and a changeable nipple inserted centrally into said punch.

Our invention further contemplates means for forming hollow metal articles by external and internal pressure comprising a die for the body of the article, a punch fitted to and centered within said die for forming the head or end of the article, and a central nipple inserted into said punch and having in it an opening for the introduction of hydraulic pressure.

In the accompanying drawings, Figure 1 shows in vertical central section a cup-shaped blank from which a cask or barrel may be produced. Fig. 2 is a similar view from which a drum may be produced. Fig. 3 is a similar view showing a cylinder from which a cask may be produced. Fig. 4 shows means for carrying out the first step in the formation of a cask, barrel, or drum from the cup-shaped blank shown in Fig. 1, a punch and nipple being used which will bend the upper portion of the blank inwardly, leaving a large opening. Fig. 5 is a similar view showing the second step, in which a punch of another form and a nipple of smaller diameter are used for drawing the upper portion of the blank more closely together. Fig. 6 is a similar view showing the third step in the operation, in which a punch of another form is used, the nipple being of the same diameter as in Fig. 5. Fig. 7 is a similar view showing the fourth step in the operation, in which another form of cylindrical extension, another form of punch, and a nipple of still smaller diameter are used; and Fig. 8 is a similar view showing the final step in the operation, in which a nipple is provided with a hole therethrough and the punch is

shaped properly to form the head of the cask, barrel, or drum.

The object of this invention is to provide means for producing a hollow article—such as a cask, barrel, or drum—from a disk of metal without any seam or joint and with only a small hole in one end; but the invention may also be used to produce a hollow article with ends integral from a cylinder of metal. In this case there will necessarily be a hole at each end.

When operating on a disk of metal, the disk is first subjected to pressure in any well-known manner to produce a cup-shaped piece, at which point the present invention commences, the special feature of the invention being to close in the open mouth of this cup, so as to form the "head" of the cask, barrel, or drum. When operating on a cylinder, (which will have been previously produced in any convenient manner and forms no part of the present invention,) the same kind of closing-in apparatus will be used for both ends.

The various stages of the closing in of the end or ends will be effected by external pressure, although we may in some cases find it desirable to use internal pressure by means of hydraulic power to assist in giving the final form to the article it is desired to produce.

When forming the cup-piece above mentioned, we may find it convenient to produce at the same time the chime at the bottom.

The cup-shaped piece for producing a cask or barrel is shown at Fig. 1, while that for a drums is shown at Fig. 2. In making a cask from a cylinder (shown at Fig. 3) the bulge will also be produced by the external pressure employed to close in the ends, the dies being so shaped as to permit of the bulge being produced. In this case bottom punches, the counterpart of the top punches, may be used to close the two ends simultaneously, or one end may be closed in first and then the other end by a single set of punches.

The formation of the head of the cask, barrel, or drum in the case of the cup-shaped piece, or, in other words, the closing of the mouth of the cup, is effected by a series of operations, the first of which is illustrated at Fig. 4. In this figure, *a* represents the die to receive the lower part of the cup. *b* is the die for the central portion of the article, and

it is made of comparatively shallow depth, so that it will not present any impediment to the withdrawal of the partly-formed article from the die at each stage of the operations.

5 This part of the die is, however, formed with a cylindrical extension *c*, which will receive and center the punch *d*, and is also formed with a flange by which the part may be secured in the press. Similar parts will be used
10 for the next two operations, as illustrated in Figs. 5 and 6.

In the operations illustrated by Figs. 7 and 8 corresponding parts are slightly modified in shape—that is to say, the part *b* is length-
15 ened to correspond to the top half of the article, as shown, so that the parts *a* and *b* separate at the center of the cask.

In Figs. 4, 5, and 6 the punch *d* is formed with a recess, the shape of which varies from
20 more or less dome shape to more or less conical shape, or vice versa, the depth also varying. Centrally of this recess is secured a projecting piece, which may be termed a "nipple" *e* and which has a most important function to
25 perform in the closing-in operations. As will be seen at Fig. 4, the recess is more or less dome-shaped—that is to say, the mouth of the recess will have a diameter about equal to that of the mouth of the cup and the
30 walls will curve round to the bottom of the recess. The wall of the cup will thus gradually as the punch descends be curved or, it might be said, drawn inward until the top reaches the angle produced at the meeting-
35 point of the walls of the recess and the periphery of the nipple, and when it can get no farther the walls will by the further descent of the punch be forced outward, so as to take the contour of the mold or die, and thus form
40 the bulge. At Fig. 4 the diameter of the nipple is shown as being comparatively large, and the opening at the top of the cup will also be large.

For the next operation the diameter of the
45 nipple is reduced to one-half, while the depth of the recess in the die, Fig. 5, is increased, the curve of the walls being slightly flattened, so that the recess will partake of a more or less conical shape. As the result of these
50 changes in the dimensions of the recess the action of the punch will reduce the size of the opening at the top, while the length of the sides of the partly-formed article will be slightly increased to provide the requisite
55 length of metal to form the head of the cask or drum when folded in. This folding in is

commenced at Fig. 6, where the recess in the punch is again rounded or widened out or made more dome-shaped, and the depth is reduced so that the action of the punch will
60 be to flatten down the metal at the top, the nipple *e*, which will be of the same diameter as in Fig. 5, still playing the important part of forcing the metal into the contour of the recess in the punch.

The next operation, as illustrated at Fig. 7, is to further flatten down the head, at the same time commencing to form the chime. In this instance the diameter of the nipple is again reduced to about one-half, which allows
70 for the drawing in of the metal to close up the opening to a further extent. In this instance the punch is not recessed to the extent before shown, but the striking-face is formed with undulations, which will give to
75 the article the desired form preparatory to the final stamping, which is illustrated at Fig. 8. In this case the nipple will be the same size as in the last, so that no further drawing in of the metal can take place, while
80 the punch has a flat face, which will flatten down farther the head of the cask, and this flattening will have the effect of closing in the "gutter" *f*, as it may be termed, to complete the formation of the chime at the head. It is
85 at this stage that we may find it desirable (say in the production of casks or barrels of large size) to employ internal hydraulic pressure, and for this purpose the die is provided with a central passage conveniently
90 connected with the power-supply, which passage is continued through the nipple, as shown in Fig. 8. Under ordinary circumstances the external pressure will, we believe, be sufficient for the purpose we have in view.

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

As a means for forming a cask or barrel shaped article, a forming mechanism consisting of a die conforming to the closed body
100 of such article and a punch shaped to conform to the head thereof and having a protruding nipple to engage the metal and form an aperture in the head as set forth.

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

EBERHARD SHUMACHER.
JOHN H. TYSON.

Witnesses:

HORACE WESTGARTHE WOOLER,
WILLIAM GUNTER.