

March 7, 1944.

D. E. GROVE

2,343,550

CONTAINER AND PROCESS OF MAKING SAME

Filed March 30, 1942

2 Sheets-Sheet 1

Fig. 1.

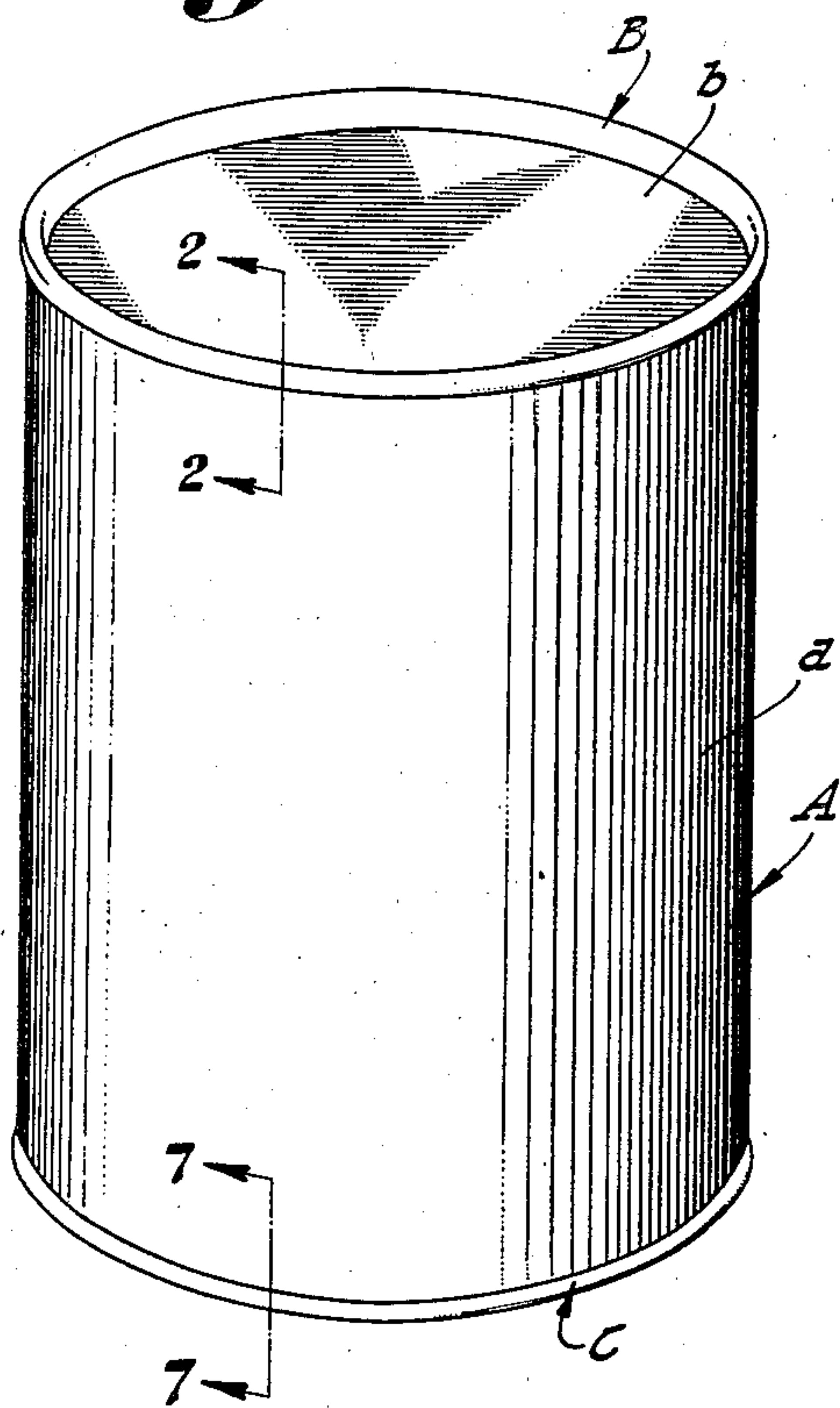


Fig. 2.

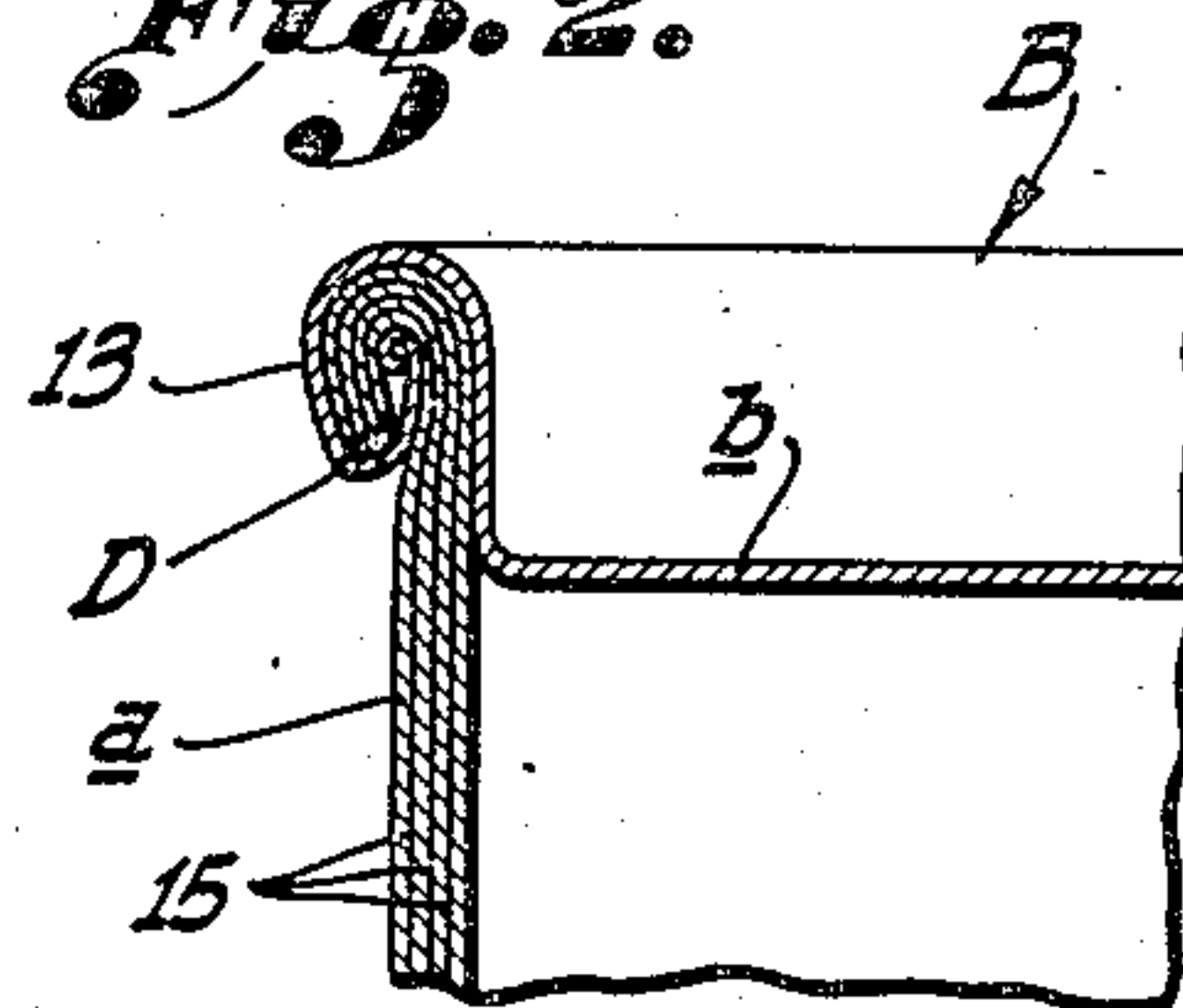


Fig. 3.

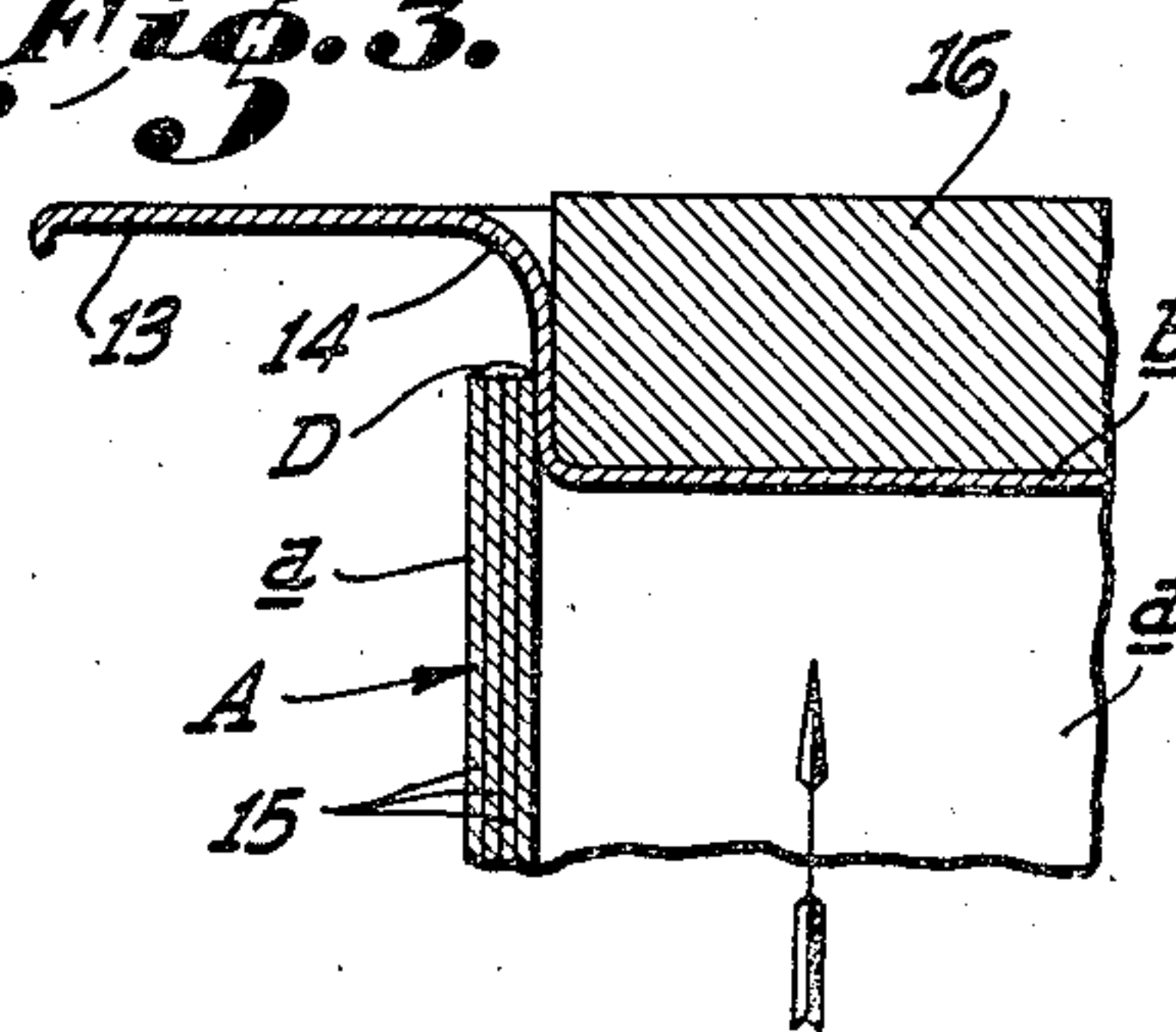


Fig. 4.

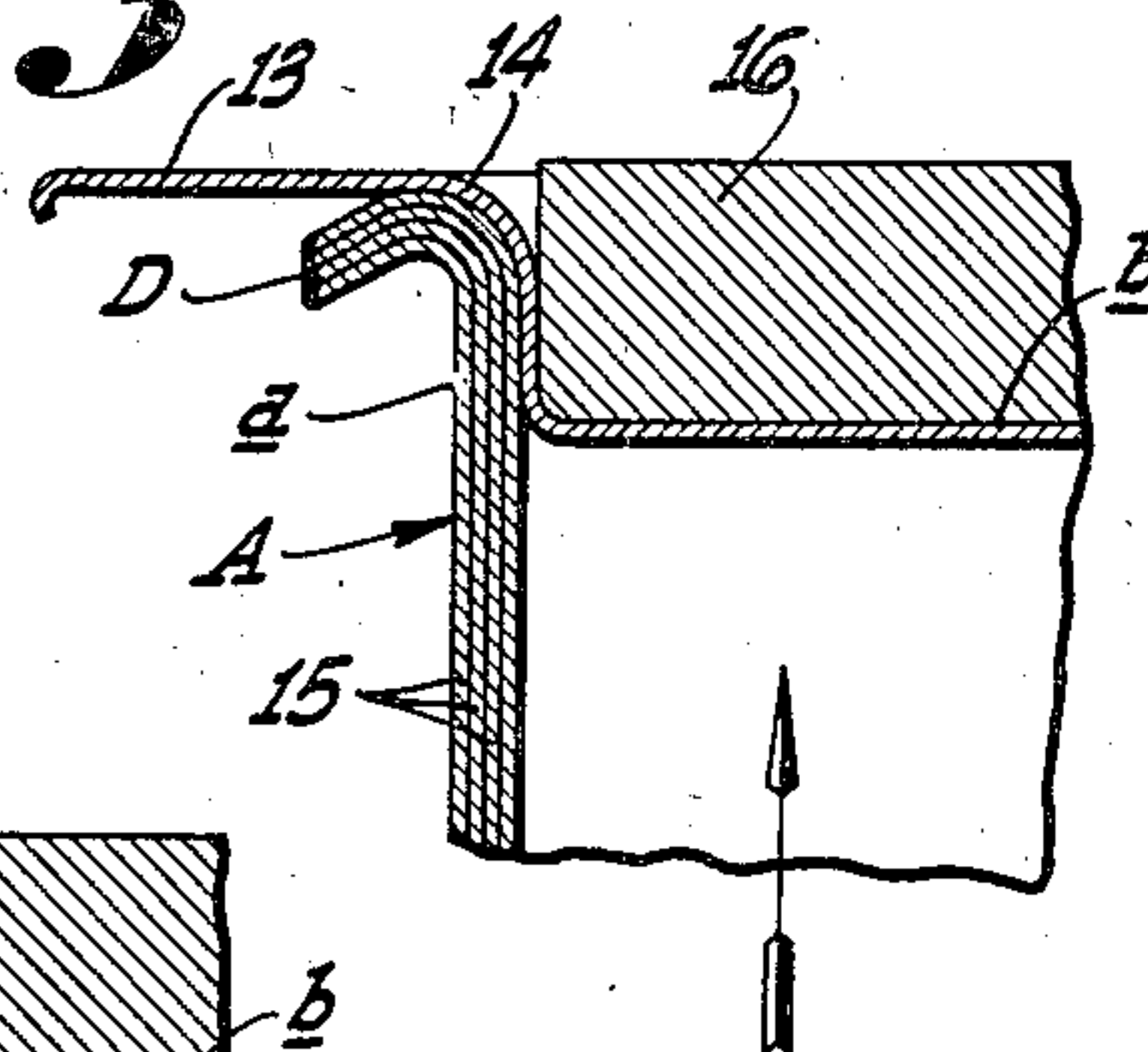


Fig. 5.

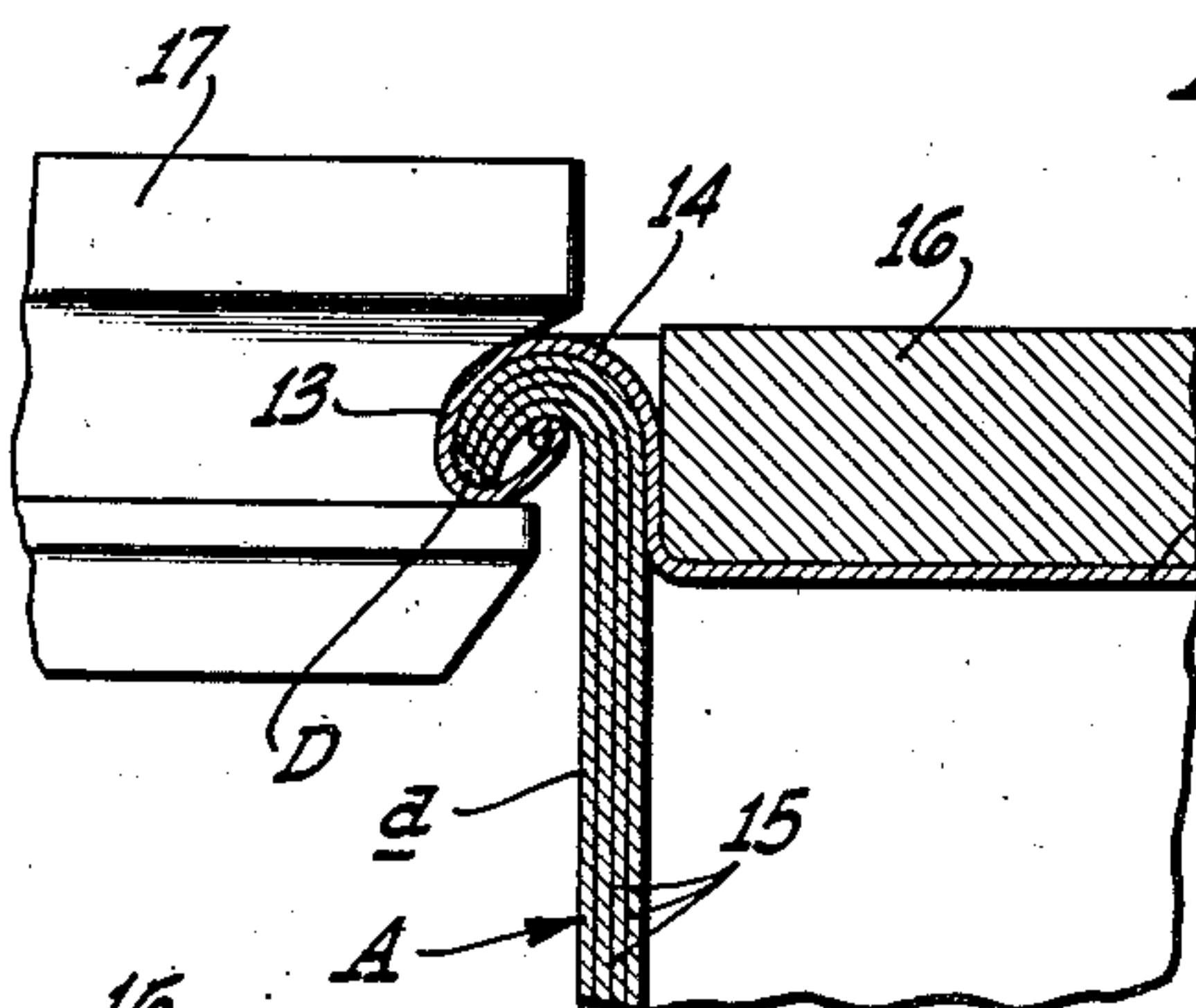
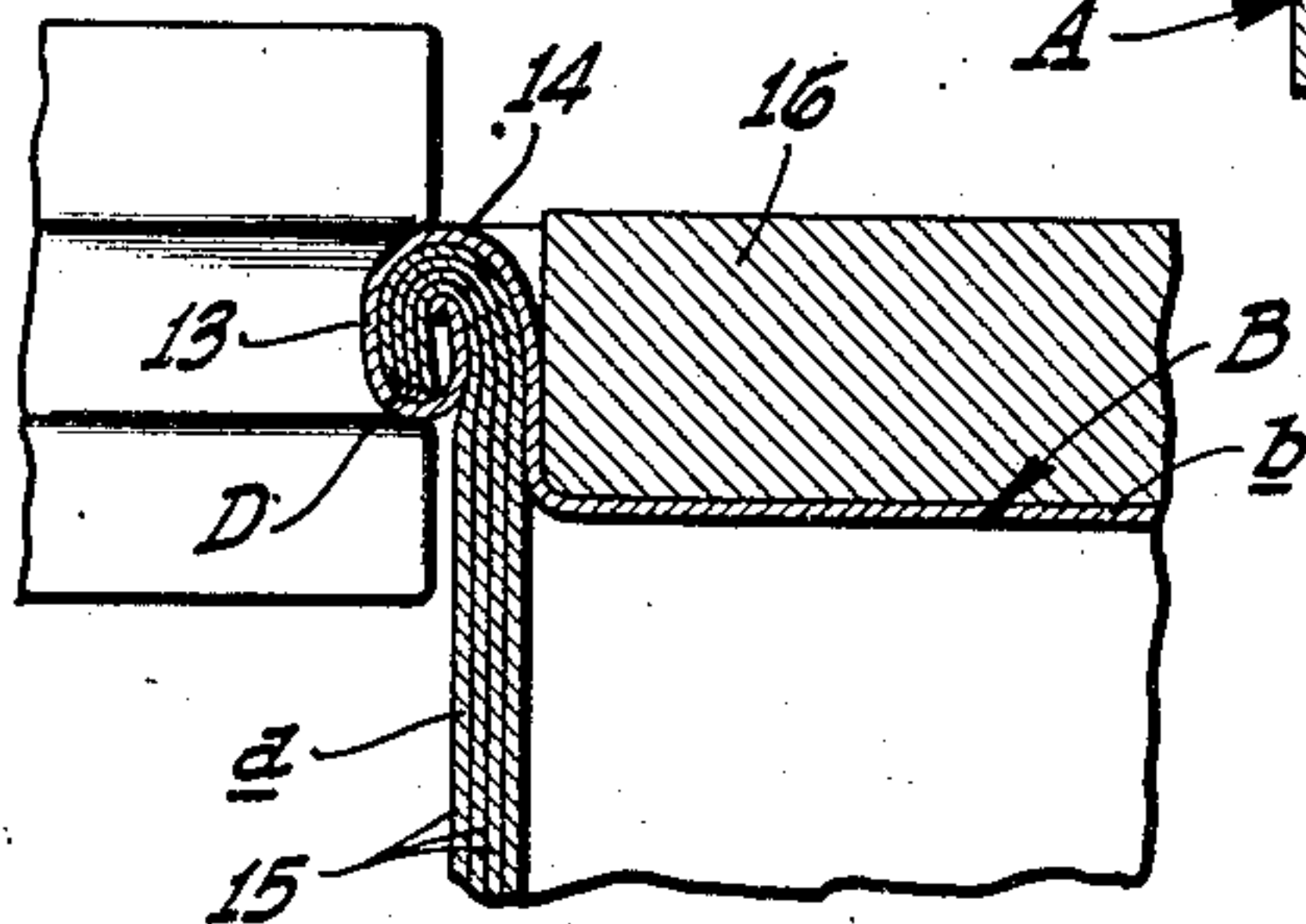


Fig. 6.



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2 Sheets-Sheet 2

Fig. 7.

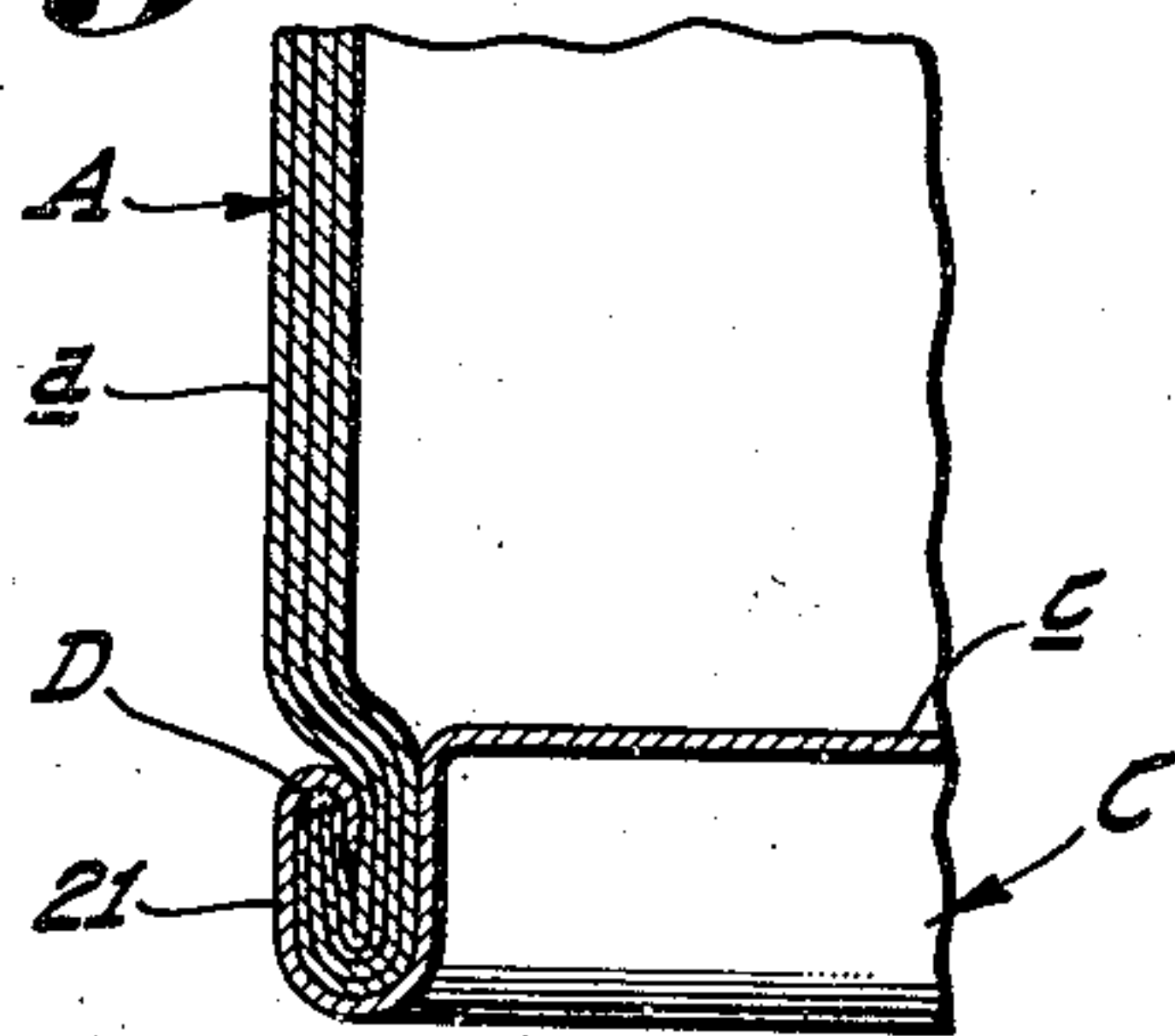


Fig. 10.

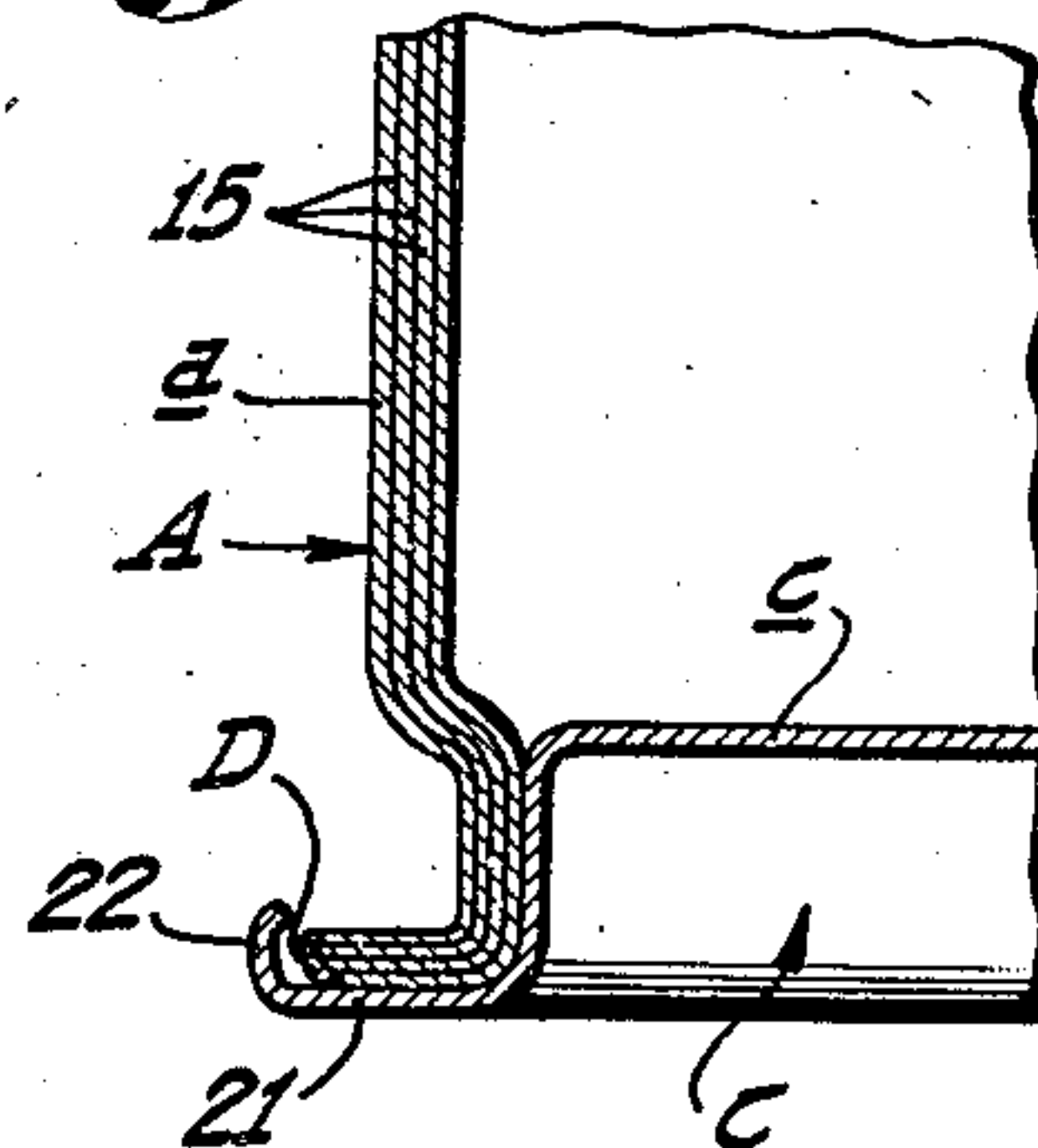


Fig. 8.

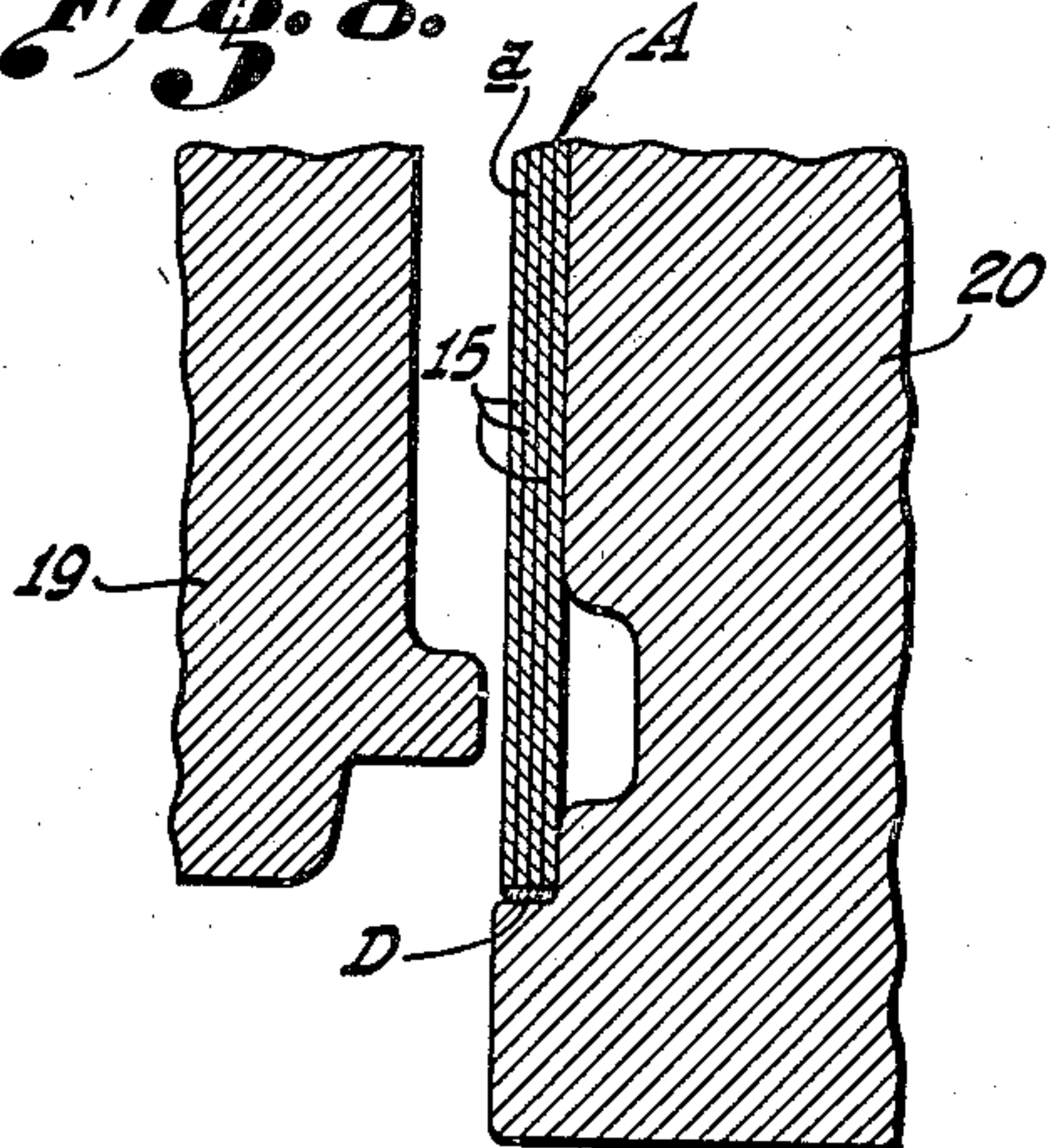


Fig. 11.

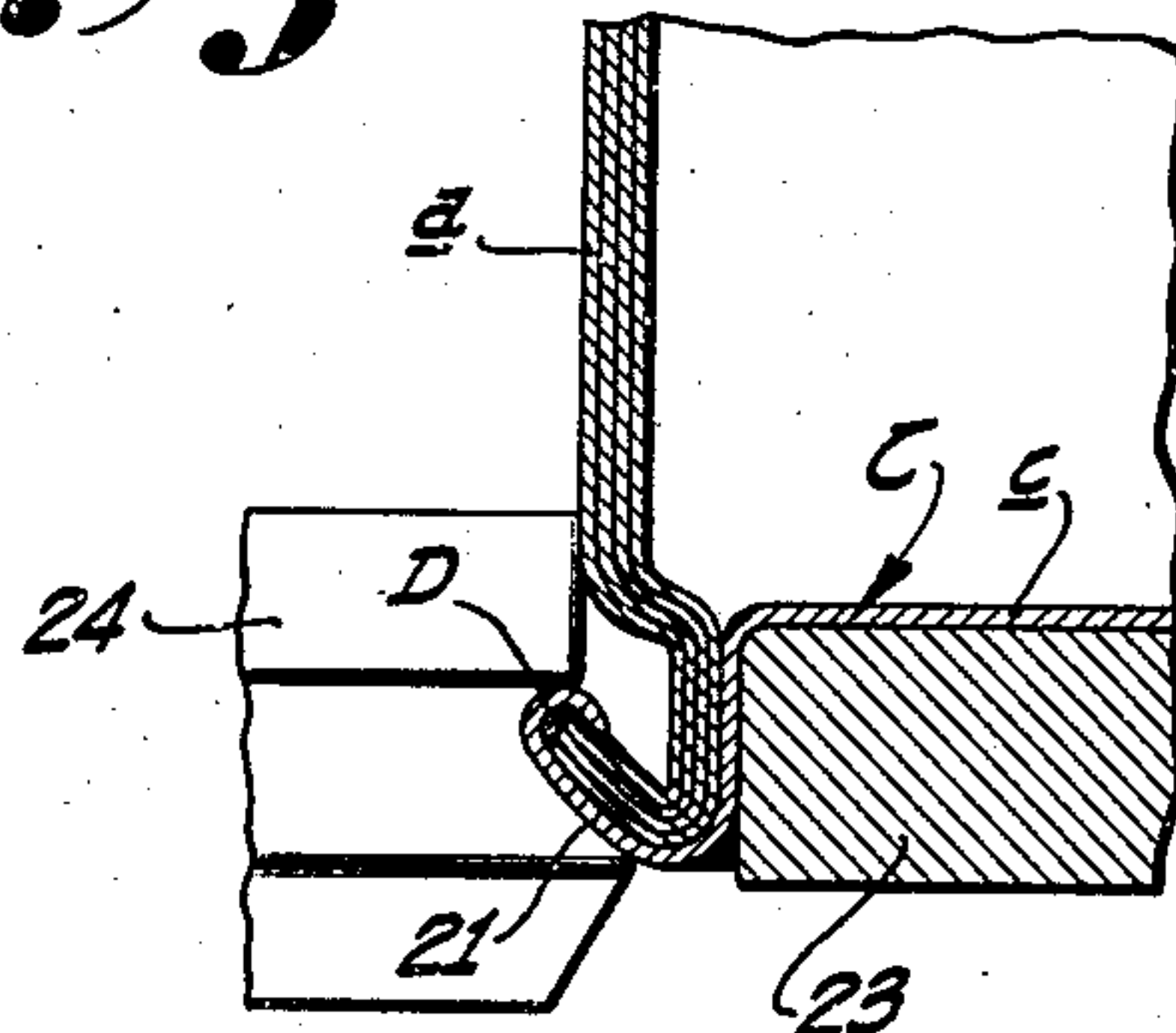


Fig. 9.

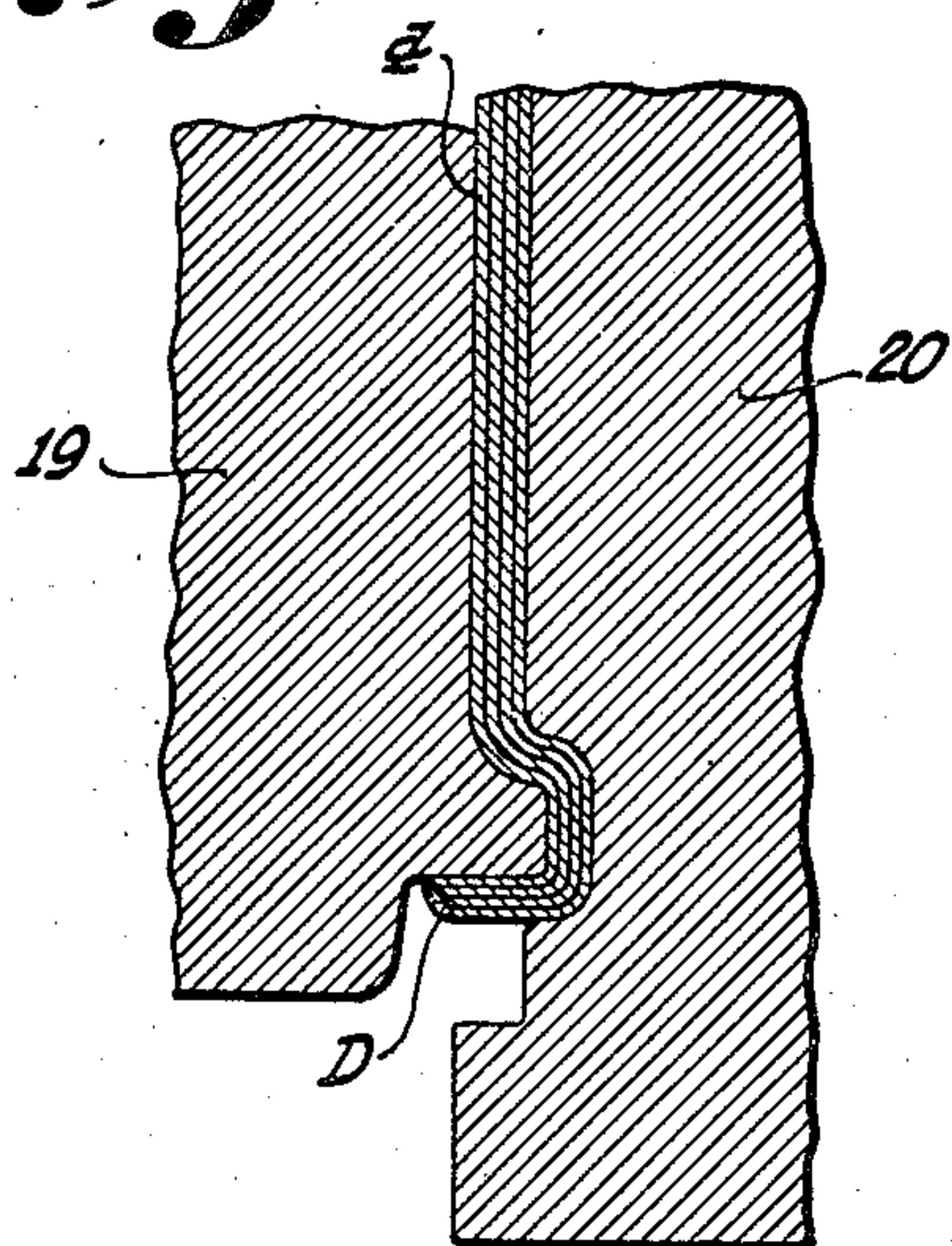
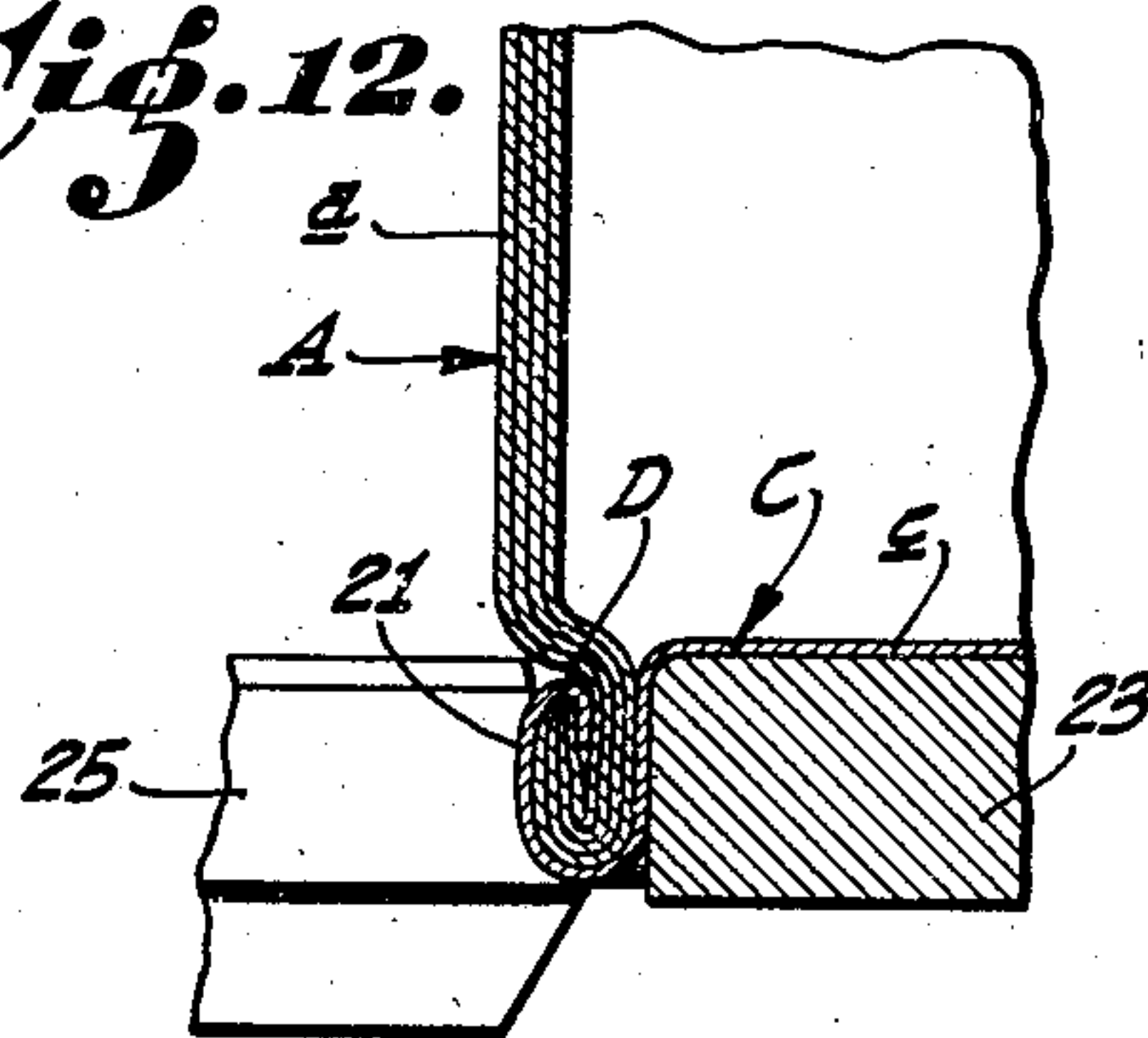


Fig. 12.



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UNITED STATES PATENT OFFICE

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CONTAINER AND PROCESS OF MAKING
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Application March 30, 1942, Serial No. 436,727

2 Claims. (Cl. 229--5.5)

This invention relates to containers and structural elements, and more particularly to rigid containers having varying body cross-sections and end closures, within which general classification or category, of course, falls more particularly cans and the like. Such cans and containers of like kind have ordinarily been formed with metallic bodies and metallic end closures, and the same long have been and are used very extensively for packaging, storing and vending both liquid and dry and semi-liquid materials and substances, very largely vegetables and meats and other aliments. Of course, also, many other materials and substances are similarly packaged, including chemicals, greases, oils and a wide range of materials and substances. Close sealing or end closing is indispensable to prevent both leakage and likewise deterioration of contents, and this is more particularly so with respect to liquids, as in the particular of leakage. Perfect sealing is required to insure long preservation of contents, and it is entirely indispensable that such sealing be complete and perfect in the use of containers for packaging foods, inasmuch as access of oxygen or air to the interiors of metallic containers tends to set up reactions rendering the contents either inedible or poisonous. Such containers have been formed principally of metal as recited, in order to obtain the qualities hereinabove mentioned and the further qualities of inherent rigidity enabling such containers and contents to be shipped and handled without damage and likewise to be piled and stacked in storage and for purposes of display for sale.

I am not aware of the established commercial utilization of any material other than metallic material for the body portions of such containers or receptacles. Such containers or receptacles with non-metallic bodies have been, to a limited extent, placed upon the market, but I know of none which has held its place there and is now commercially supplied.

It is obvious that in selecting materials for and fabricating such a non-metallic container body, recourse must be had to materials which will meet all the requirements of which a number have been heretofore set down, and particularly inherent stability and resistance to crushing stress as well as imperviousness to leakage of either gaseous or fluid materials. Likewise, such materials must permit of closing at the ends of the receptacle by the application to the bodies of metallic closures in one practice of the invention.

The matter of such materials in certain pre-

ferred forms or as to certain preferred constituents and ingredients is treated of in a companion application for Letters Patent executed the same day as the present application and filed therewith, such other application dealing not only with the material of the non-metallic container body, but with adhesive material utilized in convolutely forming such body and inside coating for such body and the application to such body of a label, if desired. The invention of the present application is concerned with such application of end closures, and I am not aware of established commercial utilization of material other than metallic material for the body portions of such containers or receptacles as combined with metallic closures.

It is one object of this invention to provide such combination or association of non-metallic container or receptacle body and metallic end closures which will be durable, gas- and fluid-tight, in which the application of the end closures may be made with facility and convenience, and which association will be generally superior from the standpoint of efficiency, serviceability, inexpensiveness and adaptability to varying conditions of use and service.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, constitution, association, interrelation and combination and relative arrangement of parts, members, features and steps or sequences of steps, all as hereinafter described, shown or indicated in the drawings, and finally pointed out in claims.

In the drawings:

Fig. 1 is a perspective view of a container or receptacle having a non-metallic body and metallic end closures applied thereto to seal the same, the seam at the top being formed to project somewhat outwardly and the seam at the bottom being formed to lie within the geometric figure of the body itself;

Fig. 2 is an enlarged sectional detail view taken upon the line 2—2, Fig. 1, and looking in the direction of the appended arrows;

Figs. 3, 4, 5 and 6 are views illustrating progressively the formation of one seam shown in Figs. 1 and 2, illustrating the use of chucks and rollers in the formation of such seam; and

Figs. 7, 8, 9, 10, 11 and 12 are also enlarged sectional views, similar to Figs. 2 to 6 inclusive, but illustrating the formation of a closure seam to produce and dispose same, as illustrated in Figs. 7 and 12, in completion, so that same will lie within the contour of the geometric figure of

the container or receptacle, the completed seam being shown in Figs. 7 and 12.

Fig. 7 is taken upon the section line 7—7, Fig. 1, looking in the direction of the appended arrows.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, I have shown therein in Fig. 1 a container or receptacle A having a non-metallic body a, the make-up of which may be that set forth and taught in said companion application for Letters Patent, including the paper stock, the adhesive coating and end sealing, and inside coating, or such body may be fabricated in any preferred and satisfactory manner and of any preferred and satisfactory materials or ingredients. Preferably it will be a body mainly of paper stock and so constituted and fabricated as to be highly resistant to crushing stresses and impervious to penetration or permeation by fluids and gases. Applied to such body portion a is a top closure B and a bottom closure C of which only the seam is shown in the drawings, but which bottom closure will ordinarily be identical in make-up with the top closure B with variations as desired or expedient in the nature of the seam itself, the top closure having an outwardly projecting seam and the bottom closure having its seam within the contour of the body. Both seams may be identical or they may be varied as desired. Ordinarily and preferably such seam is the well-known double seam heretofore employed in standard practice in seaming together metallic container or receptacle bodies and metallic end closures. As previously indicated, I do not know of any successfully commercially exploited non-metallic body with metallic end closures which body will be impervious to penetration even of fluids or gases and combined with metallic end closures seamed thereto in any manner.

In dealing with a non-metallic body some problems are encountered which are not met with in dealing with metallic bodies and metallic end closures. Therefore, while the steps in applying a metallic end closure such as B or C, as shown in the various figures, follow the steps in kind and character employed in applying metallic end closures to metallic bodies, still there are departures which are indicated in the drawings and will now be referred to.

In Fig. 3 the closure body b is shown as flanged outwardly and curled angularly at its extremity by any suitable flanging machine or means, and in so doing, this outer flange 13, which is connected with the closure body b as at 14, is so connected through a curvature of relatively large radius, as indicated in Figs. 3 and 4. When the can body is applied to the closure, or vice versa, end pressure upon the body is provided in the direction indicated by the arrows in Figs. 3 and 4, which causes the non-metallic body, which may be laminated as by laminae 15, to be distorted or deformed by bending outwardly in its traverse of such curvature at 14 from the formation shown in Fig. 3 into that shown in Fig. 4. A suitable chuck 16 is applied to and within the contour of the closure body b. Following this a seaming roll or ring 17 is applied to the flange 13, to upset the metal of same and curl it around and beneath the flanged portion of the can body portion a, as shown in Fig. 5, into initial position prior to final seaming and tight sealing.

As set forth in said companion application, certain adhesive material utilized in the adhering

together of the laminae 15 is extruded from between the laminae by pressure and becomes distributed over the marginal portions of said laminae and seals such laminae against both intrusion and extrusion, such sealing medium being shown in Figs. 3 and 4 at D, and this sealing medium enters intimately into the formation of the seam and cooperates with the impingement of the metal closure upon the non-metallic stock to effect and insure hermetically tight sealing and prevent escape or intrusion within the container or receptacle of either fluid or gas. The final step of forming the double seam, which in the main corresponds with standard practice with regard to containers or receptacles with metallic bodies, is shown in Fig. 6, with respect to the closure B, a suitable seaming roll 18 being applied to the partially completed seam produced as shown in Fig. 5.

It will be noted that in the forming of this double seam there is another departure from standard metallic body and metallic closure seaming, and that is that there is a material compression of the non-metallic material of the container or receptacle body and that compression produces a most intimate contact throughout the enter-engaging parts and portions of the seam which, even without the sealing material B, insures an especially and effectively tight joint, and which is not as capable of accomplishment in the use of metal against metal where there is always the possibility or surface channeling or failure in intimate contact. This statement is borne out by the fact that in the use of metal-to-metal closing of containers and receptacles, testing of the tightness of the seaming is required, and it is believed that such testing may be dispensed with in the use of non-metallic and metallic mating of materials in accordance with the present invention.

It is believed that for the first time the present invention, either with or without the general or special provisions as to material set down in said companion application, it is possible to provide a closed container or receptacle which will be utterly impervious to fluid or gas, both with respect to the body portion and likewise the closures. It is not clear that metallic bodies of this character are ever entirely impervious, for always there is the tendency of the less dense outer air and the more dense inner contents, if fluid or semi-fluid, to come to the balance of density and if there be only the slightest permeability of the container or receptacle, this action may result in deterioration of the contents. To secure this result the practice of lacquering the end closures as an extra precaution against permeation or penetration may be resorted to. In all events, the particular make-up and cooperation of parts and features and materials of the non-metallic body and the metallic closures in the seams uniting same, results in those zones in the most complete insurance against leakage of any nature.

In Figs. 8 to 12, inclusive, is shown the method of and steps in forming the closure C with its body portion c, the double seaming performance being somewhat varied by inseting the end portion of the preferably laminated body portion a of the body A, which is done by the use of a suitable roll 19 exteriorly applied and a mating roll 20 interiorly applied, the result of this step being shown in Fig. 9. In Fig. 10 there is shown applied the closure body c, which is suitably provide with an outwardly ranging flange 21 having

a curled edge portion 22, producing a formation into which the body formation as shown in Fig. 9 is inserted, annularly, and then a chuck 23 is applied within the closure body c and a seaming roll or ring 24 is applied to the formation and arrangement as indicated in Fig. 10, and the resultant double seam shown in Figs. 7 and 8 is finally provided by another seaming roller or die 25 producing finally the completed and impervious double seam C shown in Figs. 1, at the bottom, and 7.

It will be understood that the same sealing means or material B as shown in Figs. 3 and 4 is preferably applied to the marginal portions of the laminae 15 of the body portion a, and as shown in Fig. 4 and in Fig. 10, this sealing means accommodates slight relative displacement between the marginal portions of the laminae in formation of the same, the sealing still remaining intact.

In its broader aspects, the invention relates to union, by seaming, of various objects, parts and members with tightness and imperviousness, and is not limited to containers and closures.

It is further to be understood that my invention contemplates such variations in dimensions of material as may be required or desired or preferred for purposes of strengthening or reinforcement or to produce definite annular or other enlargements contributing to the inherent strength and stress resistance of the structure.

The method of operation and procedure incident to the seaming together or uniting of the body A and closures B and C having been referred to in its various aspects in accordance with both standard and modified or altered practice, a resume of all such procedure is not deemed necessary. It is to be pointed out that the in-

vention is not to be limited to any particular kind of non-metallic body or particular kind of metallic closure or closures, or particular and specific character of seam between the same; and that various modifications and alterations and substitutions may be made in departure from the foregoing description and the drawings in adapting the invention to varying conditions of use and service without departing from the spirit of the invention.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A container of the character described, comprising a non-metallic body of laminated structure having a crimped in-set margin, a metallic container closure, said container closure having a flange adjacent its outer edge, the in-set end of the peripheral margin of said body being coated with a fluent sealing material, said in-set end of the peripheral margin of said body being compressed within a convolution of said flange to produce a double compressive distortion of said peripheral margin.

2. A container of the character described, comprising a non-metallic body of laminated structure having a crimped in-set margin, a metallic container closure, said container closure having a flange adjacent its outer edge, the in-set end of the peripheral margin of said body being coated with a fluent sealing material, said in-set end of the peripheral margin of said body being compressed within a convolution of said flange to produce a double compressive distortion of said peripheral margin, the outer surface of said convolution of said flange being within the geometrical contour of the main portion of said body.

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