No. 684,986. Patented Oct. 22, 1901.

C. M. HIGGINS.

COLLAPSIBLE CAN OR TUBE.

(Application filed Jan. 11, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 6.

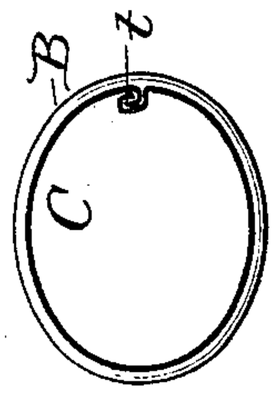


Fig. 7.

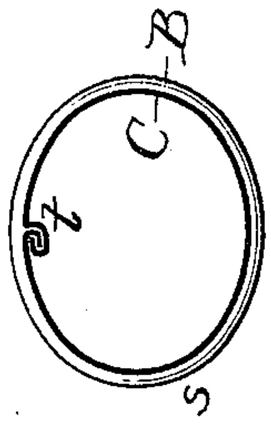


Fig. 8.

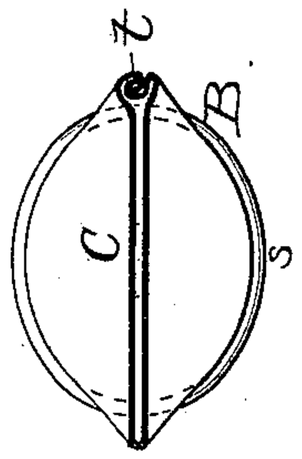


Fig. 5.

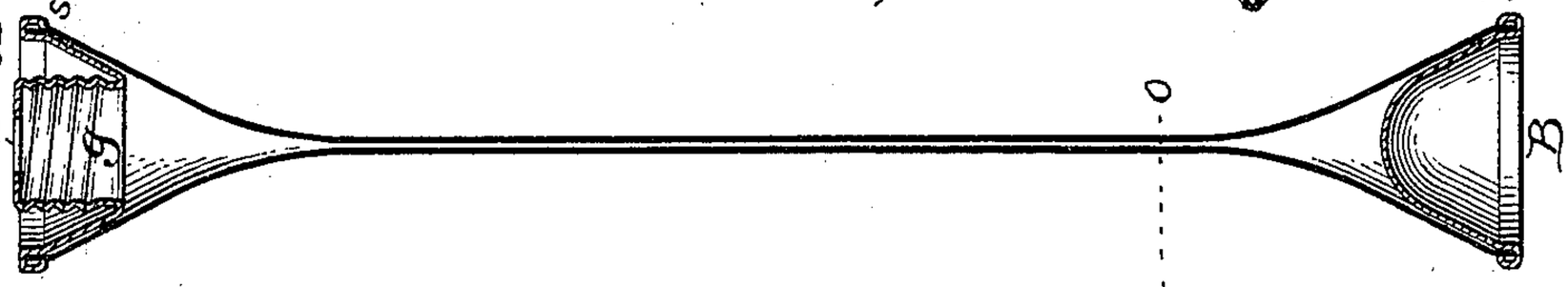


Fig. 4.

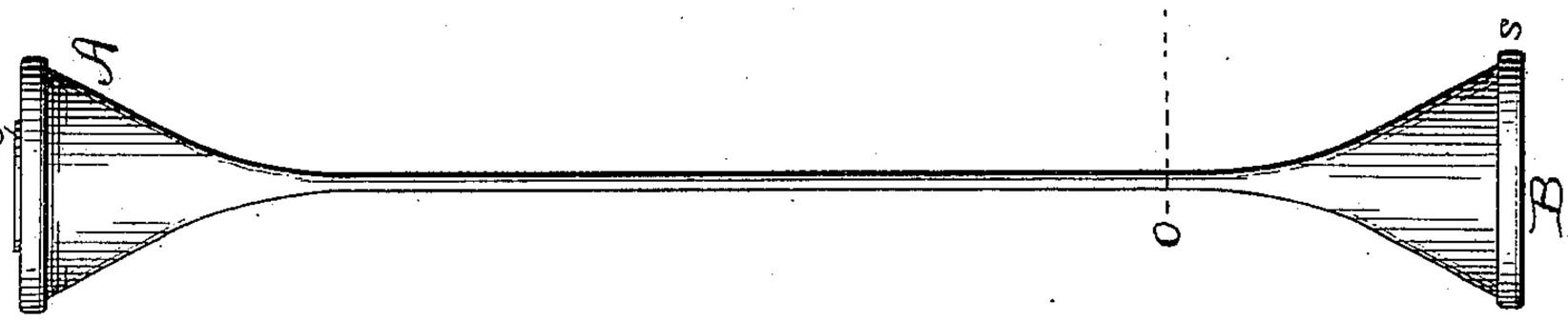


Fig. 3.

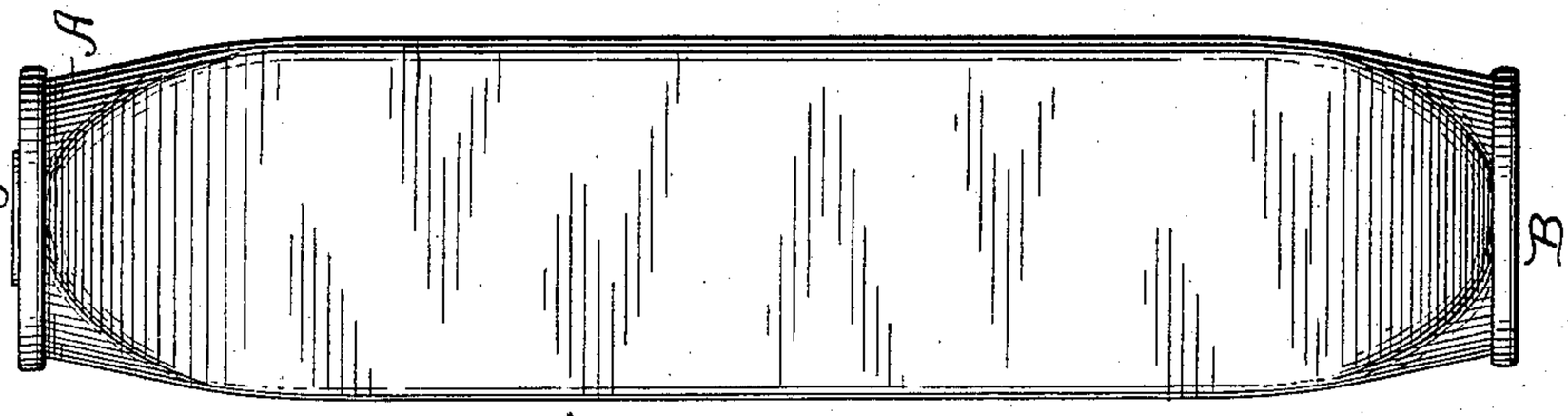


Fig. 2.

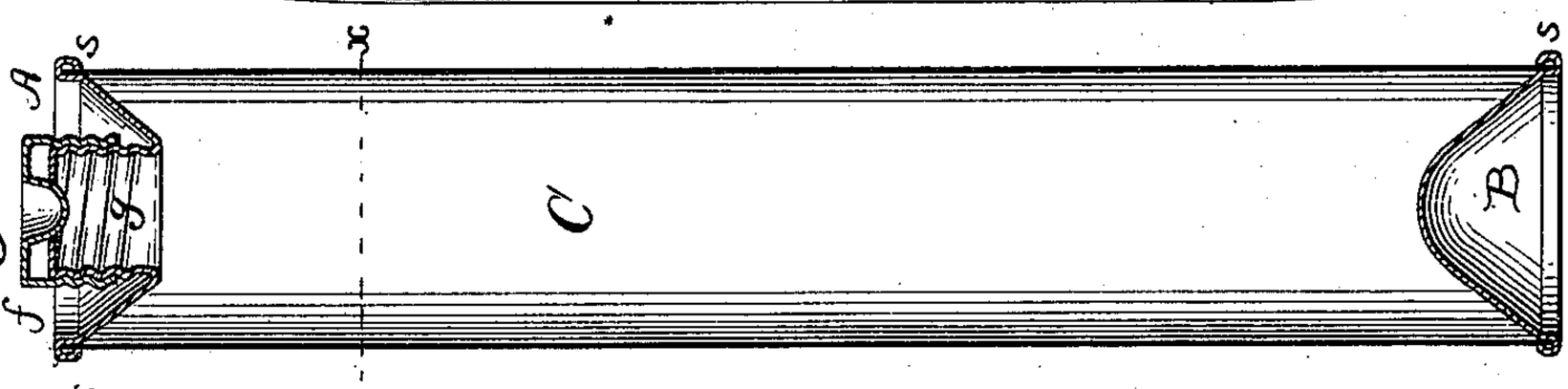
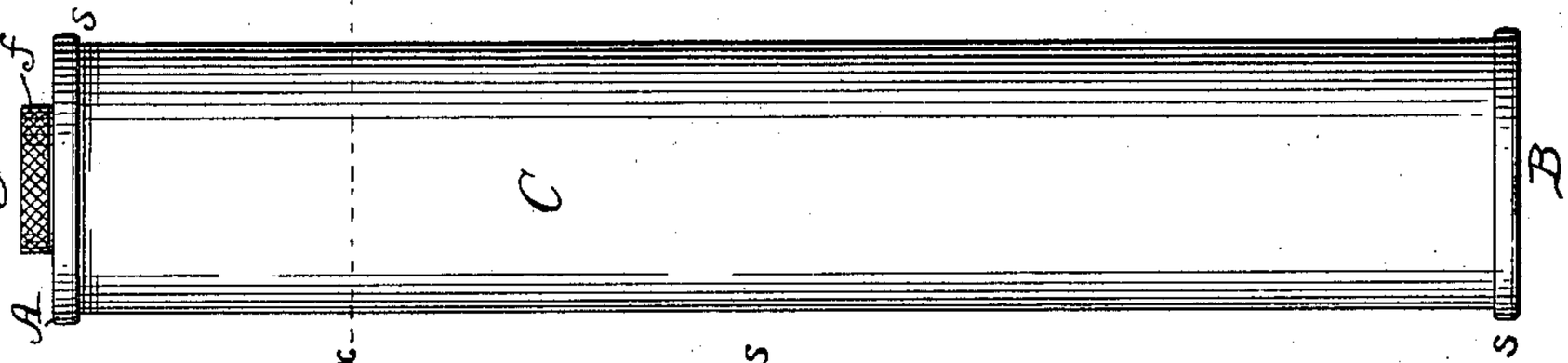
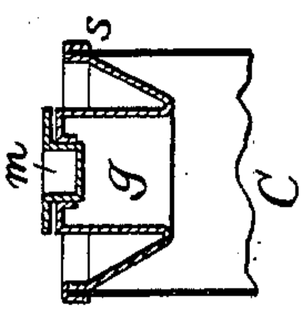


Fig. 1.



Attest:
A. N. Jesbera.
Thos. E. Robertson

Fig. 9.



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No. 684,986. Patented Oct. 22, 1901.

C. M. HIGGINS.

COLLAPSIBLE CAN OR TUBE.

(Application filed Jan. 11, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 10.

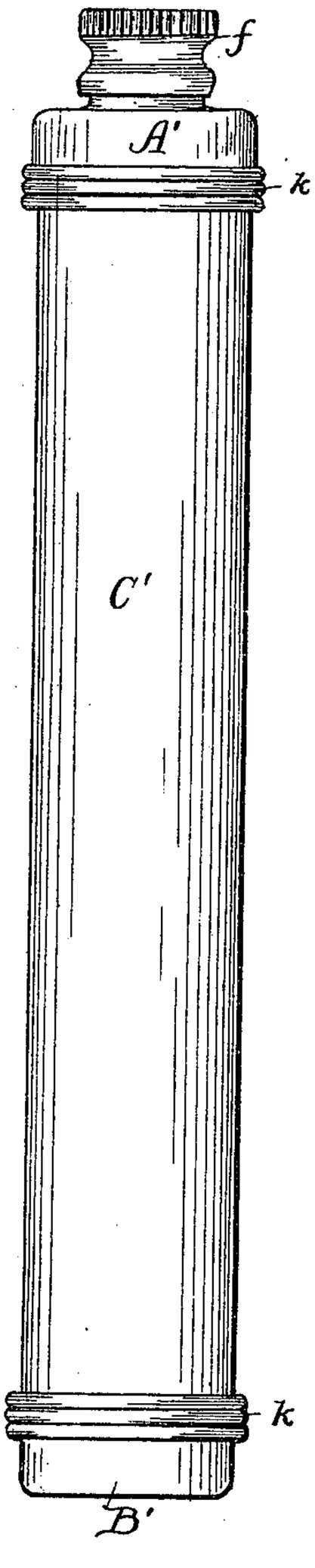
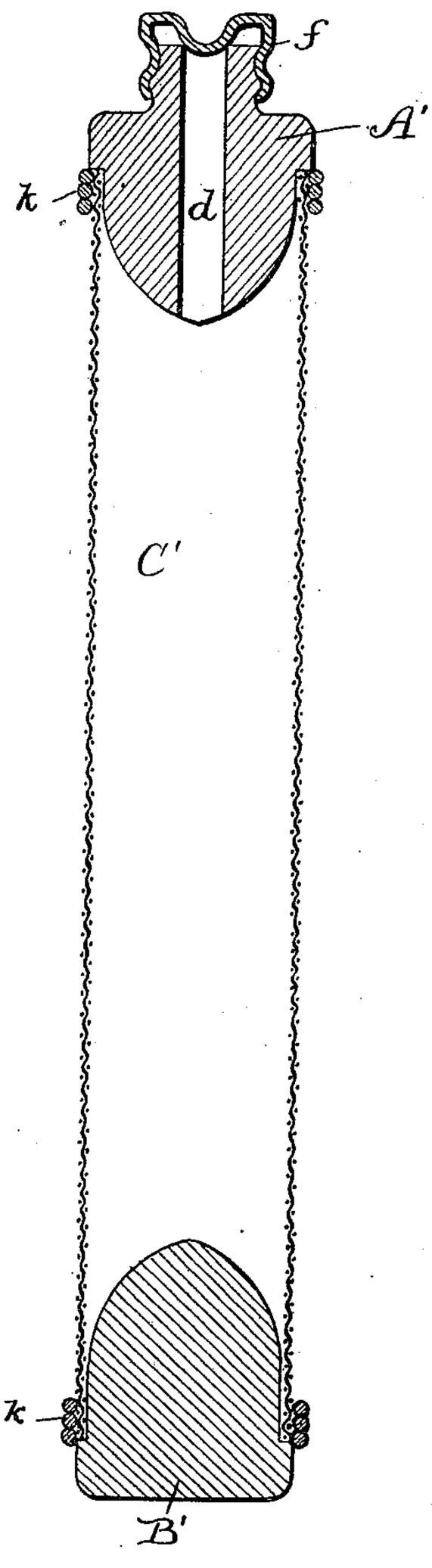


Fig. 11.



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UNITED STATES PATENT OFFICE.

CHARLES M. HIGGINS, OF BROOKLYN, NEW YORK.

COLLAPSIBLE CAN OR TUBE.

SPECIFICATION forming part of Letters Patent No. 684,986, dated October 22, 1901.

Application filed January 11, 1899. Serial No. 701,845. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HIGGINS, a citizen of the United States, residing at Brooklyn, in the city and State of New York, have invented a certain new and useful Improvement in Collapsible Cans or Tubes, of which the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to produce an improved form of collapsible can or tube for holding pasty or semifluid substances—such as paints, adhesive pastes, &c.—which shall be cheaper to manufacture and shall possess greater capacity and a more regular form and which shall admit of a better labeling and more ornamental treatment than those heretofore produced.

The ordinary collapsible tube in common use is made from soft metal or pure tin drawn in one piece, having a thick head at one end provided with a screw-cap at that end and left entirely open and headless at the opposite end. The tube is filled through this headless open end, and this end is afterward closed by pinching the walls of the tube together in a flat form and then bending or folding the flattened end over and over to form a tight closure. Another form of tube has been made of hard metal in very thin plates capable of being collapsed; but this tube has been likewise formed with a head only at one end, the opposite end of the tube tapering to the form of a thin flat wedge, which is likewise folded over and sealed at the flat tip or closure. The objection to the soft-metal tube is that the pure tin of which it is made renders it comparatively expensive, and, furthermore, this metal is very difficult to label, as ordinary adhesives do not perfectly adhere to it, and it cannot be printed upon directly, as is the case with vessels produced from decorated tin-plate made in flat sheets. The objection to the wedge-shaped tube of hard metal is that having a head at only one end and tapering rapidly to a thin edge at the opposite extremity its capacity is very limited and it holds very little for its outside dimensions. Both tubes have the further objection of being troublesome to fill and seal at the sealing ends and of being irregular and unfinished in shape at said end.

Now in my improvement I form a collapsible can or tube with a broad and rigid head at each end of similar size and with practically parallel sides of flexible collapsible material, thus producing a tube of great capacity, and I preferably form the heads at each end so that they are of conical or indented form protruding inwardly, so that when the sides of the tube are collapsed by squeezing or flattening the same there will be no waste places left within the collapsed tube; but practically all the contents will be forced out of the discharge-orifice. One of the said rigid heads is preferably made imperforate, forming a closed bottom to the tube The other head contains the discharge-orifice, through which the tube is also filled, and this orifice is provided with a removable screw-cap to form a tight closure thereto. The walls of the tube are preferably formed of very thin but tough tin-plate or taggers tin, which is printed or decorated with any desired label matter or ornamentation while in flat sheets, and this is then cut and seamed into tubular form and seamed onto the rigid heads in the usual manner of making sheet-metal cans; but instead of tin-plate the sides may be made of soft brass, heavy tin-foil, cloth, rubber, paper, or other fibrous or flexible material. By these combined features a collapsible tube is finally produced at comparatively small cost having great capacity, a very regular form and a finished appearance, and whose filling and sealing are very convenient and whose labeling is most durable and attractive.

My invention therefore consists, mainly, in the features above outlined, as hereinafter fully set forth.

In the drawings, Figure 1 is a longitudinal elevation of my improved collapsible tube in its normal state. Fig. 2 is a longitudinal section of the same. Fig. 3 is an elevation of the tube fully collapsed or flattened with all its contents forced out, and Fig. 4 is an edge view of the same. Fig. 5 is a vertical section of Fig. 4. Fig. 6 is a cross-section on the line *x x* of Figs. 1 and 2. Fig. 7 is a similar cross-section showing the longitudinal joint or seam in a different position from Fig. 6. Fig. 8 is a cross-section of the flattened tube on line *o o* of Figs. 4 and 5. Fig. 9 is a fragmentary section showing a variation in

the seal or closure. Figs. 10 and 11 are longitudinal views of a modification having solid wooden heads and a tubular side or body of cloth or other flexible material, Fig. 10 being an elevation and Fig. 11 a section.

In the drawings, A B C indicate my improved collapsible tube or can, A B being the heads or ends, and C the sides or body. According to my invention the top and bottom heads A B are formed broad, or the full size of the body, or somewhat larger, and both are preferably of the same size, and they are preferably formed quite stiff and rigid of some strong or rigid material. The sides or body C, however, are formed in the shape of a tube substantially straight or parallel sided and preferably of an oval cross-section, as shown in Figs. 6 and 7, and of some flexible or collapsible material capable of readily yielding, bending, or collapsing under digital pressure. This flexible or collapsible tubular body C is secured at each end by a water-tight joint or seam to the heads A B, as fully shown in section of Figs. 2 and 3, thus forming a completely-inclosed tubular flask or can. The lower head B is preferably imperforate or solid, forming a closed bottom, while the upper head A is formed with an orifice *d*, through which the tube may be filled and emptied, as will be understood on reference to Figs. 2, 5, and 9. This orifice *d* is formed in a screw-neck *g*, projecting from the head A, and may be closed by a screw-cap *f*, as shown in Fig. 2, which screws onto the screw-neck *g*. Instead of the screw-cap a friction-plug *m* may be used to close the orifice *d*, as shown in Fig. 9, or any other removable closure may be used, as will be understood. It will therefore be seen on referring to Fig. 2 that when the screw cap or closure *f* is removed the tube can be readily filled with the desired material through said orifice *d*, and the tube can then be sealed by replacing the screw-cap. When it is desired to remove some of the contents, it is only necessary to remove the screw-cap and squeeze the sides of the tube between the fingers, when the flexible material will yield to the digital pressure, thus partly collapsing the tube and forcing some of the contained material out of the orifice. When sufficient has thus been ejected, the cap may be again replaced to seal the tube, and thus keep its contents fresh and good for any indefinite time and intact until again required, as will be readily understood. By continued and repeated pressure it will be seen that the entire tubular body may be finally completely collapsed and flattened until the opposite sides are brought together and the entire (or practically the entire) contents have been forced out, as shown in Figs. 4, 5, and 8, thus exhausting the tube.

It will now be noted that the broad rigid heads at each end, with the tubular flexible straight-sided body between them, give the tube a very regular form, which enables it to rest either on its side, as in Figs. 6, 7, and 8, or to stand upright on its base, as in Figs. 1, 2, and 3, which is not the case with a tube of wedging form at the base. Furthermore, this parallel-sided collapsible body, with the broad rigid ends, produces a tube of great capacity for its outside dimensions, which is a great advantage over the wedge-shaped tube of limited capacity, as will be readily appreciated. As shown in Figs. 2, 5, and 9, I prefer to make the heads or ends A B of a flattened conical or indented form, protruding inwardly in order to reduce the waste spaces that necessarily exist at each end when the flexible sides are collapsed, as will be understood from Figs. 4 and 5. By this device it will be seen that the conical or flattened conical heads conform to the shape assumed by the ends of the tubular body when collapsed, and thus occupy nearly all the space at the uncollapsible extremity of each end of the tubular body, and thus practically reduces the waste of space to insignificance, and thereby prevents waste or loss of the contents, as will be understood, thus enabling practically the entire contents to be squeezed out of the tube. It will be also seen on reference to Fig. 5 that this feature of the indented head prevents excessive strain on the joint or seam between the sides and the bottom, as it limits the collapsing of the tubular side at this point, and thus prevents the tearing or opening of the seam, as would otherwise be more likely to occur. I prefer to make the heads A B of sheet metal, preferably stiff or hard metal, struck up in the form shown, and it will be seen that a further advantage of the conical or indented form is that the head is thus thereby made much stiffer or more rigid than it would be if left flat. It will be seen that each head is formed with an upturned grooved rim *s*, in which the ends of the tubular sides C are received as in a socket, and thereby tightly held by squeezing or rolling the grooved rim until it tightly embraces the interposed ends of the body, thus making a tight joint or seam in a well-known manner used in the manufacture of cans. The flexible tubular body C is preferably formed from taggers tin, soft brass, heavy tin-foil, or sheet-lead, which is first cut in flat sheets of the desired size and then rolled into tubular form, and the longitudinal edges are then joined together with a tight seam of usual form, as shown in Figs. 6 and 7, after which this seamed tube is joined to the heads A B, as already described and shown in Figs. 2 and 5. In the case of an oval tube the longitudinal seam *t* may be either on the edge at the long end of the oval, as seen in Fig. 6, or on the side of the short side of the oval, as in Fig. 7.

Before the sheet metal is cut and formed into the tubes, as described, it may be enameled and decorated and provided with any desired label matter in colors, so that when the tube is finished, as seen in Fig. 1, it will be labeled and ornamented in a very attractive and permanent manner, requiring no subse-

quent attachment of loose labels by pasting or otherwise. This is a great advantage over the drawn-tin tube, which cannot be labeled by direct printing and to which it is difficult to paste a separate label and which is very liable to subsequently get loose and fall off. In addition to this advantage of permanent and ornamental labeling and decoration my improved tube not only presents a much better and more salable appearance, but its cost is less than the separately-labeled drawn tube. A further advantage of the improved tube over the drawn-tin tube is that the improved tube has only a seal or closure at one end, whereas the drawn tube has a seal or closure at both ends, the lower one of which is a very large joint and quite subject to becoming accidentally relaxed and leaky, which is entirely obviated in my construction.

Instead of using soft flexible sheet-metal sides with the metallic heads or ends A B the flexible sides or body may be formed of a tube of cloth enameled or otherwise treated to be impervious, or it may be made of vulcanized rubber, paper saturated with some impervious material, or any other flexible material capable of being collapsed or readily yielding to digital pressure. This fibrous tube may be clamped or seamed into the grooved rims *s* of the metallic heads A B in the same manner as are the metal sides shown in Figs. 2, 5, and 9. In some cases, however, I prefer to use solid wooden heads to close the ends of the fibrous tube, as shown in Figs. 10 and 11. In these figures C′ is the tube, of cloth or other fibrous material, and A′ B′ the wooden or non-metallic heads. The lower head is imperforate, as before, and the upper head is provided with an orifice *d* and a screw-cap *f*. The heads are conical or tapering, with a protrusion inward, with the same effect as shown in the other figures. These wooden heads may be cemented in the tubes, or the tube may be bound onto the heads by a wire or other binding, as indicated at *k*, or secured in any other suitable manner.

While the details of the construction of my improved tube may be varied, as described, without departing from the main feature of construction, yet I prefer to make the tube with stiff or rigid metallic ends or heads of, say, hard brass or tin-plate, the tubular body being preferably formed of soft brass, sheet-lead, thick tin-foil, or other sheet metal much softer or more flexible than the heads and easily collapsible to digital pressure, as this will form a tube which will be particularly strong, ornamental, and durable, and yet very easily collapsed, as will be understood.

What I claim as my invention is—

1. An improved collapsible tube or can, consisting of a body-section C made of a sheet of thin yielding metal formed into a tube with a longitudinal seam *t* in combination with the rigid or unyielding heads A B struck up out of relatively thicker or stiffer metal and united with the collapsible body-section C by the seams *s s*, substantially as and for the purpose set forth.

2. An improved collapsible metallic tube formed of the following elements, to wit: the collapsible body-section C formed of thin sheet metal with longitudinal seam *t* in combination with the rigid or metallic head A formed with aperture *d* and stopper *f* and uniting seam *s*, and the rigid metallic bottom B with uniting seam *s*, substantially as and for the purpose set forth.

3. In a collapsible tube or can, the combination with a tubular collapsible body such as C of a head or end such as B having a conical or tapering form protruding inwardly, substantially as and for the purpose set forth.

4. A collapsible tube or can formed of a tubular collapsible body of soft or yielding material adapted to yield or collapse under digital pressure, separate heads of stiff or rigid material seamed into each end of the yielding collapsible body, one of said heads having a conical or tapering form protruding inwardly, substantially as and for the purpose set forth.

In testimony whereof I affix my signature, in the presence of two witnesses, this 10th day of January, 1899.

CHARLES M. HIGGINS.

Witnesses:
WILLIAM J. DRIVER,
JNO. E. GAVIN.