

No. 610,398.

Patented Sept. 6, 1898.

H. GOODWIN.

DEVICE FOR MANUFACTURING COMPRESSIBLE TUBES.

(Application filed Dec. 30, 1895.)

(No Model.)

2 Sheets—Sheet 1.

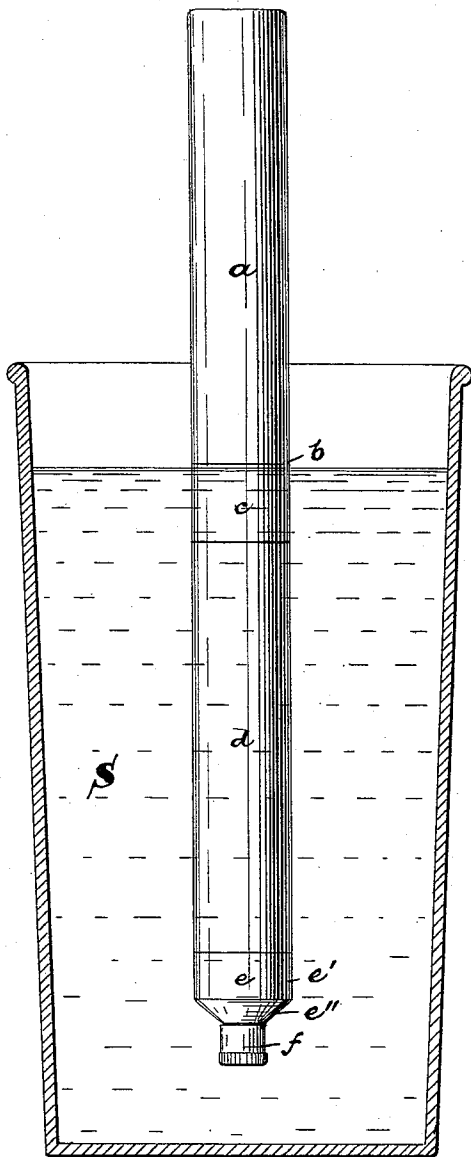


Fig. 1.

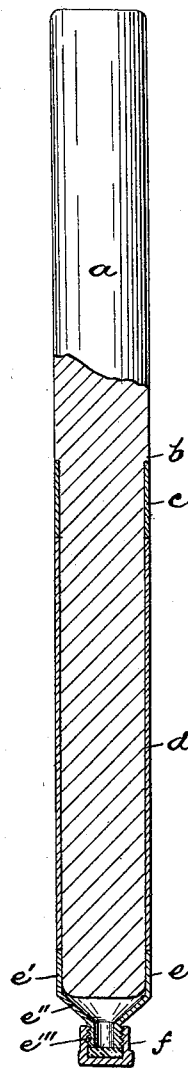


Fig. 2.

WITNESSES:

Robert Sallberger
C. B. Pitney.

INVENTOR.

Hannibal Goodwin,
BY *Drake & Co.* ATTY'S.

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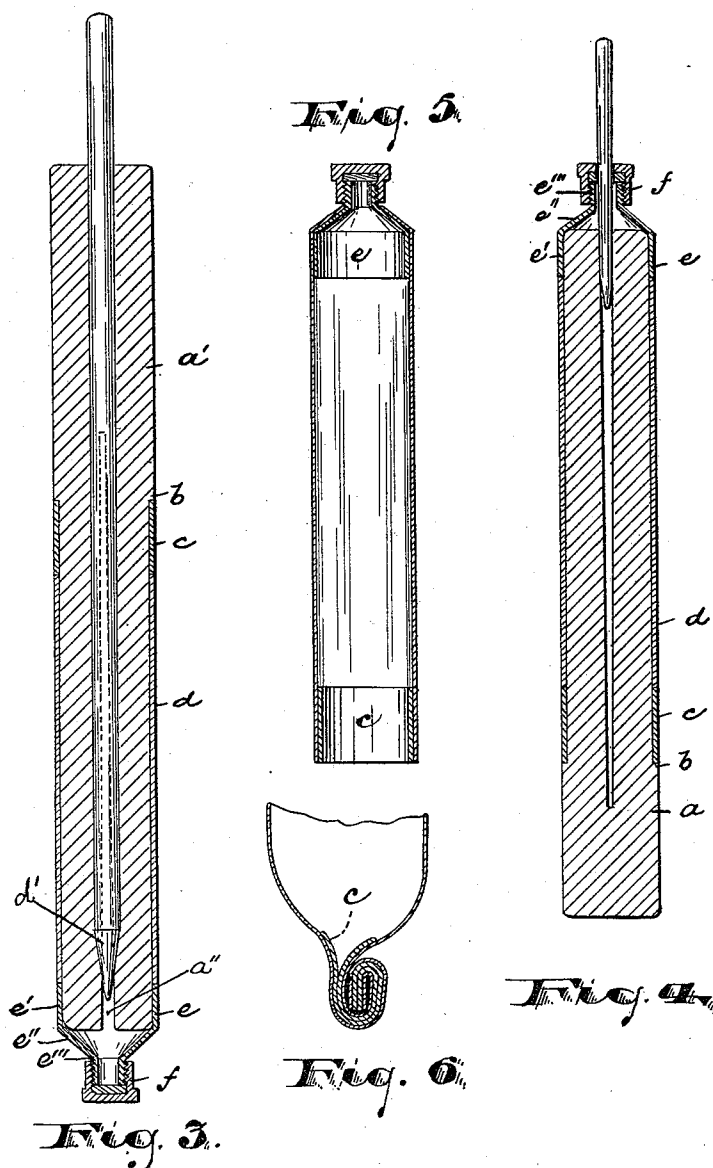
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UNITED STATES PATENT OFFICE.

HANNIBAL GOODWIN, OF NEWARK, NEW JERSEY.

DEVICE FOR MANUFACTURING COMPRESSIBLE TUBES.

SPECIFICATION forming part of Letters Patent No. 610,398, dated September 6, 1898.

Application filed December 30, 1895. Serial No. 573,783. (No model.)

To all whom it may concern:

Be it known that I, HANNIBAL GOODWIN, 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 Devices for the Manufacture of Compressible Tubes; 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

15 The object of this invention is to facilitate and improve the manufacture of that class of tubes for holding either liquid or viscid substances employed for toilet, industrial, or other purposes which are translucent to admit of the contents being seen and flexible or compressible to enable the contents to be easily ejected.

The collapsible tubes heretofore usually employed have consisted ordinarily of metal, 25 such as tin; but possessing all the opacity of metal they not only concealed the nature or color of their contents and the exact amount of the contents that remain after a portion had been discharged, but they soon became tarnished and too unsightly to occupy a place among other usual toilet articles. My invention relates more particularly to a class in which the tubes are not only collapsible or compressible, but transparent or translucent.

35 The tube resulting from employing the means of manufacture herein described possesses itself features of novelty which will form the subject of an application for a patent. The present case is intended to describe and claim 40 the means of manufacture.

The invention therefore consists in the improved means employed in the manufacture of translucent, collapsible, or compressible tubes and in the arrangements and combinations of parts, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate 50 corresponding parts in each of the views, Figure 1 is a sectional view of a vessel containing a solution or liquid, which when

spread in thin films and evaporated will leave a transparent or translucent flexible residual pellicle, a former of peculiar construction being shown in side elevation dipped within said liquid. Fig. 2 is a sectional view of said former, and Figs. 3 and 4 are similar sectional views showing details of construction that are preferred under certain conditions. Fig. 5 is a sectional view of the tube after removal from the form, and Fig. 6 shows the lower folded end of said tube.

As to the material and general structure of the tube, it is of a cellulosidal nature, with top and bottom end pieces, preferably of metal such as commonly employed in collapsible tubes—that is to say, the top piece has its nozzle and cap, and the bottom end piece is adapted for folding in order to close up the bottom of the tube and seal its contents, as well as to roll up the tube in order to press forward and out the contents from the nozzle of the upper end piece.

In carrying out the invention I provide a supporter *a*, consisting of wood or other suitable material, which is provided with a slight shoulder *b* to serve as a stop for the lower ring-like end piece *c* of the tube. Below the shoulder the smaller or reduced part of the supporter is preferably cylindrical and of uniform diameter to the end. Said end piece *c* fits closely upon the reduced portion of the supporter against said shoulder *b*, so that little or no liquid can flow between the joints and so that said end piece will be held in place by friction. I next apply to the reduced portion of the supporter a form *d*, comprising a tube, which corresponds in diameter with the end piece *c* and abuts against the end of the same. It extends from said end piece toward the extremity of the support, but terminates short of said extremity, so that said supporter will project outwardly three-eighths of an inch, more or less, from said forming tube to receive the opposite end piece *e*. The enlarged part *e'* of the end piece *e* corresponds in diameter with the diameters of the tubular form and end piece *c*, and thus fits snugly upon the end of the reduced part of the cylindrical supporter and abuts against the end of the tubular form, being held in place by friction. The end piece *e* is provided with a shoulder *e''* and at the end oppo-

site the enlarged part *e'* with a nozzle *e''*. Said nozzle is preferably threaded to receive the cap *f*, the last being correspondingly threaded to admit of removal from and application to said nozzle. The parts being in place, I have now on the supporter three sections *c d e* ready to be dipped into the liquid or solution *s*, the combined length of which parts is to be the length of the finished tube. For obtaining a more perfect and secure contact between the above-named supporter and the three sections applied thereto I may and in some cases prefer to use a slit or slotted supporter capable of being expanded by a wedge, as shown in Fig. 3, the wedge in this case extending through an axial perforation opening through the handle *a'* and the slit or saw-cut *a''* opening from the opposite end. Within the axial perforation or bore, at the split end thereof, I form a shoulder *d'*, as shown in Fig. 3, to be engaged by the wedge and enable the support to be expanded into holding contact with the end piece *e*, or I may employ a slotted supporter capable of being expanded by a wedge which passes through a specially-prepared cap and also through the nozzle of the upper end piece, all as shown in Fig. 4. With either of the above arrangements the projecting end of the wedge may be employed in suspending the tube forming apparatus during the process of immersion, dripping, and drying. I next immerse the supporter thus surrounded with the sections of the tube and the intermediate forming tube into the liquid. This is a solution of pyroxylin having the properties desired for the purpose. I then raise the said supporter again, with a thin film of liquid adhering. Allowing the excess of solution to drain back, I then suspend it in the open air and evaporate the solvent from said pyroxylin solution till the pyroxylin pellicle enveloping the combined outer surfaces of the form and end pieces is consolidated and dried. I next withdraw the supporter and leave behind an open-ended tube consisting of the two end pieces and the intermediate tubular form, all covered exteriorly with the film of pyroxylin, serving as a binder. I next collapse or compress the central tubular form *d* and detach it from the pyroxylin film with which it is surrounded and remove it through the open end piece *c*. The forming tube is preferably of thin flexible tin or similar metal or other suitable material capable of collapsing and is thus readily collapsed after the withdrawal of the supporter and again brought into proper and smooth cylindrical form by the reinsertion of the former. To facilitate this detachment and removal, I may employ divers means. For example, I may make the central section *d* non-adhesive by

smearing it with mineral wax; but my preferred method is to immerse in water, which will prepare the central section when properly pressed to be easily detached and removed. As a result we have a detached tube provided with top and bottom metallic end pieces, the body of the tube being formed, essentially, of pyroxylin, strong, flexible, insoluble in a majority of chemical agents, non-expansible and non-contractile and non-fusible by strong heat, the same being inert and imparting nothing deleterious to the contents of the tube and capable of having imparted to it every variety of tint, the said body portion being, furthermore, as brilliant as glass while about as pliant as leather and of unflinching translucency and the said pyroxylin extending over the end pieces. The lower metallic end piece *c*, with its covering of dry or substantially dry or hardened pyroxylin, is then folded in the manner common in all metal tubes, the metal serving as a binder for the pyroxylin and closing the end with great firmness without the use of cement. The pyroxylin may then be cut where it covers the joint at the lower end of the cap *f*, said cap may be removed and a new one uncovered with pyroxylin or celluloid may be applied, or the film of matter covering said cap may be stripped therefrom, after which the device is ready for the market or to be filled with artists' colors or other matter.

Having thus described the invention, what I claim as new is—

1. The combination with a supporter having a shoulder for limiting the endwise movement and gaging the position of the applied parts when placing the same upon the form-receiving portion of said supporter, of a form, of tubular shape to fit upon said form-receiving portion, and in length shorter than said form-receiving portion to permit the opposite tube end pieces to be arranged on said portion at opposite ends of the form and in alignment with said form, substantially as set forth.

2. The combination with the supporter having a shoulder or stop projecting from its periphery and a form-receiving portion at one side of said shoulder, of a form comprising a longitudinally seamless or unjointed piece of collapsible material formed to fit said form-receiving portion and shorter in length than said portion and end pieces of the tube to be applied to said portion at opposite ends of the form, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of October, 1895.

HANNIBAL GOODWIN.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.