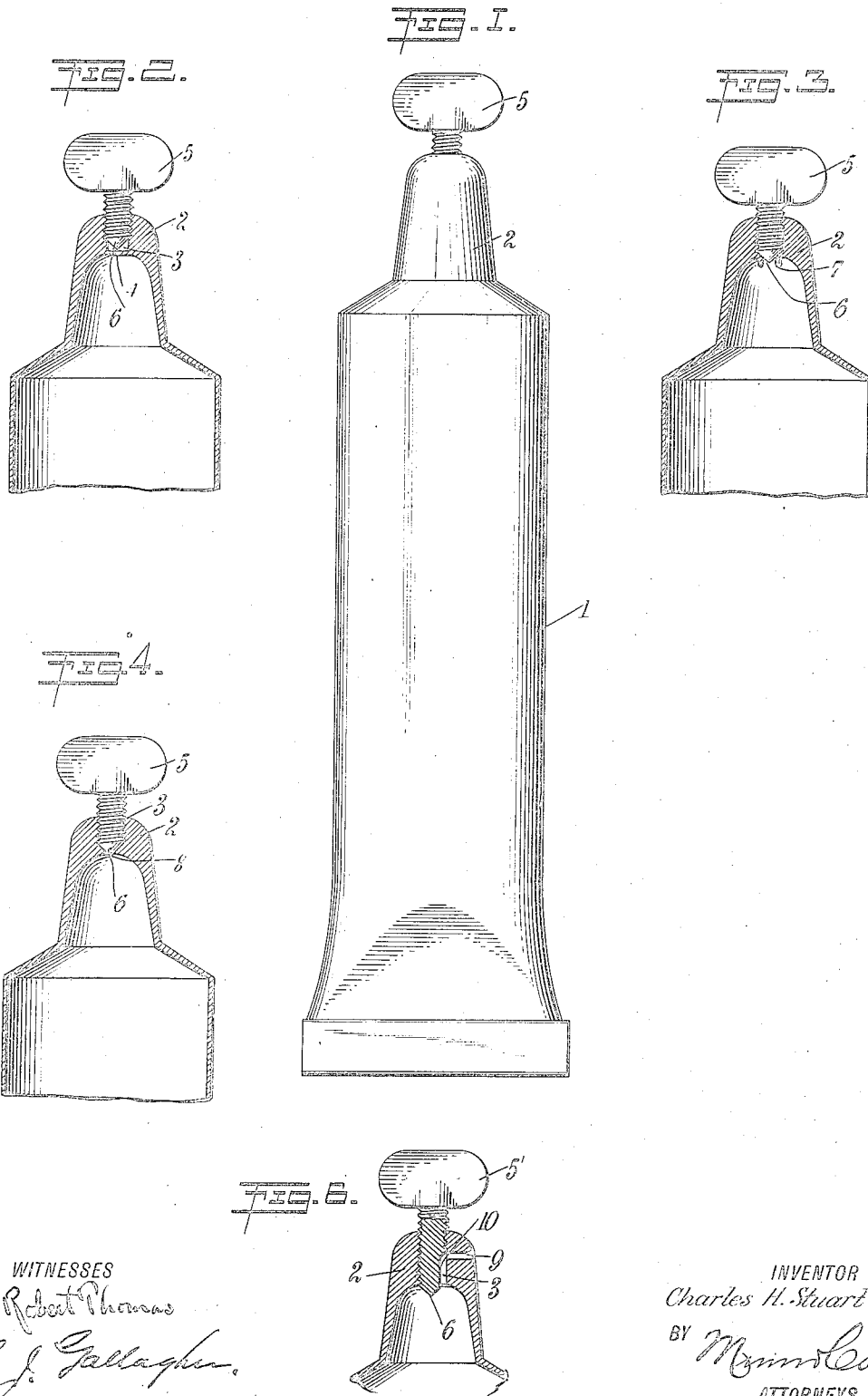


C. H. STUART.
COLLAPSIBLE TUBE.
APPLICATION FILED NOV. 15, 1911.

1,045,629.

Patented Nov. 26, 1912.



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CHARLES HENRY STUART, OF NEWARK, NEW YORK.

COLLAPSIBLE TUBE.

1,045,629.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed November 15, 1911. Serial No. 630,315.

To all whom it may concern:

Be it known that I, CHARLES H. STUART, a citizen of the United States, and a resident of Newark, in the county of Wayne and State of New York, have invented a new and Improved Collapsible Tube, of which the following is a full, clear, and exact description.

The invention relates to tubes formed of soft metal, such as tin, and adapted to be gradually collapsed from the rear end to force out the contents.

The object of my invention is to provide a tube having an outlet neck, and a closure therefor, so formed and arranged that the closure will have a tight fit at all times in the outlet orifice of the neck, and will not become loosened by repeated insertion and removal.

I have found that when threaded closures are employed to engage the wall of the outlet orifice of a collapsible tube, if the bore of the outlet is of the same diameter throughout, the threaded closure becomes loose after being inserted once or twice, and I have found furthermore, that even with the employment of a screw of larger diameter than the one that has become loose, it will not remain tight in the orifice, but will in turn become loose and permit leakage of the contents past the closure. I find however, that I am enabled to effect a tight closure by means of a threaded closing device, preferably in the form of a thumbscrew, if I provide a diaphragm originally forming a complete closure of the outlet orifice, and to be punctured by a thumbscrew of such a length as to be forced through the diaphragm. In this case the material at the punctured diaphragm appears to retain a form, leaving an engaging portion for the threads of the spindle, which repeatedly takes tight hold of the threads and is not pressed back into the body of the neck. It is necessary, also, that the diaphragm be very thin, because if given a substantial body it will have such a resistance to the advancing screw as to be compressed laterally into the material of the body of the neck, or bodily forced entirely away from the inner end of the outlet orifice, and will not bind against the thread and grip the same tightly, as will a thin diaphragm. The diaphragm may be located at the inner end of the outlet orifice, or a sufficient distance from the outer end to permit the thumb-

screw to cut initial threads in the neck to guide the screw. In any case there is sufficient neck portion outside the diaphragm to sustain the thumbscrew in the original package and outside of the diaphragm without cutting its way through the said diaphragm until the purchaser comes into possession of the tube and desires to puncture the diaphragm to permit discharge of the contents.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a collapsible tube embodying my invention; Fig. 2 is a vertical section of the upper portion of the tube showing the thumbscrew in place and before the diaphragm is punctured; Fig. 3 is a view similar to Fig. 2, but showing the thumbscrew in the act of puncturing the diaphragm; and Fig. 4 is a vertical section of the upper portion of the tube, with the thumbscrew in place, the figure being given to illustrate a modification in which, if the parts be proportional, they may be to give in a measurably practical degree, the advantages of the diaphragm shown in the other figures.

The body 1 of the tube is provided with a neck 2 of any desired exterior conformation, and in the outer end of said neck, centrally thereof, is a bore 3 extending axially of the neck, and forming in practice the outlet orifice of the tube. Extending across the bore 3 is a very thin diaphragm 4, which may form a complete closure of the bore 3 when the tube is made up, or have a minute orifice as indicated at 8 in Fig. 4.

In connection with the tube and neck thus formed I employ a screw 5, preferably a thumbscrew, which has a conical forward end 6. The screw 5 is inserted in the bore 3, cutting its own threads for a sufficient distance to maintain the screw in position without forcing its conical end 6 through the diaphragm, and in this form the tube is marketed. When the purchaser desires to use the contents of the tube the screw 5 is turned to advance its conical forward end and its threaded portion in the bore 3, to puncture the diaphragm, as indicated at 7 in Fig. 3. Then the screw is advanced farther, to cause the inner end of its threaded portion to pass through the diaphragm and

engage the edge 7, defining the reduced portion of the bore 3. When the thumbscrew is turned back to open the bore 3 and permit the escape of the contents of the tube, the edge 7 produced by the punctured diaphragm will flex with the threads, while hugging the threads closely. I find in practice, that if the diaphragm is made very thin, the edge 7 of the punctured diaphragm will not be forced entirely away from the bore 3, nor will it be compressed into the material forming the wall of the bore.

It is understood, of course, that the upper end of the neck in which the bore 3 is formed, has sufficient body to offer resistance to the screw, so that the relatively thin diaphragm will alone be punctured by the screw without a bodily distortion of the neck, the solid portion of the neck forming a support for the edge portions formed by the punctured diaphragm.

In Fig. 4, the diaphragm has a minute orifice 8 formed originally therein, which is closed by the conical end 6 of the thumbscrew. It is possible with the form shown in Fig. 4, if the diaphragm or contracted portion of the bore be made very thin, to obtain in a measurable degree, the binding effect of the punctured diaphragm when the screw is screwed entirely therethrough.

Having thus described my invention, I

claim as new, and desire to secure by Letters Patent,—

The herein described combined collapsible tube and closure therefor, said tube having a neck formed with an outlet bore, a solid portion around said bore and a diaphragm formed in the bore of the neck at a point inward from the inner end, and a screw having a threaded portion of a length to pass through said diaphragm and have the forward end of the threaded portion engage the diaphragm, and the said diaphragm being sufficiently thin to produce, when engaged by the threaded portion of the screw, a thin flexible edge forming a wall defining the outlet orifice at the diaphragm, the said edge having a clinging action on the screw during repeated insertions and withdrawals of the latter, and the bore of the neck outside of the diaphragm being of a length to guide the screw and to retain the same without engagement with the diaphragm until it is desired to force a threaded portion of the screw through the diaphragm.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES HENRY STUART.

Witnesses:

E. V. PEIRSON,
WILSON M. GOULD.