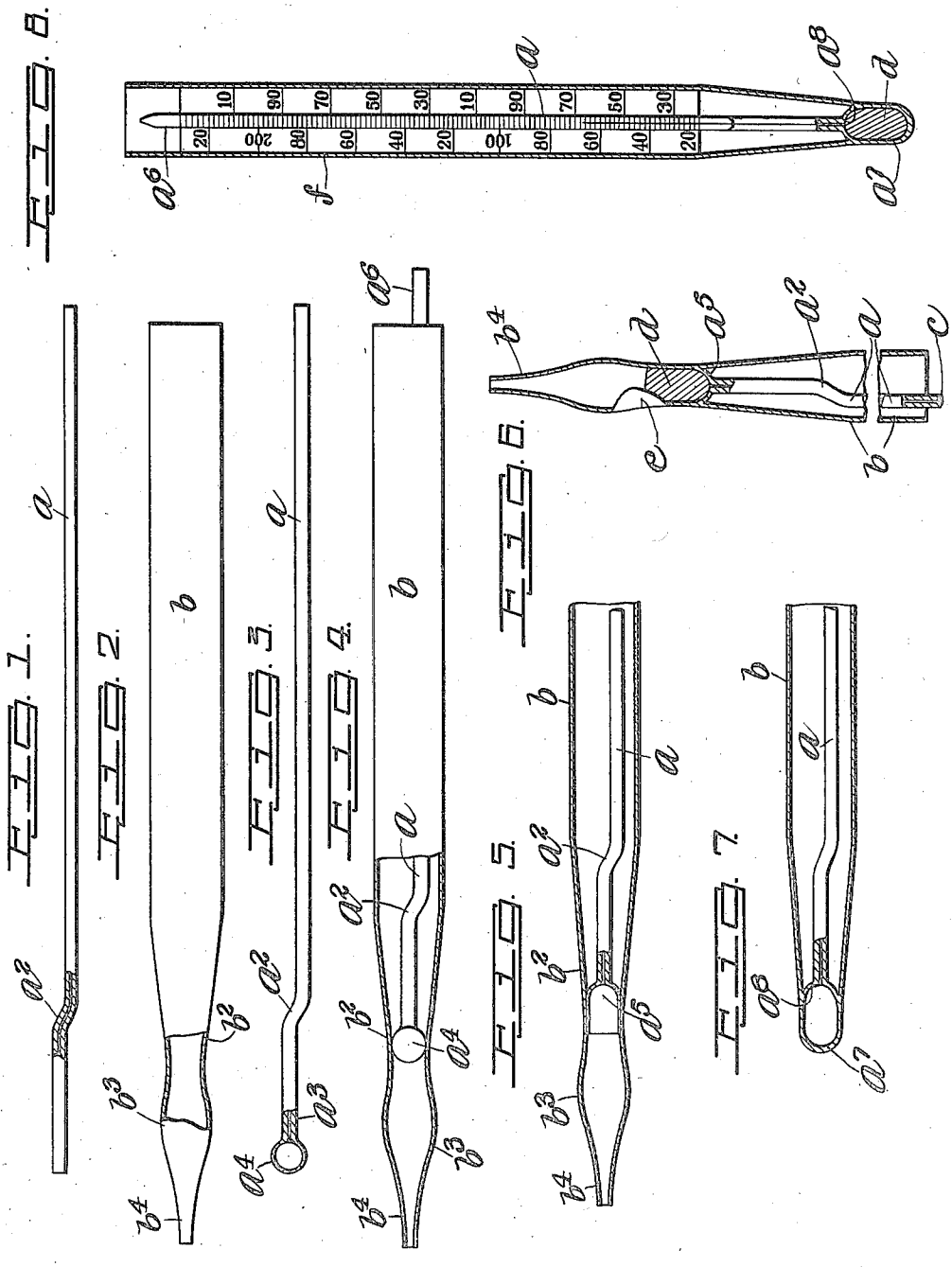
F. J. BERBERICH.

METHOD OF MAKING THERMOMETERS.

APPLICATION FILED JUNE 26, 1917.

1,255,979. Patented Feb. 12, 1918.



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METHOD OF MAKING THERMOMETERS.

1,255,979. Specification of Letters Patent. Patented Feb. 12, 1918.

Application filed June 26, 1917. Serial No. 176,953.

To all whom it may concern:

Be it known that I, FRANK J. BERBERICH, a citizen of the United States, and residing at Woodhaven, L. I., in the county of Queens and State of New York, have invented a certain new and useful Method of Making Thermometers, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to thermometers, and particularly to what are known as insulated thermometers, and to devices of this class designed for use in determining the temperature of liquids, and the object of the invention is to simplify and cheapen the construction of devices of this class without impairing their efficiency, and with this and other objects in view the invention consists in the method of forming or constructing thermometers of the class specified, hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a view partially in section of a capillary tube which I employ in the construction of my improved thermometer;

Fig. 2 a similar view of a casing tube which I employ;

Fig. 3 another view of the capillary tube and showing the first step of my improved process;

Fig. 4 a view showing the capillary tube within the casing tube and indicating the second step of the process;

Fig. 5 a view similar to Fig. 4 and indicating the third step of the process;

Fig. 6 a view similar to Fig. 5 but indicating the fourth step of the process;

Fig. 7 a similar view but indicating the fifth step of the process; and,

Fig. 8 a sectional view of a complete thermometer made according to my invention.

In the practice of my invention, I provide a capillary tube a which in all respects is similar to the capillary tube usually employed in devices of the class under consideration, and the tube a, as shown, is provided near one end with an offset bend a^2, but this offset bend is not essential and may or may not be employed.

I also provide a casing tube b of the form usually employed in the manufacture of thermometers of this class, and this tube is open at both ends and provided at one end with a reduced tapered extension b^2 beyond which, in the construction shown, is a bulbous enlargement b^3 which said tube is further tapered as shown at b^4, but the bulbous enlargement b^3 is not essential in my improved process.

The first step of my improved process consists in forming on the end a^3 of the capillary tube a hollow bulb a^4 which is formed in the usual manner by the heating and blowing process.

The second step of the process consists in inserting the tube a into the casing tube b so that the bulb a^4 at the end of the tube a will snugly fit in the tapered part b^2 of said casing tube b. The third step of the process consists in heating the reduced and tapered portion b^2 of the casing b, and the bulb a^4 therein, until said parts reach a plastic state and then blowing through the tube a and exploding the outer side of the bulb a^4 and expanding said bulb to form an open oblong cylindrical bulb member a^5, as shown in Fig. 6, the walls of which unite with and become integral with the corresponding walls of the tapered portion b^2 of the casing tube b.

The next step in the process consists in closing the end a^6 of the capillary tube in the usual manner, or by a piece of sealing wax as shown at c in Fig. 6, and then holding the device in an inverted position, or with the tapered end thereof directed upwardly and pouring a predetermined amount of mercury or other material into the open cylindrical bulb member a^5 through the open end b^4 of the casing tube as shown at d in Fig. 6, after which the casing tube is marked as shown at e to determine the point at which the end of the casing, or the bulb member a^5 is to be closed, after which the material d is poured out through the open end b^4 of the casing tube, after which the casing tube is heated at the point e and manipulated to close said tube at said point and to thus form the complete bulb a^7 shown in Fig. 7, and in this operation the end portion b^4 of the casing tube b is broken off.

The above described operation reinforces the bulb a^7 as will be readily understood, and thickens and strengthens the walls thereof, and makes the same more substan-

tial and less liable to break than when said bulb is formed by the usual or other process, and said bulb instead of being of the usual spherical form is of an elongated form; and by forming said bulb in the manner described a perfectly smooth, even and curved outlet a^8 from the bulb into the capillary tube a is provided, and this facilitates the operation of exhausting air and moisture or other substances from the bulb.

After the formation of the bulb in the manner herein described, the finishing work in order to produce the complete thermometer f shown in Fig. 8 is performed in the usual manner, the mercury being introduced into the bulb a^7 through the capillary tube a in the usual manner, after which the moisture and air is extracted from the bulb and tube and the scale formed or set, in the usual manner, after which the end a^6 of the capillary tube is closed in the usual manner, as is also the corresponding end of the casing tube in finishing the thermometer, but in the accompanying drawing said end of the casing tube is not shown as closed.

It will be understood, of course, that as in other thermometers of this class, the amount of mercury employed will depend upon the size of the bulb a^7 and the size of the capillary tube and that the necessary scale or scale marks are provided in the usual manner as indicated in Fig. 8.

By the herein described process I am enabled to produce thermometers of the class specified much more quickly and at a much less expense than was heretofore possible, and while I have shown and described the method of procedure which I prefer, my invention is not limited to the exact details thereof and changes therein and modifications thereof may be made within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The process herein described of forming a thermometer which consists in providing a capillary tube, and a casing tube one end of which is tapered, forming a bulb on one end of the capillary tube, inserting said capillary tube into the casing tube so that the bulb closely fits the tapered portion thereof, heating the tapered portion of the casing tube and the bulb, blowing through the capillary tube to rupture the bulb and expand the walls thereof and form an elongated bulb member and then closing the casing tube at the end of said bulb member to form the complete thermometer bulb.

2. The process herein described in forming a thermometer which consists in providing a capillary tube and a casing tube, forming a bulb member on one end of the capillary tube, inserting said capillary tube into the casing tube, heating said casing tube and bulb member to a plastic condition, blowing into the capillary tube to expand and rupture the bulb member and to unite the side walls thereof with the walls of the casing tube and closing the bulb end of the casing tube and the bulb member to form a complete thermometer bulb.

3. The process herein described of forming a thermometer which consists in providing a capillary tube and a casing tube, forming a bulb on one end of the capillary tube, the outside diameter of which is the same as the inside of a part of said casing tube, inserting said capillary tube into the casing tube, heating said casing tube and bulb to a plastic condition, blowing into one end of the capillary tube to expand and rupture the bulb and form an open elongated bulb member within the casing tube and then closing the open end of said bulb member to form a complete thermometer bulb.

4. The process herein described of forming a thermometer which consist in providing a capillary tube and a casing tube, one end portion of the casing tube being reduced, forming a bulb on one end of the capillary tube, inserting said end of the capillary tube into the casing tube until the bulb thereon fits the reduced end portion thereof, heating said reduced end portion of the casing tube and said bulb, blowing into the capillary tube to rupture said bulb and expand the walls thereof into engagement with the walls of the casing tube and to form in said casing tube an elongated open bulb member, sealing the end of the capillary tube opposite the bulb member, pouring a predetermined amount of liquid substance into said open bulb member, marking the casing tube to determine the point of the closure thereof, and heating and closing said casing tube to form a complete thermometer bulb.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 25th day of June, 1917.

FRANK J. BERBERICH.

Witnesses:
C. E. MULREANY,
H. E. THOMPSON.