May 31, 1938. C. NURNBERG 2,119,344

THERMOMETER

Filed Oct. 7, 1937

Fig. 1.

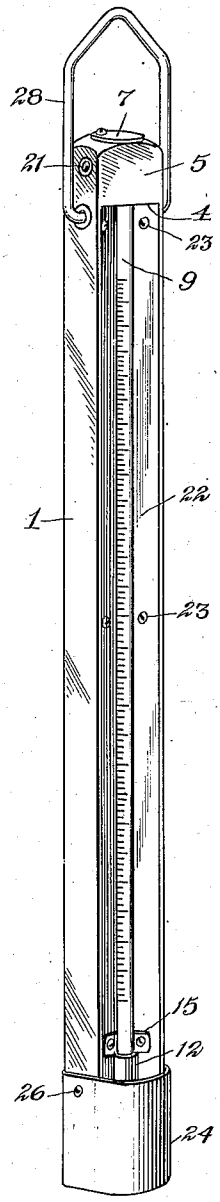


Fig. 2.

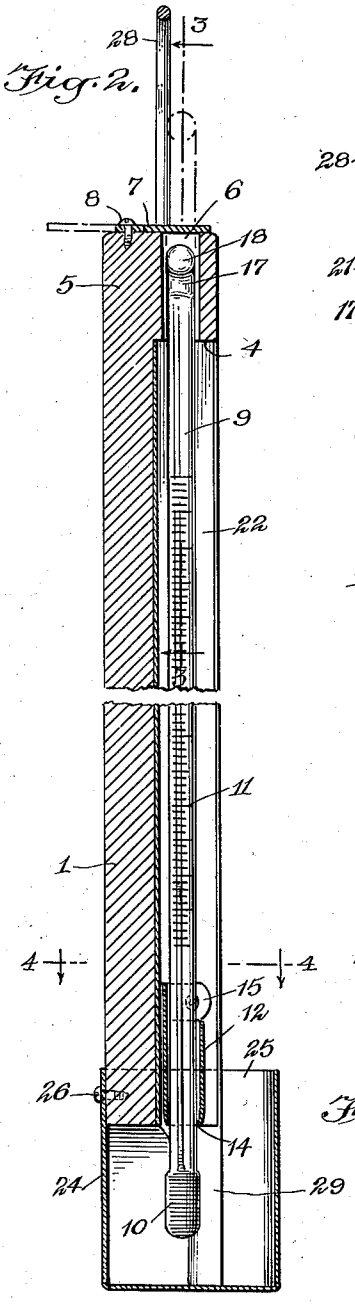


Fig. 3.

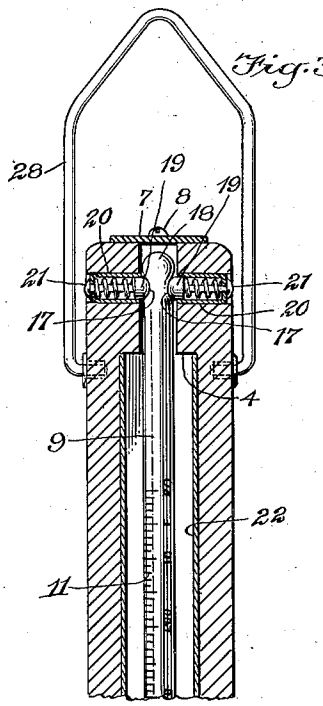


Fig. 4.

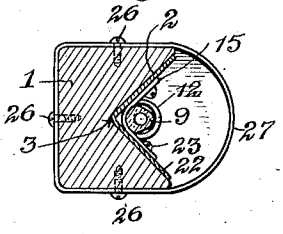
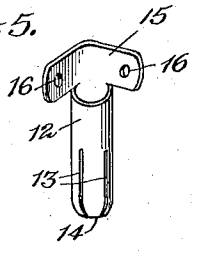


Fig. 5.



WITNESSES

INVENTOR

Charles Nurnberg

BY

Munn Anderson & Liddy

ATTORNEYS

Patented May 31, 1938

2,119,344

UNITED STATES PATENT OFFICE

2,119,344

THERMOMETER

Charles Nurnberg, Brooklyn, N. Y.

Application October 7, 1937, Serial No. 167,693

4 Claims. (Cl. 73—354)

The present invention relates to thermometers, and more particularly to that type of thermometer known as a tank thermometer, for use in determining accurately the temperature of petroleum products contained in any usual form of tank or container.

The invention has for its object to produce a thermometer of the type mentioned in which the glass tube shall be firmly supported in its case, and to provide means which will permit the ready removal and insertion of the tube, and to quickly replace a broken tube with a new tube.

To the above ends the present invention consists of a thermometer having a case provided with means to receive and support the tube in a fixed position and to so form the tube that it can be readily connected with retaining devices at or near its opposite ends, and it further consists of the devices and combinations of devices which will be hereinafter described and claimed.

The present invention is shown in the accompanying drawing in which—

Fig. 1 shows a perspective view;

Fig. 2 shows a broken longitudinal sectional view on a somewhat larger scale than that employed in Fig. 1;

Fig. 3 shows a section of the upper end of the thermometer taken on the line 3—3 in Fig. 2;

Fig. 4 shows a cross section on the line 4—4 in Fig. 2;

Fig. 5 is a perspective view of the lower retaining clip.

Similar reference characters will be employed to designate corresponding parts.

In the drawing 1 indicates the casing made of hardwood or some other material of sufficient strength and resistance to the action of the liquids with which the thermometer is to be used.

The case 1 is generally rectangular in cross section, as shown in Fig. 4, and at its front face is provided with a tube recess or seat 2 having outwardly inclined lateral surfaces meeting at the point 3 which is directly at the longitudinal central line of the recess. The seat or recess 2 opens through the lower end of the case 1 and at its upper end terminates at 4 above which the outer lateral surfaces of the top end of the casing will define a full rectangle constituting a block 5. The block 5 is provided with a cylindrical opening 6 which passes entirely through from the bottom of the block to the top thereof in direct alinement with that portion of the recess 2 near the apex of the angularly disposed surfaces in which the tube is supported.

The upper end of the opening 6 is closed by a suitable cover 7 which as shown in the drawing may comprise a metallic disk pivotally connected to the top of the casing as at 8 and arranged to be swung horizontally so as to cover and uncover the opening 6 through the block 5.

The glass tube 9 is positioned in the seat 2 in line with the opening 6 and securely held therein by means hereinafter described. At its lower end it is provided with a cylindrical bulb 10 of a diameter less than that of the opening 6 so that it may be inserted and removed by passing it through said opening. It will of course contain any usual or preferred form of thermo-sensitive indicating fluid, such as mercury, and will carry a scale 11 formed and applied in any usual manner which will resist the action of the materials with which it may be used. The lower end of the tube will be supported by a tubular clamp 12, the lower end of which is split as indicated at 13 and bent inwardly slightly as at 14 to yieldingly engage the tube.

The clamp 12 is provided at its upper end with angularly disposed wings 15 perforated as shown at 16 whereby it may be affixed to the inclined walls of the seat directly in line with the opening 6 and the tube seat. It should of course be of sufficient diameter to permit the ready passage therethrough of the bulb 10 and the lower end of the tube 9 as indicated in Fig. 2.

It is of course essential that the tube 9 shall be firmly held at its upper end and preferably in such manner that when in position there can be no longitudinal movement of the tube. This is accomplished by providing the upper end of the tube 9 with oppositely disposed recesses 17 above which the tube has a semi-spherical formation as indicated at 18.

In the block 5 are opposed yielding detents consisting of the rounded heads 19 fitted to have a sliding movement in the bearings 20 and backed up by springs 21. The tension of the springs normally tends to force the heads 19 towards each other and it should be of sufficient strength to hold the heads 19 in the recesses 17 while at the same time permitting the free passage of the tube 9 under slight pressure between the heads 19 when removing and inserting the tube. This is facilitated by the rounded contacts of the heads 19 with rounded shoulders on the tube adjacent the recesses 17.

If desired the inclined seat 2 of the casing 1 may be provided with an angularly bent metal facing plate 22 which may be secured in position by screws 23.

At its lower end the thermometer is provided

with a metal cup **24** open at the top as indicated at **25** and secured to the casing **1** by screws **26**. The front of the cup will be curved outwardly as indicated at **27** while at other points it will fit the casing. The cup will be of such a depth that it will enclose and protect the lower end of the tube **9** at the same time leaving considerable space below the bulb **10** with the upper edge of the cup **25** somewhat below a plane corresponding to the upper open end of the tubular clamp **12**. Thus when the tube is held in the position as shown in Fig. 2, the upper open end of the tubular clamp **12** will be clearly visible so that in inserting the tube **9** the bulb **10** at the lower end thereof may be readily positioned in axial alinement with the open end of the tubular clamp **12**.

At its lower end the casing **1** carries downwardly extending spacing posts **29** (one of which is shown in Fig. 2), the lower ends of which engage the bottom of the cup affording a support therefor and controlling the position of the upper edge of the cup in attaching it to the casing **1**.

At the upper end the thermometer is provided with a pivoted metal bail **28** whereby it may be suspended, or by means of which the operator may hold the thermometer while in use.

It will be noted that should the tube **9** be broken in use, as frequently happens, it is unnecessary to employ any implement in removing the broken tube and inserting a new tube. The construction shown and described insures that the tube will be held in position without the employment of clamps requiring special tools to spread them when it is desired to insert or remove a tube, such clamps being often the cause of tube fracture. All that is required in the present construction is to move the cover **7** so as to clear the opening **6** in the block **5** at the top of the case **1** and pass the tube therethrough, the yielding detents in the block **5** which engage the upper end of the tube permitting the free sliding movement and passage of the tube through the opening and automatically engaging the recesses at the upper end of the tube when it has reached the desired position. At the same time the cylindrical bulb **10** of a diameter not exceeding the greatest diameter of the tube permits the lower end of the tube to pass into and through the tubular clamping device **12**, the spring ends **14** yielding to that extent required.

I claim:

1. A thermometer comprising a casing having a tube seat in its front face, a block at its upper end overhanging the tube seat, an opening in said block in line with the tube seat, a tube of a diameter throughout its length which will permit it to be passed through said opening having near its upper end oppositely disposed recesses, and yielding detents projecting into said opening to engage the recesses to hold the tube in the tube seat.

2. A thermometer comprising a casing having a tube seat in its front face provided with outwardly flaring walls, a block at its upper end overhanging the tube seat, a cylindrical opening in said block in line with the tube seat, a tube of a diameter throughout its length which will permit it to be passed through said opening having near its upper end oppositely disposed recesses, and independent yielding detents provided with rounded heads projecting into said opening to engage said recesses to hold the tube in the tube seat.

3. A thermometer comprising a casing having a tube seat in its front face, a block at its upper end overhanging the tube seat, a cylindrical opening in said block in line with the tube seat, a tube of a diameter throughout its length which will permit it to be passed through said opening having near its upper end oppositely disposed recesses, yielding detents projecting into said opening to engage the recesses to hold the tube in the tube seat, and a clamp at or near the lower end of the tube seat to receive and hold the tube, the clamp being in alinement with the opening through the block at the upper end of the casing.

4. A thermometer substantially as set forth in claim 3, provided with a cup at the lower end of the casing, and spacing posts at the lower end of the casing to position the cup so that the upper edge of its wall will be below the upper end of the clamp.

CHARLES NURNBERG.