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COOLING CAPSULE FILLED VALVE

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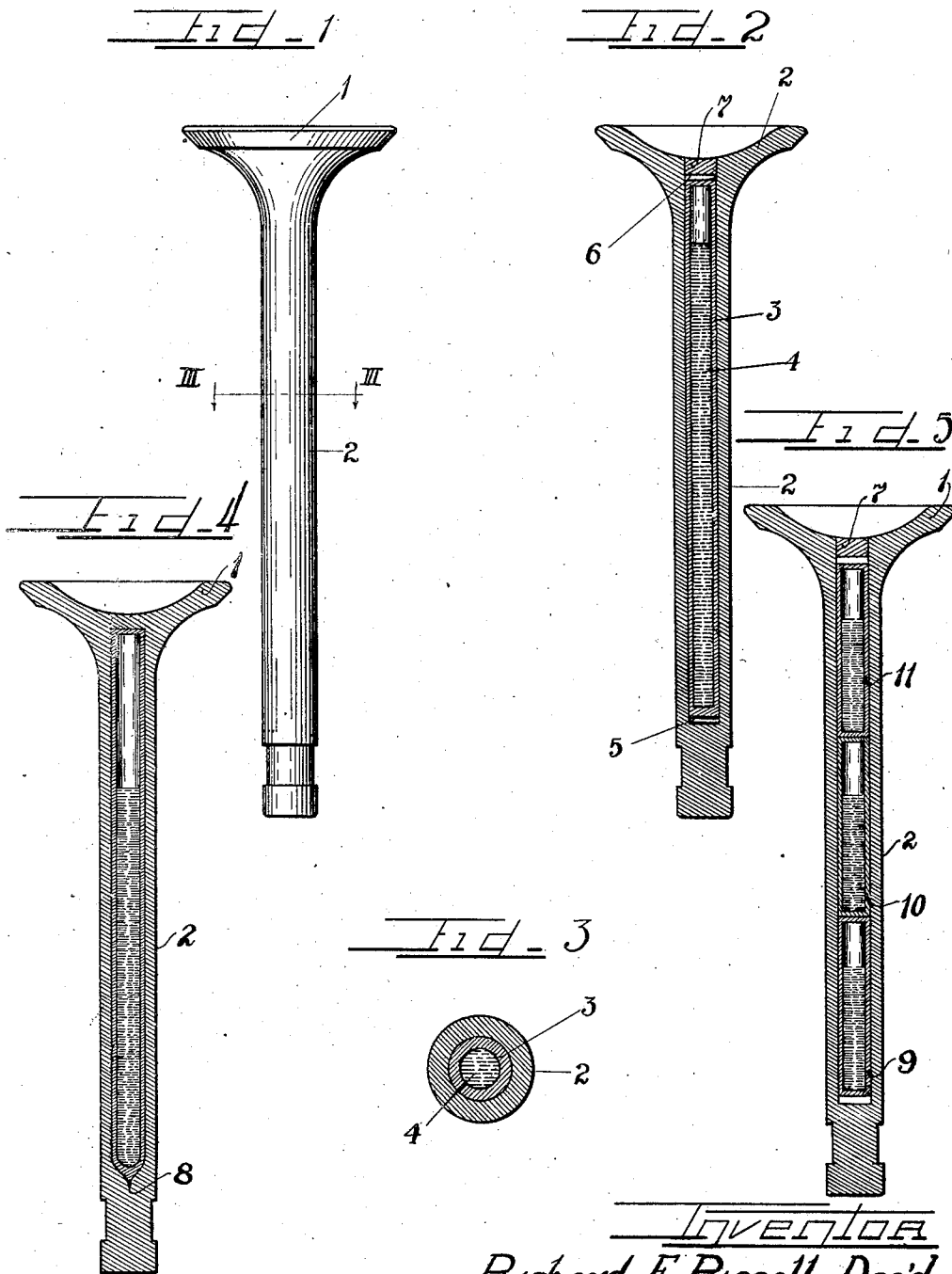
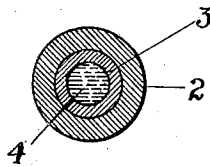


Fig. 3



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RICHARD E. BISSELL, DECEASED, LATE OF CLEVELAND, OHIO, BY GENEVIEVE BISSELL, ADMINISTRATRIX, OF LANSING, MICHIGAN, ASSIGNOR TO THOMPSON PRODUCTS, INCORPORATED, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

COOLING-CAPSULE-FILLED VALVE

Application filed January 20, 1930. Serial No. 422,208.

This invention relates to a cooling-capsule-filled valve, and concerns itself primarily with a capsule for retaining a salt or other cooling agent.

5 The use of a capsule not only facilitates the manufacture of cooling-agent-filled valves but also eliminates the possibility of leakage and obviates the requirement that the valve structure be liquid tight. Further, by making
13 the capsule of a metal having the proper conductivity, it is possible more equally to distribute the heat and thus maintain the cooling agent, preferably a salt, under operating conditions in a uniformly liquid condition. In cases where the structural metal
15 of the valve itself does not provide proper conductivity, there is a tendency for the cooling agent to be liquid at one end while remaining in the solid state at the other end. Under
20 these circumstances, the effectiveness of the cooling agent is more or less diminished.

The invention comprises the novel structure and combinations of parts hereinafter described and more particularly pointed out
25 and defined in the appended claims.

In the accompanying drawings which illustrate a preferred embodiment of this invention and in which similar reference numerals refer to similar features in the different
30 views:

Figure 1 is an elevational view of a valve embodying this invention.

Figure 2 is a longitudinal sectional view taken through the valve and its stem.

35 Figure 3 is an enlarged sectional view taken upon the line III—III of Figure 1.

Figures 4 and 5 are longitudinal sectional views taken through a valve and its stem exemplifying modified forms of the invention.

40 Referring now to the drawings and more particularly to Figures 1 to 5 inclusive, which illustrate the preferred embodiment of this invention, there is illustrated a valve consisting of a head portion 1 and stem 2, which may
45 be integral with the head or of different steel structure. The stem 2 of the valve is made hollow and within the hollow stem there is an elongated metal capsule 3, the metal of which said capsule is formed having preferably
50 a high rate of heat conductivity. Said

capsule 3 is partially filled with a salt, a mixture of salts, or other cooling agent 4. The cooling agent used may be of any well known variety that is fusible within the working temperatures of the valve.

55 An example of a suitable cooling agent is a mixture comprising 34% lithium nitrate and 66% potassium nitrate, the mixture having a melting point of 257° F. It is also feasible to use pure metallic sodium, which melts at
60 206° F. and has a lower vapor pressure at high temperatures than the aforesaid salt mixture.

It will be noted in Figures 2 and 5 that the elongated capsule 3 is shown somewhat shorter than the cavity within the stem leaving a clearance 5 and 6 at the respective ends thereof
65 in order to allow for relative expansion between the capsule and the valve. It is however, not necessary that clearances be provided since the walls of the capsule 3 are normally sufficiently thin and yielding to permit
70 them to collapse without rupturing and without disturbing the steel structure of the stem.

75 The material from which the capsule is made may consist of any suitable metal but preferably one having a high rate of heat conductivity. In the present instance the capsule 3 is illustrated as made of seamless copper. While the capsule may be made in
80 various ways, it is, however, preferably formed by welding.

The capsule may be inserted from one end of the valve stem so that it will be held tightly in position by a push fit. Of course, the end of the cavity is thereafter suitably
85 closed, as by plug 7 (Figure 2) or by swaging 8 (Figure 4). The wall of the capsule preferably tightly engages the inner wall of the stem throughout its length in order to
90 cut down resistance to heat transfer to a minimum.

It will be appreciated that in the use of a capsule of high conductivity, the heat is more quickly and readily distributed, with the result that the entire body of the salt is more
95 uniformly liquefied than would be the case were the salt merely inserted in a hollow cavity in the stem. It will also be apparent that the use of a capsule for retaining the
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salt obviates the necessity of having the valve stem liquid tight and also simplifies the manufacture of cooling agent-filled valves.

5 In Figure 4 is shown a valve containing in its stem 2 a capsule 3 completely filling the hollow of said stem. The relative expansion, due to variations in the temperature to which the valve is subjected, would slightly compress the capsule 3 lengthwise but would not result in a permanent set. As shown in Figure 4 the stem 2 is swaged, as at 8, after insertion of the capsule 3.

10 In Figure 5, there is illustrated a valve similar to that of Figures 1 to 3 inclusive in the hollow stem of which are positioned a plurality of capsules 9, 10 and 11, each partially filled with a cooling agent. The cooling agents in the several capsules 9, 10 and 11 may have different fusion points, the cooling agent in capsule 11, near the valve head, having a relatively high fusion point and the cooling agents in capsules 9 and 10 relatively lower fusion points to compensate for the lower temperatures obtaining in the stem of the valve. Instead of being separate, the capsules 9, 10 and 11 may be formed integrally like sausage links.

15 I am aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

35 I claim as my invention:

1. A valve comprising a hollow stem, a capsule in said stem and a cooling agent that is fluid within the working temperature range of the valve within said capsule.

40 2. A valve comprising a hollow stem, an elongated metal capsule within said stem, and a cooling agent liquid at the working temperature of the valve within said capsule.

45 3. A valve comprising a hollow metal stem, an elongated metal capsule of higher heat conductivity than the stem located in said hollow stem and a cooling agent liquid at the working temperature of said valve within said capsule, for the purpose set forth.

50 4. A valve comprising a hollow metal stem, an elongated seamless metal capsule positioned within said hollow stem, the metal of which the capsule is formed having a relatively higher coefficient of thermal conductivity than the metal of the stem, and a salt fusible at the working temperature of said valve within said capsule and partially filling the same.

55 5. A valve comprising a hollow stem, a plurality of capsules within said stem and cooling agents having different fusion points within said capsules.

60 6. A valve comprising a hollow metal stem, an elongated seamless metal capsule posi-

tioned within said hollow stem and in close contact with the inner stem wall throughout the length of said capsule, the metal of which the capsule is formed having a relatively higher coefficient of thermal conductivity than the metal of the stem, and a salt fusible at the working temperature of said valve within said capsule. 70

7. A valve comprising a hollow metal stem, an elongated seamless copper capsule positioned within said hollow stem and in close contact with the inner stem wall throughout the length of said capsule and a salt fusible at the working temperature of said valve within said capsule and partially filling the same. 75

8. An article of manufacture, a member, one portion of which is subject to relatively high temperature while another portion is subject to a much lower temperature, means for equalizing said temperatures comprising a capsule disposed within said member between said portions, and containing a cooling agent that is fluid at the relatively high temperature but solid at normal temperatures. 80

In testimony whereof I have hereunto subscribed my name at Los Angeles, Los Angeles County, California.

GENEVIEVE BISSELL, 85
Administratrix of the Estate of Richard E. Bissell, Deceased.

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