Aug. 30, 1932. H. E. L. LABBÉ 1,874,106

APPARATUS FOR THE AUTOMATIC EMPTYING OF RECEPTACLES CONTAINING A LIQUID AT A GIVEN TEMPERATURE

Filed Nov. 25, 1929 2 Sheets-Sheet 1

Fig. 1

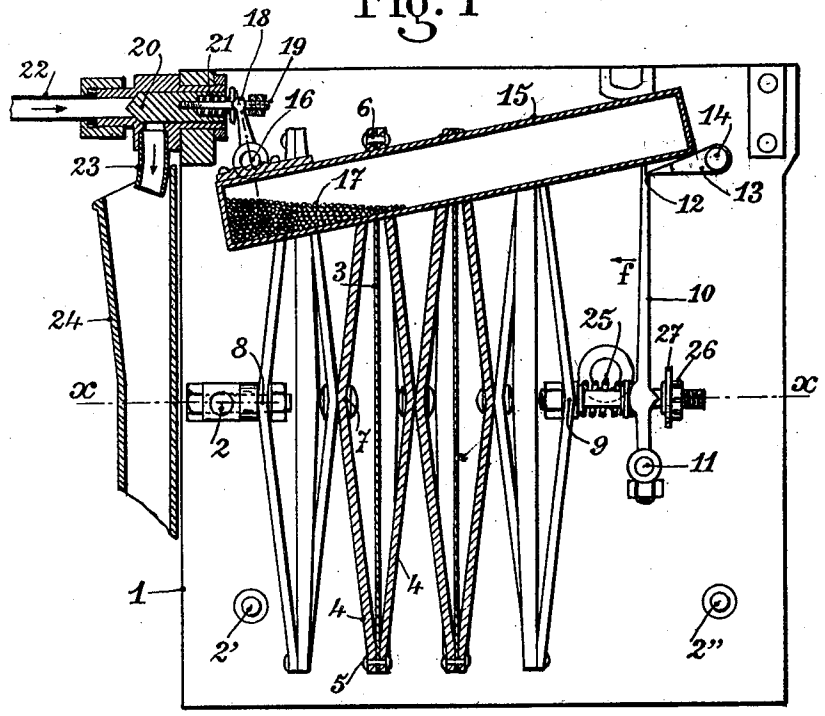
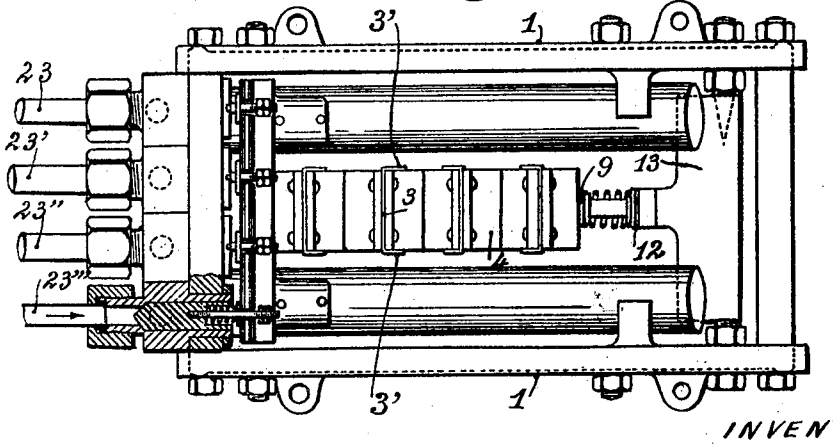


Fig. 2



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Fig. 3

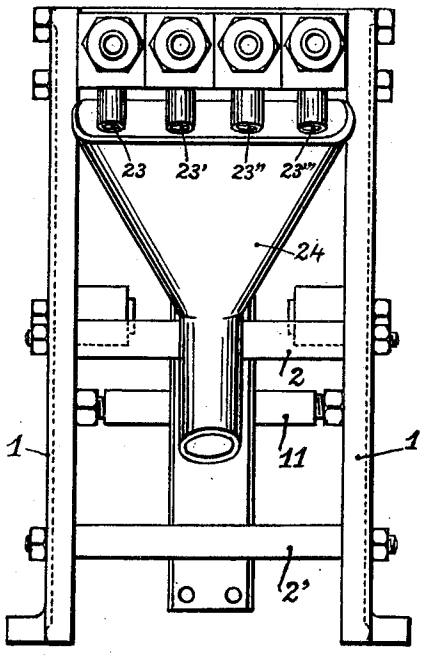
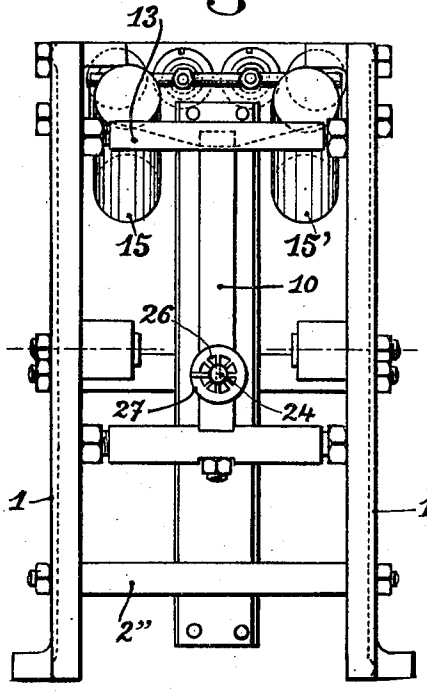


Fig. 4



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UNITED STATES PATENT OFFICE

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APPARATUS FOR THE AUTOMATIC EMPTYING OF RECEPTACLES CONTAINING A LIQUID AT A GIVEN TEMPERATURE

Application filed November 25, 1929, Serial No. 409,736, and in Germany August 15, 1928.

The present invention relates to an automatic apparatus for emptying liquids contained in receptacles of any kind when the outside atmosphere or air attains a given temperature, and may be advantageously used for the automatic emptying of the water contained in the cooling chambers of internal combustion engines.

The apparatus embodying the present invention is characterized by the combination of a device which is deformable by the effect of temperature, and a valve by which the receptacle can be emptied.

In this combination, the said device which is deformable by the effect of the temperature variations is itself characterized by the fact that it consists of a plurality of sections; each of which sections forms a geometric figure whereof one part consists of a metal member such as steel having a relatively small coefficient of expansion and which, in the normal conditions of operating, is not mechanically deformable in a given direction, whilst the part ending at the two extremities of the first mentioned part is constituted by metal pieces or members, for instance of aluminium, having a relatively high coefficient of expansion, and in the operating conditions these members are mechanically deformable in a given direction. The said sections are placed end to end, in the said direction and are joined together. One of the sections at the end of the series is secured to a fixed point, and the section at the other end acts upon a lever by which the emptying valve operating means may be actuated.

Such apparatus may be variously constructed, and for instance, an apparatus may be employed in which the emptying valve of the receptacle comprises a valve normally closed by a spring, and comprising a controlling stem or rod secured to a pivoted counterweight combined with a cam normally resting upon one end of the said lever, the whole being so disposed that the said lever will release the said cam when the proper temperature is attained; the cam thus falls by its own weight and causes the descent of the said counterweight, thereby opening the valve.

The accompanying drawings show an embodiment of the invention, which is not of a limitative nature.

Fig. 1 is a longitudinal axial section of a device for the automatic emptying of a receptacle, according to the invention.

Fig. 2 is a plan view of the same;

Fig. 3 is an elevation of one end of the apparatus shown in Fig. 1, and

Fig. 4 is a similar view of the other end of the apparatus.

In these figures, like numerals represent corresponding parts.

The apparatus herein represented comprises a frame consisting of two plates 1 connected together by cross-pieces 2, 2′, 2″ etc. One cross-piece 2 carries the device which is deformable by heat. This forms a thermostatic device which herein consists of a plurality of sections assembled in a consecutive series.

Each section of said thermostatic device comprises:

First. A vertical member 3 consisting of a metal or alloy having a small coefficient of expansion, such as steel, which member consists of a structural iron member of U or I formation having flanges 3′ adapted, according to the conditions of utilization of the apparatus, to assure the indeformability in the horizontal direction.

Second. Members 4 secured at their ends 5 and 6 to the two corresponding ends of the member 3, and the central part 7 of said members 4 is situated at a distance from the member 3, said members 4 consisting of a metal or alloy such as aluminum whose coefficient of expansion exceeds that of the member 3.

As shown in Figures 1 and 2, the deformable sections are preferably combined in pairs, and in each pair thus formed, a rigid member 3 is preferably combined with said deformable members which form a sort of lozenge-shaped section of which the said indeformable member 3 is one of the diagonals.

In the construction shown, four such lozenge-shaped sections may be mounted in a series on the axis x—x, and this device is secured at one end 8 to the cross-piece 2; the

outer end 9 is movable by the variations of temperature, and it acts upon a lever 10 which turns on an axle 11 and is provided with an end portion 12 normally in contact with a cam 13 which is movable on an axle 14 and supports a counterweight 15, movable on an axle 16. Herein, the said counterweight 15 has the form of a tube containing a heavy mass which is loose in said tube and which may consist of metallic grains, or of a ball, or the like.

A lever 18 secured to the shaft 16 controls the stem 19 of the valve 20 which is provided with a closing spring 21 and is mounted on the emptying pipe 22, 23 of the receptacle (not shown) to be emptied.

The said apparatus is so arranged that when the thermostat is cooled to a determined temperature, which is below the normal temperature, the contraction of the said deformable arrangement comprised between the elements 8 and 9 is sufficient to turn the lever 10 through an angle such that the end 12 will be separated from the cam 13. Since the said cam is no longer supported, it will fall while turning on its axle 14; the counterweight 15 then falls. The mass 17 which is loose in the tube 15 moves from one end of the said tube to the other. The valve 20 which is moved from left to right now opens, and the receptacle connected to the pipe 22, 23 is thus emptied.

When the temperature has resumed its normal value, the apparatus may be placed by hand in its initial position, and it is then enabled to act again.

As shown in Figures 1 and 4, the lever 10 is provided with an adjusting device, and this device consists of a screwthreaded rod 24 which is secured to the thermostat and traverses the said lever, and also of a spring 25 mounted between the thermostat and the lever, and of a nut 26 screwed upon the said rod and provided with a hand wheel 27.

As shown further in the drawings, the emptying valves of four distinct receptacles are mounted on the emptying pipes 23, 23′, 23″, 23‴ of the said receptacles, and all of the said valves are controlled by the same thermostat. In this event, the counterweight may consist of several tubes, for instance, two tubes 15, 15′ (Fig. 4).

A common funnel 28 may be disposed below these various emptying pipes.

The apparatus herein described and represented is adapted to act when the temperature falls below the determined value, for instance in the case of frost, however, it is to be understood that the cooperating arrangement between the various elments may be associated in any other suitable and convenient manner.

It will also be understood that the construction shown and described is capable of many modifications, and those modifications that are within the scope of the claims, I consider within the spirit of the invention.

What I claim is:—

1. An automatic apparatus for the emptying of a liquid contained in a receptacle when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for the receptacle, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other part consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, the said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to a lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the discharge valve of the said receptacle, whereby the said discharge valve will be opened when the hereinabove given temperature is attained.

2. An automatic apparatus for the emptying of a liquid contained in a receptacle when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for the receptacle, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other parts consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, the said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to a lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the discharge valve of the said receptacle, whereby the said discharge valve will be opened when the determined temperature is attained.

3. An automatic apparatus for the emptying of liquid contained in a receptacle when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for the receptacle, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure

whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other part consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, the said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to an adjustable lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the discharge valve of the said receptacle, whereby the said discharge valve will be opened when the hereinabove given temperature is attained.

4. An automatic apparatus for the emptying of liquids contained in a plurality of receptacles when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for each of the receptacles, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other part consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to a lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the discharge valve of each receptacle, whereby all of the said discharge valves will be opened when the hereinabove given temperature is attained.

5. An automatic apparatus for the emptying of liquids contained in a plurality of receptacles when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for each of the receptacles, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other part consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to a lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the dicharge valve of each receptacle whereby all of the said discharge valves will be opened when the hereinabove given temperature is attained.

6. An automatic apparatus for the emptying of liquids contained in a plurality of receptacles when the surrounding air has attained a given temperature, said apparatus comprising, in combination, a discharge valve for each of the receptacles, a device which is deformable by the variations of temperature, said device consisting of a plurality of sections which are subjected to said variations of temperature, each section having the form of a geometrical figure whereof a part consists of a metal having a relatively small coefficient of expansion and is practically indeformable in a given direction while the other part consists of a metal having a greater coefficient of expansion and is mechanically deformable in the said direction, said sections being deformable in the same direction and assembled end to end in this direction, the first section being secured to a fixed point, and the last section being secured to an adjustable lever; a cam controlled by said lever; a counterweight controlled by said cam and connected to the discharge valve of each receptacle, whereby all of the said discharge valves will be opened when the hereinabove given temperature is attained.

In witness whereof I have hereunto set my hand.

HENRI EUGÈNE LÉON LABBÈ.