H. HOHLMANN, Jr.
AUTOMATIC TEMPERATURE REGULATOR.
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1,036,116.

Patented Aug. 20, 1912.

Fig. 1

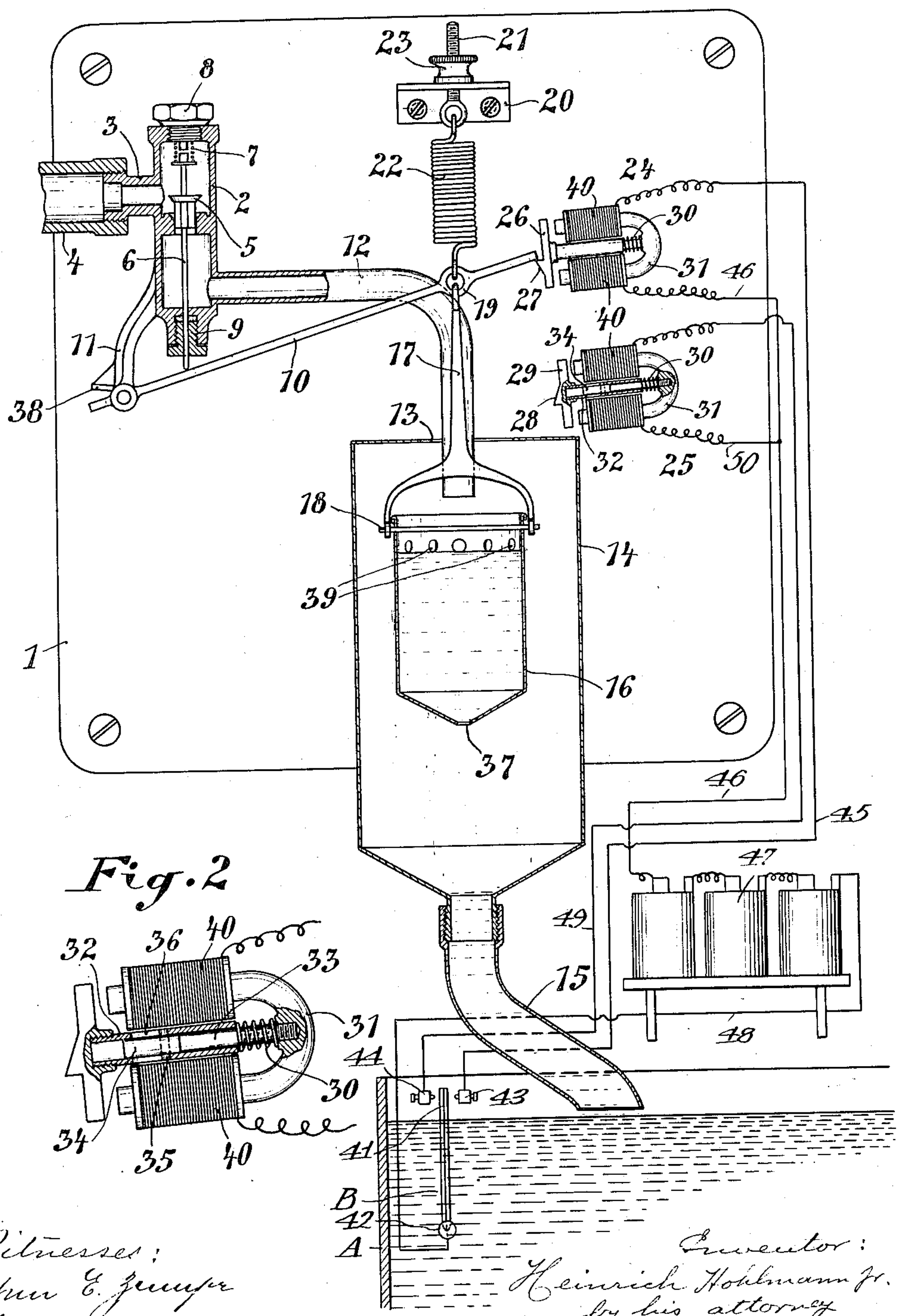

Fig. 2

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UNITED STATES PATENT OFFICE.

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AUTOMATIC TEMPERATURE-REGULATOR.

1,036,116. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed February 6, 1911. Serial No. 606,718.

To all whom it may concern:

Be it known that I, HEINRICH HOHLMANN, Jr., of 64 Stoppenbergerstrasse, Essen-on-the-Ruhr, in the Kingdom of Prussia, Empire of Germany, merchant, have invented certain new and useful Improvements in Automatic Temperature-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In many of the industrial arts it is an absolute necessity that the contents of receptacles employed therein be kept at the same or practically the same temperature. This is for instance the case in breweries with mashing-tubs, brewers' coppers and the like, or in larger butcheries, where hams, sausages, etc., are to be well boiled, but must be prevented from boiling to pieces. In order to answer these conditions devices must be provided which shall act automatically when the desired temperature is overstepped or not reached, so that the temperature of the contents of the receptacles employed can be regulated within very narrow limits.

The object of my present invention is to provide an automatic temperature-regulator for receptacles, the contents of which are to be kept at an even temperature, which shall fulfil these conditions in a very simple and yet effective manner.

To this end I employ an electro-magnetically operated valve-lever which is steadily borne downward and simultaneously serves as a support of the spindle of a self-closing liquid-valve and as a carrier of an overflow-reservoir in such a manner, that as soon as the highest temperature permissible has been reached said valve-lever will rise and open said valve, whereas said lever will be drawn down under the influence of the filled overflow-reservoir as soon as the lowest temperature permissible has been attained; whereupon said valve will be automatically closed. This play will continue with periodical interruptions until the regulator will be switched out and the contents of the receptacle are removed.

This temperature-regulator differs from the known regulators of this kind inasmuch as it can be applied not only to a great variety of purposes, but also offers the advantages of a very simple construction and a very comprehensible mode of operation, so that in case of a disturbance the cause thereof can be easily detected and thus the necessary steps taken to remedy the evil.

In the accompanying drawing:—Figure 1 is an elevation of my present invention, partly in section. Fig. 2 is a plan-view of one of the electro-magnets employed for locking and releasing a valve-lever.

Upon the base 1 the valve-casing 2 is mounted and connected by means of the branch 3 to the supply-pipe 4 by which the cooling-water is led to said casing. Within the latter the valve 5 is arranged and seated upon the spindle 6 which is steadily pressed downward by the spring 7 centered by the screw-cap 8 and guided in the stuffing-box 9. From the latter the lower end of said spindle projects downward to contact with the valve-lever 10 which is hinged to a lateral arm 11 of the valve-casing. Opposite to this arm an angularly bent discharge-conduit 12 is arranged and passes through the opening 13 into the cylindrical splasher 14, the lower end of which is connected by means of a drain-hose 15 or the like to a receptacle A the contents of which are to be kept at the same or practically the same temperature. Within said splasher a reservoir or bucket 16 is arranged and held in suspension by the bifurcated hanger 17 attached by means of the rod 18 to said reservoir and by means of its hooked end to the eye 19 of the lever 10. Above the latter a bracket 20 is secured to the base 1 and holds in its horizontal flange an eye-bolt 21. With this bolt the lever 10 is connected by means of a tension-spring 22, the tension of which can be regulated by moving the eye-bolt upward or downward by the aid of the knurled nut 23. Above said splasher and sidewise of the end of the lever 10 the electro-magnets 24 and 25 are arranged in such a manner that said lever will be retained by the former when the valve 5 is opened, and by the latter when said valve is closed. To this end the T-shaped armature 26 of the electro-magnet 24 is provided with a wedge-shaped nose or catch 27 whose retaining-face points upward; whereas the similarly shaped nose 28 of the armature 29 of the electro-magnet 25 points downward. For a similar reason the sliding surfaces of these noses are slanting in opposite directions.

Each of these armatures is pushed outward by means of a spring 30 abutting against the horse-shoe core 31 of its electro-magnet when released by the core, by which it is carried. The armatures may be guided and retained in their outward position as clearly illustrated in Fig. 2, wherein the spring 30 is arranged between the end of the tubular shank 32 of the armature and the bow of the horse-shoe core and is guided on the shaft of the stud 33. The latter carries the armature on its head 34 and retains it in its proper position by a cross-pin 35 operating in the guide-slots 36 of the tubular shank 32.

Within receptacle A is arranged a thermostat B which is shown to consist of a compound metal rod 41 adapted to be deflected to the left or to the right when the temperature of the contents of the receptacle rises or falls. Rod 41 is secured at one end to the wall of receptacle A as at 42, while the other end of said rod is flanked by a pair of spaced contacts 43, 44 respectively. Contact 41 is by wire 45 connected to one of the coils 40 of electromagnet 24 which is in turn by wire 46 connected to a source of electricity 47, the latter being by wire 48 connected to the fixed end of rod 41. Contact 44 is by wire 49 connected to the coils 40 of electromagnet 25 which is in turn by wire 50 connected to wire 46. When the parts occupy the positions shown in Fig. 1, the lever 10 is retained by the armature 26 of electro-magnet 24, thereby maintaining valve 5 in its opened position to admit cooling water into receptacle 16. When the lowest temperature permissible has been reached within receptacle A, thermostatic rod 41 will impinge against contact 43 to send an electric current through the coils of electromagnet 24. In this way the latter will become energized to attract its armature 26 and thereby liberate lever 10. Since the reservoir 16 was filled and is kept filled while in its elevated position, because more water flowed into it through the opened valve 5 than could flow off through the outlet-opening 37, smaller in diameter than the conduit 12 and advantageously replacing the siphon or overflow-tube usually employed for similar purposes, the lever 10 is now free to descend under the influence of the weight of the volume of water contained in said reservoir because the spring 22 is too weak to resist the action of said volume of water. The result of this motion of said lever is, that the valve 5 is closed, the armature 29 is pushed inward against its spring 30 and that the nose 28 will slip over the end of the lever 10 and retain it in its new position, wherein it is most effectively aided by the spur 38 of the arm 11. Since the valve 5 is closed now, none of the liquid, usually water, contained in the reservoir will hereafter flow off through the overflow-holes 39, but all will leave the reservoir by way of the outlet-opening 37. The contents of the receptacles, such as mashing-tubs, brewers' coppers, vats, boilers and the like, have now reached their lowest temperature and some time will elapse before they will reach again their highest temperature. At the moment this takes place, rod 41 will be deflected to impinge against contact 44 to send an electric current through the coils 40 of the electro-magnet 25, so as to attract its armature 27 and release lever 10. Since the reservoir 16 is empty now, the spring 22 is in a position to raise the lever 10 and said reservoir far enough upward to push the armature 26 of the electro-magnet 24 inward to let the nose 27 slip under the free end of the lever 10. Simultaneously herewith the valve 5 is being opened again, so that cold water can flow anew into the reservoir 16, which it leaves partly by way of the outlet-opening 37 and partly by way of the overflow-holes 39 to pass through the hose 15 or the like to the receptacle the contents of which have to be kept at an even temperature. Through the mixture of the cooling-water with said contents the temperature of the latter will of course sink again, so that after a certain interval of time the valve 5 will be closed again in the manner indicated above. This periodical opening and closing of the valve will cause the temperature of the contents of the receptacle to vary within very narrow limits, so that the mean temperature will represent the normal temperature desired.

I claim:—

1. In an automatic temperature regulator of the class described, a self-closing liquid supply valve, a spindle carrying the same, a lever engaged by said spindle and adapted to open the valve, a self-emptying bucket suspended from the lever and adapted to receive a temperature regulating liquid, a spring for raising the lever and bucket, the combined weight of the lever and charged bucket exceeding the pull of the spring, while said pull exceeds the weight of the lever and emptied bucket, independent means for locking the lever in either of its end positions and thermostatic means adapted to actuate the independent locking means.

2. In an automatic temperature regulator of the class described, a self-closing liquid supply valve, a spindle carrying the same, a lever engaged by said spindle and adapted to open the valve, a self-emptying bucket suspended from the lever and adapted to receive a temperature regulating liquid, a spring for raising the lever and bucket, the combined weight of the lever and charged bucket exceeding the pull of the spring, while said pull exceeds the weight of the lever and emptied bucket, a pair of spring catches adapted to lock the lever in either

of its end positions, a pair of electromagnets for releasing said catches and thermostatic means adapted to actuate the electromagnets.

3. In an automatic temperature regulator of the class described, a valve casing having a seat, a liquid supply pipe and a liquid discharge conduit communicating with said casing, a valve adapted to engage the seat, a spring-influenced spindle carrying the valve and projecting downward through the casing, a lever hinged to the casing and engaged by the valve-spindle, a bucket suspended from the lever below the discharge conduit, said bucket being provided with a lower liquid outlet port and a plurality of upper overflow openings, the area of the port being less than that of the discharge conduit, a splasher surrounding the bucket, a liquid receptacle the temperature of which is to be regulated, means for connecting the splasher with said receptacle, a lifting spring engaging lever, means for locking the lever in either of its end positions and thermostatic means adapted to actuate the locking means.

4. In an automatic temperature regulator of the class described, a supply pipe, a discharge conduit, a valve intermediate said pipe and conduit, a lever operatively connected to said valve, a bucket suspended from the lever below the discharge conduit, said bucket being provided with a lower liquid outlet port and a plurality of upper overflow openings, the area of the port being less than that of the discharge conduit, a splasher surrounding the bucket, a liquid receptacle the temperature of which is to be regulated, means for connecting the splasher with said receptacle, a lifting spring engaging the lever, means for locking the lever in either of its end positions and thermostatic means adapted to actuate the locking means.

5. In an automatic temperature regulator of the class described, a valve casing, a liquid supply valve inclosed therein and having a spindle that projects downward through said casing, a lever engaged by the valve-spindle, an apertured bucket suspended from the lever, independent adjustable means for raising the lever, means for locking the lever in either of its end positions, means for releasing said locking means, a receptacle the temperature of which is to be regulated and thermostatic means within said receptacle for actuating said releasing means.

6. In an automatic temperature regulator of the class described, a valve casing, a liquid supply valve inclosed therein and having a spindle that projects downward through said casing, a lever fulcrumed to the casing and engaged by the valve spindle, means for raising the lever to open the valve, an apertured bucket suspended from the lever, means for closing the valve upon a descent of the lever, a pair of electromagnets, spring-influenced armatures controlled thereby, wedge-shaped abutments on said armatures that are adapted to be engaged by the lever, and thermostatic means adapted to actuate the electromagnets.

7. In an automatic temperature regulator of the class described, a liquid supply valve, a lever controlling the same, mechanical means for locking said lever in either of its end positions, electromagnetic means for releasing said locking means, a bifurcated hanger depending from said lever, a bucket connected to the hanger and having a lower liquid outlet port and a plurality of upper overflow openings, a spring attached to the lever, a threaded bolt connected to the spring, a bracket in which said bolt is guided, a nut on the bolt that rests on said bracket and thermostatic means adapted to actuate the lever-locking means.

Signed by me at Barmen, Germany this 17th day of January 1911.

HEINRICH HOHLMANN, JR. [L. S.]

Witnesses:
CHAS. J. WRIGHT,
WALTER VONNEGUT.