W. FROST.

BURNER FOR VULCANIZERS.

APPLICATION FILED MAR. 1, 1920.

1,388,032.

Patented Aug. 16, 1921.

2 SHEETS—SHEET 1.

Fig. 4.

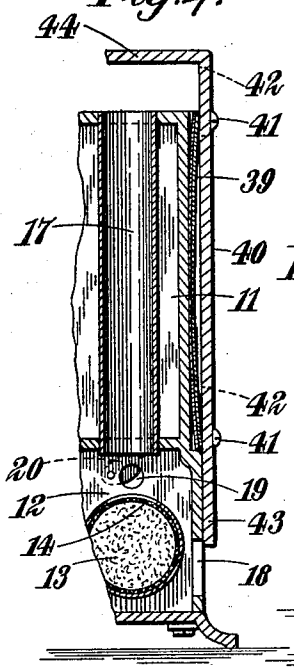


Fig. 1.

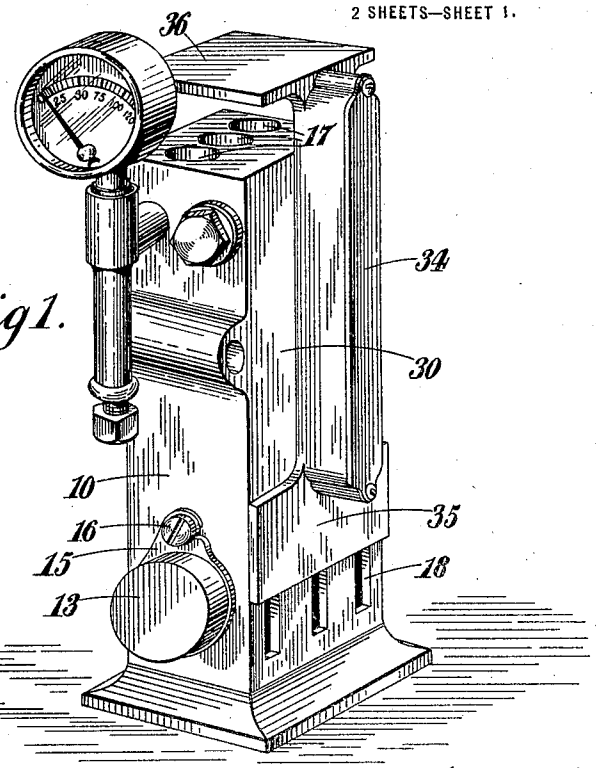


Fig. 2.

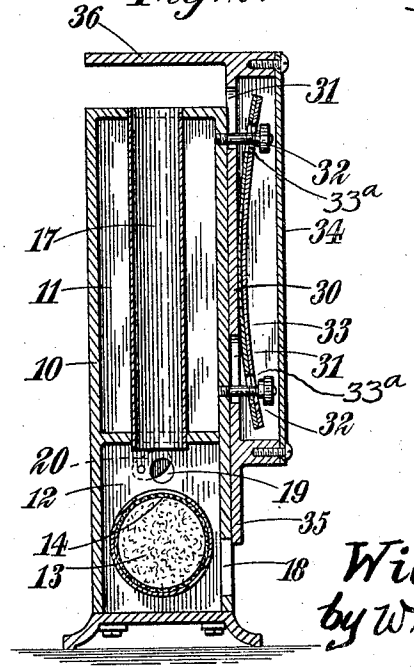
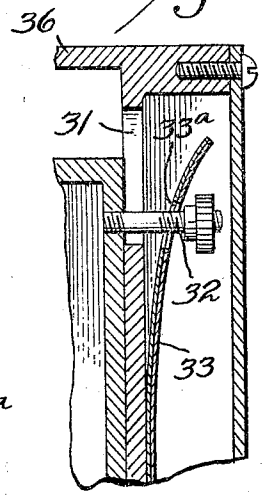


Fig. 3.



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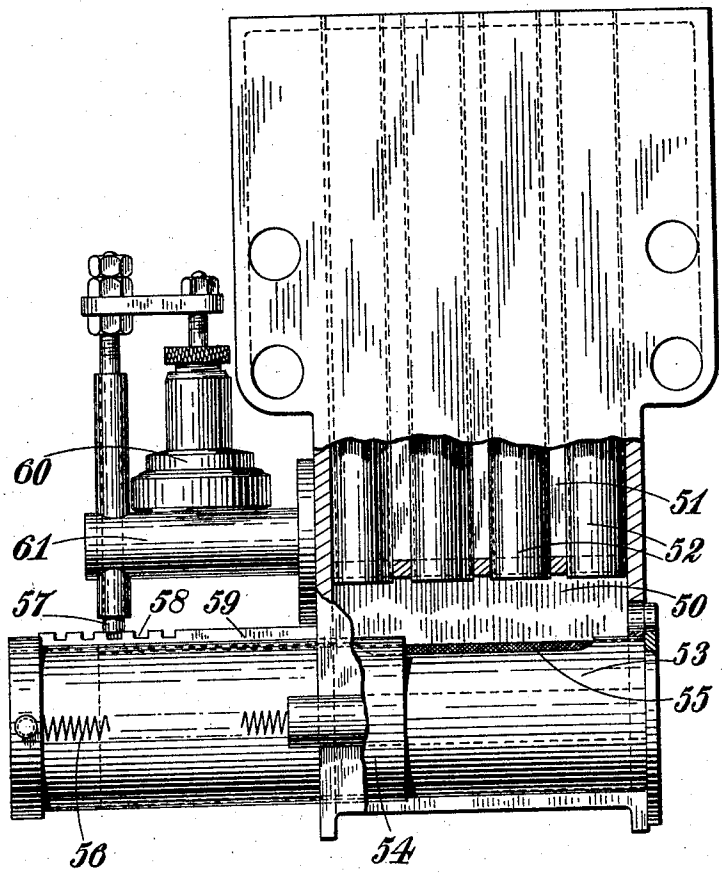
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2 SHEETS—SHEET 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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BURNER FOR VULCANIZERS.

1,388,032. Specification of Letters Patent. **Patented Aug. 16, 1921.**

Application filed March 1, 1920. Serial No. 362,180.

To all whom it may concern:

Be it known that I, WILLIAM FROST, a subject of the King of England, residing at London, England, have invented certain new and useful Improvements in Burners for Vulcanizers, of which the following is a specification.

This invention is for improvements in or relating to vulcanizers of the type wherein the steam-generation is effected by a burner having a wick or its equivalent, such as a gauze sheet, fed with liquid-fuel, such for example as methylated spirit.

The main object of this invention is to provide a construction of vulcanizer whose burner control shall be effective in operation and shall operate quickly when actuated.

Another object is to provide a control for the burner which can be brought initially into one of a number of adjusted positions to regulate the burner when the latter is started.

In these vulcanizers, it has been the practice to provide a member movable to regulate the heat or extinguish the burner, such member for example, covering and uncovering the orifice of the burner. The regulation can also be effected by controlling the air supply to the burner or the outlet-flues therefrom.

According to this invention there is provided in a burner of the type described for a vulcanizer, the combination with a member that is mounted to slide to regulate or extinguish the burner, of a yielding-control which tends always to move the member so as to reduce or extinguish the heating effect of the burner, and retaining means to hold it back against the yielding-control, which means is automatically operated by the vulcanizer, (for example by the steam-pressure or temperature generated therein), to release the member.

According to another feature of the invention, there is provided in combination with a slidably mounted controlling-member that is frictionally held against its yielding-control, of means such as a bi-metallic spring or a flexible diaphragm, normally exerting pressure to produce the desired friction, but so arranged that the heating of the vulcanizer reduces the said pressure to release the controlling member; the said reduction in pressure can be obtained by deforming the spring by increasing its temperature, or by exerting steam pressure on the diaphragm to move it.

Other features of the invention will be hereinafter described, and the novel details pointed out in the claims.

In the accompanying drawings, which illustrate various embodiments of this invention,

Figure 1 is a perspective view showing one embodiment;

Fig. 2 is a side view in central section of Fig. 1;

Fig. 3 is a fragmentary enlarged sectional view of the spring of Fig. 2;

Fig. 4 is a view similar to Fig. 2 illustrating a modification; and

Fig. 5 is a longitudinal central section of another modified construction.

Like reference characters indicate like parts throughout the drawings.

Referring first to Figs. 1 and 2, the device comprises a casing 10 divided into upper and lower chambers 11, 12 respectively, the upper chamber 11, constituting the water and steam space, and the space 12 constituting the burner-chamber. The burner is illustrated as a cylindrical casing 13, packed with an absorbent material and having an opening 14 in the side covered with wire gauze. With this burner methylated spirit or other suitable material is used as the fuel in the known manner and the whole burner is mounted in circular openings in the side walls of the casing 10, being retained in place by a notched lug 15, engaging a pin or screw 16, as shown in Fig. 1.

A number of pipes 17 extend through the chamber 11 from the chamber 12 to the upper end where they are open to atmosphere, and these tubes constitute the flues whereby the products of combustion pass away from the burner and give up their heat to the water in the chamber 11. The air inlet to the chamber 12 is provided by a series of slots or openings 18 in one side wall thereof; a small additional opening 19, with an adjustable cover 20, may also be provided, if so desired.

A shutter-member 30 is mounted on one of the vertical faces of the casing 10, and it has two slots 31 through which pass pins 32 fixed in that casing, so that the member 30 can slide relatively to the casing.

A metallic bow-spring 33 is mounted on the pins 32 so as to press the part 30 against

the wall of the casing 10 and hold it frictionally in any position to which it may be adjusted. This spring is conveniently inclosed in a casing or box formed on the part 30 and covered by a plate 34. The part 30 further carries at its lower end a plate 35 which is adapted to cover the openings 18 when the shutter-member 30 is down in its lowest position, and it also carries a plate 36, which, in this position, covers the upper ends of the tubes 17.

In Fig. 3, the spring 33 is bimetallic and is so arranged that it exerts its pressure by virtue of its curved shape, and the metal having the greater expansion coefficient is placed on the concave side so that when the spring becomes heated by conduction through the wall of the steam chamber, it tends to straighten, this being facilitated by the freedom of the pins 32 in the slots 33^a, and thereby reduces the pressure which it exerts on the member 30.

In the operation of this device the shutter is opened to any desired extent and the burner is lighted. When the requisite temperature for vulcanization has been attained by the steam in the chamber 11, the spring 33 operates in the manner above described, to release the frictional hold on the shutter-member 30 so that the latter falls and closes the air-inlets 18 and the outlets 17, thereby extinguishing the burner and preventing any further undesirable rise of temperature. It is obvious that the burner need not be completely extinguished as the shutters could be arranged so as merely to diminish the heating effect of the burner instead of completely extinguishing it.

In the modified construction illustrated in Fig. 4, the device is similar as to the majority of the parts, these parts being indicated by the same reference characters as in Figs. 1 and 2. The modifications consist in the construction and arrangement of the sliding-shutter; in this case a plate 40 fits against the side wall of the chamber 10, conveniently, being of the same dimensions as that wall. The lower portion 43 is adapted to control the air-inlets 18, and a flange or plate 44 at the top controls the flues 17 in the manner hereinbefore described. This plate 40 is mounted to slide on the face of the casing 10, being guided by screws 41, engaging slots 42 in the plate 40. A notch or recess is provided in the wall of the chamber 10 and a bimetallic spring 39 of bowed formation is mounted therein. This spring is similar to the spring 33 previously described, and operates in the same manner except that it presses the plate 40 outward against the heads of the screws 41 to provide the frictional retaining grip.

In both these constructions the spring is adjusted to operate at the desired temperature by stressing it in position by any convenient means. As shown in Fig. 2, the ends of the springs are seated against adjustable nuts on the pins 32. In the construction illustrated in Fig. 4, the same arrangement may be used, *i. e.* adjustment can be effected by providing two adjusting screws similar to those in Fig. 2, or if desired, only a single adjusting screw may be used at one end.

The operation of this device is similar to that already described, and need not be repeated.

In the modified construction illustrated in Fig. 5, the device comprises a burner-chamber 50, a water and steam chamber 51, and tubes 52, serving as the outlet flues from the burner similar to the constructions already described. The burner 53 is also similar, but it is controlled by a sliding cylindrical shutter 54, which is movable longitudinally of the cylindrical burner 53, to cover the orifice 55 from which the flame issues. This shutter 54 is controlled by springs 56 which tend to bring it into its closed position. A detent 57 is provided to engage a notch or notches 58 formed in a bar 59 secured on the shutter 54 and to hold it against the returning action of the springs 56, and this detent is operated, that is to say lifted out from its notch 58, by any convenient device whereof the action is determined by the pressure or temperature existing in the steam-chamber 51.

In the construction illustrated, a flexible or spring-controlled diaphragm is mounted in a chamber 60, which communicates by a passage 61 with the interior of the steam-chamber, and the arrangement is such that the detent 57 is normally pressed downward into a notch 58, but when the steam pressure has attained a sufficiently high value, it lifts the detent 57 to release the shutter 54, which is thereupon moved by the springs 56 to close the burner. Obviously, instead of a pressure-operated diaphragm, a device such as a bimetallic rod controlled by the temperature existing in the steam-chamber could be used to release the detent.

In other details, the operation of this device is similar to that already described and therefore need not be repeated.

It will be appreciated that in all the constructions hereinbefore described, the controlling-shutter can be opened to any desired degree and retained therein until released by the automatic control. In the case of the construction illustrated in Fig. 5, instead of a series of notches to engage the detent, an adjustable stop may be provided, this stop being adjustable along the bar 59.

It will also be appreciated that in the construction illustrated in Fig. 5, the shutter could control the burner by a rotary movement instead of an axial movement, or that by providing suitable openings in the shutter,

the manual control to determine whether the burner shall be fully opened or only partially opened can be effected by one movement, say the rotary movement, and the extinguishing could be effected by the other movement, that is to say the axial movement. The precise form of the trip mechanism for such device need not be described in detail since it may take various forms, as will be obvious to those skilled in the art.

Finally, it will be appreciated that although one type of burner has been referred to in the above description the invention is applicable to any other type of burner which it may be desired to use.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a slidable controlling member for the heating-means mounted so that it tends to move to diminish the heating effect of same, and retaining-means normally holding said controlling member back against its tendency to move, and arranged to release the same under the automatic control of the heating chamber.

2. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a slidable controlling member for the heating-means mounted so that it tends to move to diminish the heating effect of the same, and retaining-means normally holding said controlling member back against its tendency to move and arranged to release the same under the automatic control of the temperature of the heating chamber.

3. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a slidable controlling member for the heating-means mounted so that it tends to move to diminish the heating effect of the same, and retaining-means in the form of a yielding control that normally frictionally holds said controlling member back against its tendency to move and is arranged to release the same under the automatic control of the heating chamber.

4. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a controlling member that is slidable to regulate the heating effect of the heating-means, a yielding control that tends always to move said controlling member to reduce said heating effect, and retaining-means normally holding said controlling member back against the action of said yielding control and arranged to release the same under the automatic control of the heating chamber.

5. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a controlling member mounted to slide on a wall of said heating chamber, and thereby regulate the heating effect of the said heating-means, and pressure-exerting means automatically controlled by the heating chamber and arranged to normally press the controlling member against said wall and hold it frictionally in its inoperative position.

6. In a vulcanizer, the combination with a heating chamber, and heating-means for heating the same, of a controlling member mounted to slide on a wall of said heating chamber and thereby regulate the heating effect of the said heating-means, and a bimetallic spring automatically controlled by the temperature of the heating chamber and arranged to normally press the controlling member against said wall and hold it frictionally in its inoperative position.

7. In a vulcanizer, the combination with a heating chamber, and heating-means therefor having an inlet for air, of a gravity-actuated shutter that is movably mounted on said chamber to control the flow of air through said inlet, and a bimetallic spring arranged to press the shutter against its support and thereby hold the same in its inoperative position, which spring is so situated as to be heated by the said heating chamber and is so arranged that its deformation, when heated, reduces the pressure on the shutter and permits the latter to fall under the action of gravity and thereby close said inlet.

8. In a vulcanizer, the combination with a heating chamber, and heating-means therefor having an inlet for air and an outlet for combustion products, of a gravity-actuated shutter that is movably mounted on said chamber to control the flow of air and combustion products through said inlet and said outlet, and a bimetallic spring arranged to normally press the shutter against its support and thereby hold the same in its inoperative position, which spring is so situated as to be heated by the said heating chamber and is so arranged that its deformation, when heated, reduces the pressure on the shutter and permits it to fall under the action of gravity and thereby close said inlet and said outlet.

In testimony whereof I affix my signature.

WILLIAM FROST.