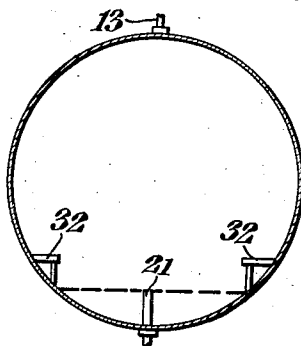
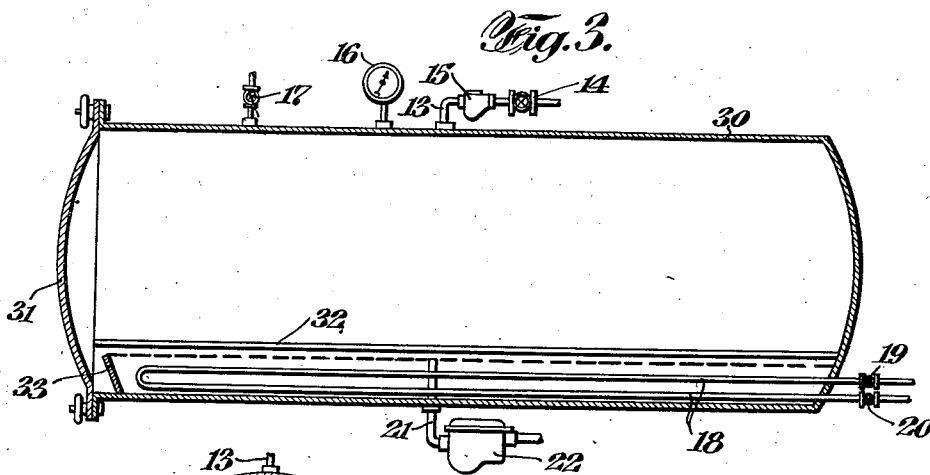
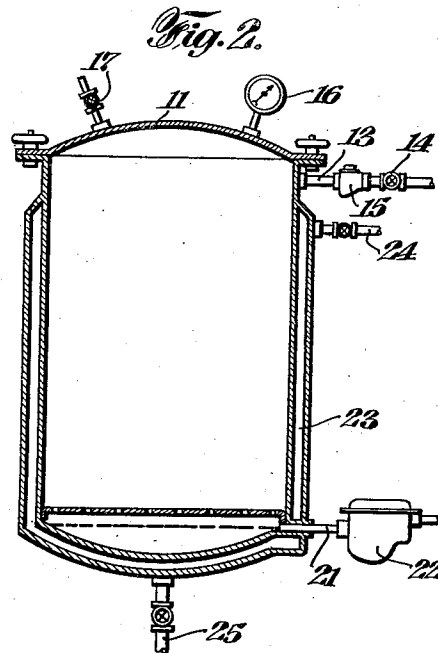
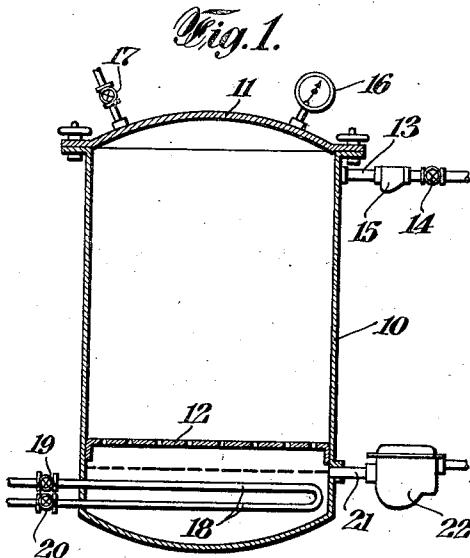


Oct. 28, 1941.

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AUTOCLAVE AND THE LIKE

2,260,710

Filed May 18, 1939



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2,260,710

AUTOCLAVE AND THE LIKE

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Application May 18, 1939, Serial No. 274,389

3 Claims. (Cl. 23—290)

This invention relates to vulcanizers, autoclaves and the like, and more especially to the arrangement of means for supplying heat to articles within such devices.

Heretofore it has been customary to heat autoclaves or other similar closed chambers by introducing live steam directly into such chamber. The steam is condensed while giving up heat to the treated goods and to the autoclave itself. However, in many cases the condensate is contaminated and cannot be returned to the boiler and, therefore, in most installations, as for instance, in rubber plants, the condensate is not reclaimed but is disposed of in any suitable manner. This procedure entails a number of disadvantages such, for example, as loss of heat, loss of condensate and the necessity of steadily venting the autoclave in order to eliminate air and gases introduced with the steam. The continuous venting during the entire steaming operation is another source of steam loss, as it is difficult to separate air or gases from steam. Furthermore, if the steam is throttled from a higher to a lower pressure, the steam becomes superheated which generally is another undesirable feature.

In order to overcome the disadvantages of direct steam supply, indirect heating means are sometimes used and heating jackets or coils are provided in the lower part of the autoclave. Some water previously introduced into the steam space is evaporated when the heat is turned on. The heating surfaces are usually so arranged that any condensate produced will eventually touch such surfaces, thereby assuring evaporation of the liquid and the filling of the autoclave with steam.

The heating cycles of autoclaves and the like are usually composed of two parts, *a* the heating up period and *b* the curing period at a predetermined temperature. The indirect heating surfaces have to be dimensioned to satisfy the greatest heat demand in a given time which occurs during the heating up period. Experience shows, however, that the exclusive use of such indirect heating means is often not practicable because of excessive equipment cost, limited space for coils or jackets or a high pressure involved.

An object of this invention is the combination and the particular arrangement of direct and indirect heat sources in autoclaves to assure a quick heating up and a minimum of the heat and condensate losses. In particular, this invention prevents the loss of any heating fluid dur-

ing the second part of the operation known as the curing period in as much as there is no necessity of adding heating medium into the curing chamber during this time.

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawing, wherein

Figure 1 is a vertical section through one form of autoclave embodying the invention;

Figure 2 is a vertical section through a second form of autoclave;

Figure 3 is a vertical section through a third form of autoclave; and

Figure 4 is a section on the line 4—4 of Figure 3.

In Figure 1 is illustrated a typical autoclave comprising a body 10 having a removable cover 11 and a false bottom or perforated shelf 12 on which the goods to be steam treated are supported. A pipe 13 is provided for introducing steam into the top of the autoclave and the pipe is provided with a control valve 14 and a check valve 15. A pressure gauge 16 or thermometer is provided on the lid or cover 11 and likewise an air vent 17 is supported by such cover.

In the bottom of the chamber is provided a coil 18, the inlet and outlet of which are provided with control valves 19 and 20. An outlet pipe 21 leads from the chamber 10 below the false bottom 12 and above the coil 18 and is equipped with a steam trap 22 which prevents any evacuation of vapor, but acts as an overflow for condensate to maintain a body of liquid in the chamber 10 having its level below the false bottom 12 and above the coil 18.

When the autoclave has been properly loaded and closed, heating medium is supplied to the coil 18 by opening the valves 19 and 20 and live steam is admitted through the pipe 13 by opening the valve 14. The resulting indirect and direct heating action assures a quick rise in pressure and temperature within the chamber. The condensate formed flows to the bottom of the vessel where it is re-evaporated by contact with the coil 18. As soon as the heating up period is finished and the desired temperature or pressure is reached, the valve 14 is closed and the curing period begins. Up until this time the vent 17 advantageously is kept open in order to eliminate all air and gases. However, during the curing period the vent should be kept closed as no more air will be introduced into the chamber. With proper dimensioning of the heating coil the curing temperature will be maintained and there

will be no condensate overflow during the curing period.

When the process is terminated the valves 19 and 20 are closed and the steam pressure is relieved through the vent 17. The lid 11 then may be removed for extraction of the goods. Also it may be advisable to provide a hand operated or an automatic water feeding source for the purpose of maintaining a proper supply of water in the lower part of the autoclave. Such means is not herein shown as under many conditions of operation sufficient liquid will remain in the bottom of the chamber after each run to supply the liquid necessary for the subsequent run.

In the modification disclosed in Figure 2 the coil 18 is omitted and in place thereof there is provided a jacket 23 to which steam is supplied through the pipe 24 and condensate is removed through the pipe 25. The remainder of the autoclave is of the same construction as shown in Figure 1 and its operation is the same as that of Figure 1.

In the modification illustrated in Figure 3 the autoclave 30 is horizontal and is provided with the removable end 31. The goods to be treated are supported by a carriage (not shown) having wheels which run on the tracks 32. In this modification a coil 18 is arranged in the lowest part of the vessel and in such way as not to interfere with the carriage. At the open end of the chamber is provided a barrier or dam 33 tightly attached to the outer shell so as to prevent the escape of liquid through the open end of the autoclave. The chamber of this modification is provided with a gauge 16, vent 17, steam inlet 14, and condensate outlet 21, the same as in the previous modifications.

The operation of the apparatus disclosed in Figures 3 and 4 is the same as that of the previous modifications, except that the goods to be treated are introduced into and removed from the chamber 30 while being supported by a car-

riage. Indirect heat is supplied by the coil 18 and live steam is supplied through the pipe 14.

I claim:

1. In a device of the character described, a closed chamber, a steam inlet in its upper portion, reticulated article supporting means spaced from the bottom of said chamber, an outlet leading from said chamber above the bottom thereof and below said supporting means, a steam trap in said outlet permitting escape of excess condensate and maintaining a body of condensate in the chamber having its level below said supporting means, and means for supplying indirect heat to liquid in the bottom of said chamber.

2. In a device of the character described, a closed chamber, a steam inlet in its upper portion, reticulated article supporting means spaced from the bottom of said chamber, a coil in said chamber below said supporting means, means for supplying heating medium to said coil, and an outlet leading from said chamber above said coil and below said supporting means, and a steam trap in said outlet permitting escape of excess condensate and automatically maintaining a body of condensate in the chamber having its level below said supporting means and above said coil.

3. In a device of the character described, a horizontal cylindrical chamber open at one end, a cover therefor, horizontal tracks in said chamber for an article supporting carriage, a baffle across the open end of said cylinder below said tracks, an outlet leading from said chamber above the bottom thereof and below said tracks, a steam trap in said outlet permitting escape of excess condensate and maintaining a body of condensate in the chamber having its level below said supporting means, means for supplying indirect heat to liquid in the bottom of said chamber, and means for supplying steam to the upper portion of said chamber.

JEAN F. GSCHWIND.