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AUTOMATIC CONTROL VALVE FOR KIERS

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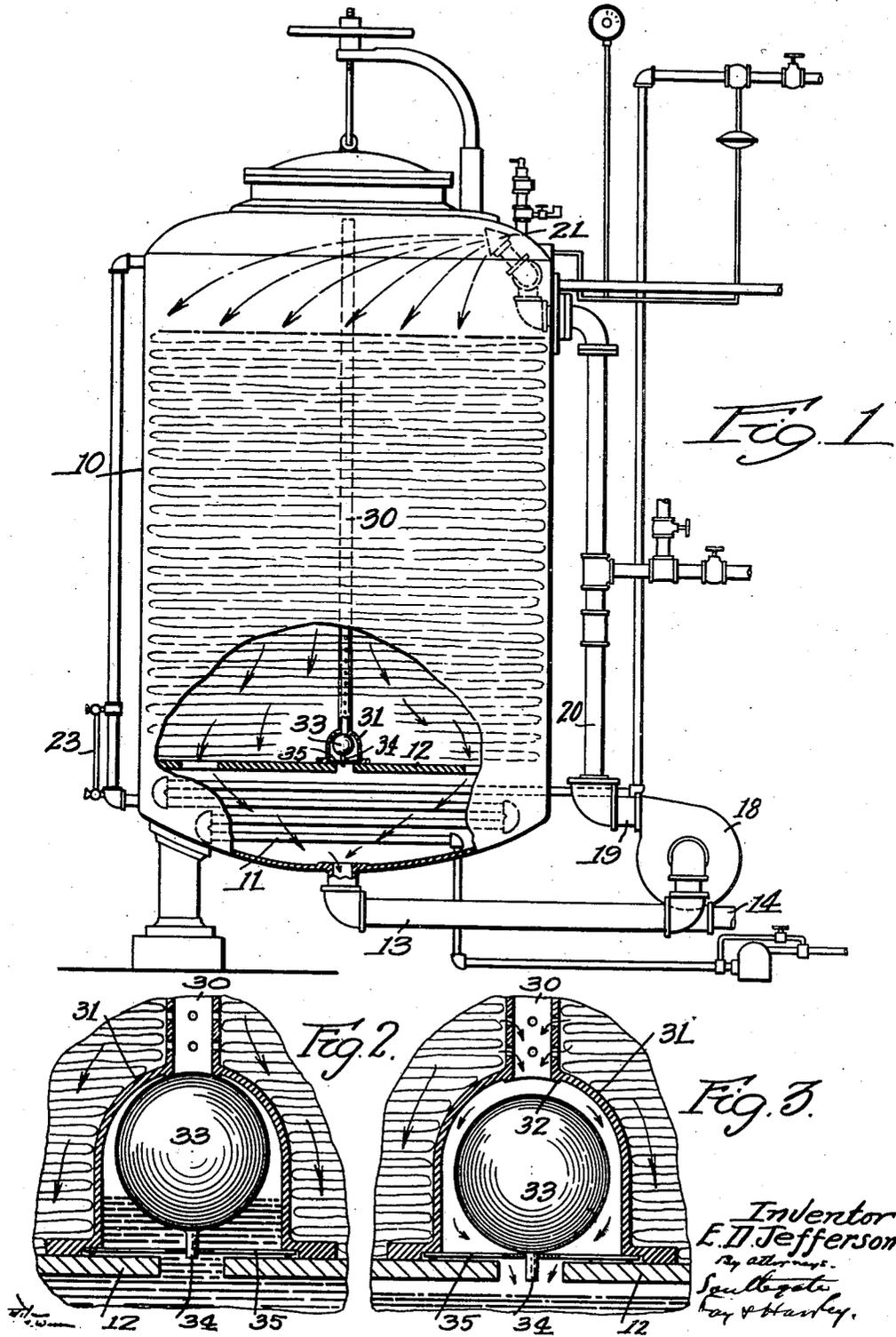


Fig. 1.

Fig. 2.

Fig. 3.

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AUTOMATIC CONTROL VALVE FOR KIERS

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The principal objects of this invention are to provide an internal automatically operating valve for regulating the circulation in a kier to overcome the possibility of a bad boil and to provide simple and effective means in the kier for controlling the flow of liquor down at the center of the kier to drain it by gravity into the region of the coils without being obstructed by the goods above. This is an improvement over the arrangement shown in my copending application for patent, Serial No. 524,438, filed March 23, 1931.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing, in which.

Fig. 1 is a diametrical sectional view of a kier constructed in accordance with this invention;

Fig. 2 is an enlarged sectional view of the valve showing it closed, and

Fig. 3 is a similar view showing the valve open.

The sizing materials now used in kiers usually contain mineral oils and corn starch or other unsaponifiable materials which are apt to obstruct the flow of liquor so as to pull the well dry under the grates and choke the top of a pump operated kier. This trouble is apt to last until the mass of liquor and goods gets to a certain temperature high enough to melt these materials. Unless the temperature is raised slowly and evenly at the start, gummy substances are formed in masses throughout the kier and a bad boil follows.

The automatic control is dependent upon the liquor below the grate. If for any reason that in the goods above the grate does not come down fast enough, the liquor below the grate will be pumped out and recede from the goods and my automatic regulation is controlled by the level in the well.

The kier is packed full of goods and it is well known that there is seldom any difficulty with the treatment of the goods around the circumference of the kier for a space of twelve or fourteen inches from the outer walls. It is in the center that the trouble

occurs. There is no way for the liquor to drain through the goods except, of course, by gravity as the pump, for well known reasons, cannot act to help it. For the purpose of allowing the liquor to come down through at the center I employ an equalizing pipe in the heart of the mass, perforated so that the liquor can work down through it. The liquor at the center can enter this pipe through the perforations and drop to the bottom of the goods by gravity, as in my above identified application. The percolation of the liquor down through the goods is equalized at the center in this way and the goods are treated as well at the center as they are at the circumference of the kier.

The chief new feature of this invention is the provision of an automatic valve in the kier to control the drawing of liquor out of the bottom of the equalization pipe.

In the form shown I have illustrated a well known type of kier 10 having a steam heating coil 11 in the well below the grate 12 for heating the liquor therein by indirect heat or radiation. From the bottom of the kier is a discharge pipe 13 which is connected with a drain 14. It is also connected through the pipe 13 with a pump 18. The discharge pipe 19 of this pump is connected with a vertical pipe 20 which extends up to the top of the kier outside and is connected with a spraying device or nozzle 21 for spraying the liquor into the top of the kier and spreading it all over it. A gauge 23 can be used to indicate when waxes obstruct the flow.

As stated above, under certain circumstances, the liquor in the well below the grate 12 can drop down and a liquid level can be formed. Extending up from the grate to a point above the goods is a perforated pipe 30 terminating at the bottom in a bell-shaped chamber 31. This pipe preferably is perforated every six inches. The top of this chamber has a valve seat 32 for a hollow metal float valve 33. The chamber 31 is bolted to the grate. The float valve 33 has a vertical guide pin 34 guided in a hole in a fixed guide bar 35.

Under normal operation of the kier the

float 33 is always as high as possible and closed, as shown in Fig. 2. It opens only when the unusual circumstance happens that the pump is drawing out the liquor faster than it is draining down from the cloth and the level gets below that shown in Fig. 2. The level may get down low enough so that possibly the heating coil may be exposed to the air and there might be a possibility of the water being drawn out and the well being left dry. Before this can happen the valve 33 is opened as shown in Fig. 3. Now the liquor can drain down into the well.

As explained above it is difficult to secure even treatment of the goods under the present conditions of treating cotton and that is due to the fact that the liquor cannot descend as rapidly at the center where the goods are packed tightly. Now with this equalizing pipe 30 the liquor that gathers around the center can enter this pipe and drop down if the valve opens.

Under ordinary operation, with everything working well, the float 33 will stay at the top and keep the pipe 30 closed. The pump 18 operates and forces the liquor into the kier at the top. I not only get the ordinary percolation of the liquor downwardly through the goods, but at the center I get an additional drop of the liquor through the pipe 31 when this is required. This may be considered as excess liquor and it comes out of the pipe near the bottom and immediately drains into the well.

Although I have illustrated and described only one form of the invention I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore I do not wish to be limited in this respect otherwise than as set forth in the claims but what I claim is:—

1. In a kier, the combination of a grate, a well below the grate, a perforated pipe extending from the grate upwardly, and a float at the bottom of the pipe for closing it when the liquor level at the bottom is above the grate and opening it otherwise to allow the liquor to drain down into the well below the grate.

2. In a kier, the combination of a grate and a perforated pipe extending from the grate upwardly to near the top of the kier, said pipe having a valve seat at the bottom above the grate, a chamber below the valve seat, and a float valve in said chamber for controlling the drainage of liquor from the bottom of the pipe.

3. The combination with a kier and a pump for supplying it with liquor at the top of a central vertical perforated pipe in the kier, a grate below the bottom of the pipe, a chamber with the top of which the pipe communicates, a valve seat in the cham-

ber and an automatically operating valve in the chamber for opening and closing communication between the pipe and chamber in accordance with any free level of liquor in the chamber.

4. The combination with a kier, a grate therein and a pump for supplying the kier with liquor at the top, of a liquid level operated, normally closed, valve inside the kier at the grate for increasing the drainage of liquor to a point below the grate when the pump draws out the liquor faster than it drains down below the grate with the valve closed.

In testimony whereof I have hereunto affixed my signature.

EUGENE D. JEFFERSON.