

J. A. BUTLER.

KEIR.

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Fig. 1.

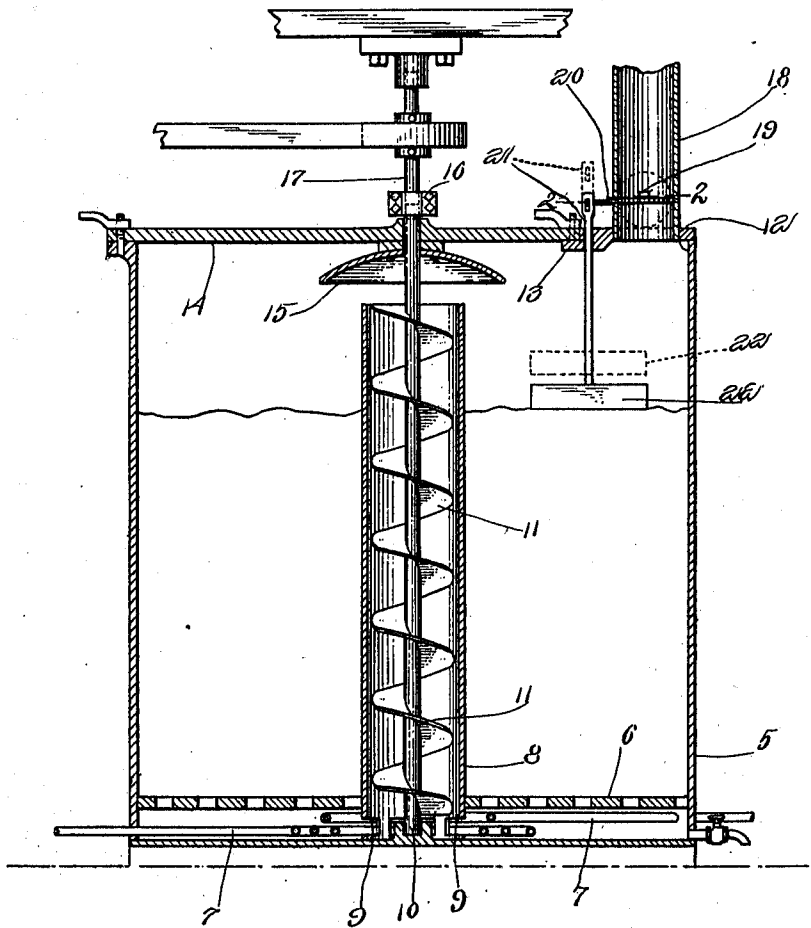
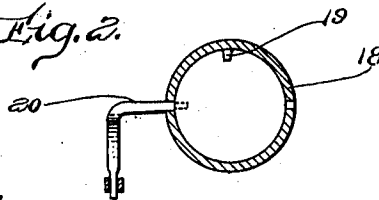


Fig. 2.



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UNITED STATES PATENT OFFICE.

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KEIR.

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To all whom it may concern:

Be it known that I, JAMES A. BUTLER, of Winthrop, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Keirs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention has reference to improvements in keirs and relates particularly to improvements in that class of keirs in which textile fabric is subjected to some part or step of the bleaching process or of the subsequent washing.

One object of this invention is to so construct a keir, in which textile fabric can be subjected to the action of fluids, that, through the medium of the fabric expanded by the absorption of the fluid in which it is immersed, and by the rising of the fabric in the keir by reason of the ebullition of said fluid, an escape for the surplus gases may be automatically opened.

Another object of the invention is to improve the construction of keirs of this general nature.

The invention consists in the peculiar construction of the keir.

The invention also consists in the combination with a closed keir having a valved ventilating pipe at its upper portion, of the means, controlled by the height of the fabric in said keir, for operating the valve of said ventilating pipe.

The invention also consists in such other novel features of construction and combination of parts as shall hereinafter be more fully described and pointed out in the claim.

Figure 1, represents a vertical sectional view of the improved keir. Fig. 2, represents a sectional view of the vent pipe taken on line 2—2, Fig. 1, and showing the manner of mounting the valve.

Similar numbers of reference designate corresponding parts in both figures.

Keirs of this nature are adapted for use in the process of bleaching textile fabrics. In such process the fluid containing the bleaching agent is supplied to the keir and the fabric is immersed in such fluid, heat is now applied to raise the temperature of the fluid and said fluid caused to circulate through the fabric and is absorbed by the fabric to such an extent that the fabric swells while, by reason of the ebullition of the fluid, the folds of the fabric become loos-

ened and the mass of fabric increases in height until it ultimately fills the keir and forces the top therefrom. In order to prevent such damage it is necessary to watch the progress of the bleaching process and the swelling of the fabric and, from time to time, to reduce the heat and pressure and permit the contents of the keir to cool somewhat and settle. Such intermissions in the bleaching delay the same and cause a considerable loss of steam.

The present invention is herein shown as applied to a keir 5 having the perforated false bottom or fabric support 6 and provided with the steam pipes 7, 7 by which steam is supplied to raise the temperature of the fluid in the keir. Centrally disposed within the keir 5 is the cylindrical conduit 8, having the inlets 9, 9 at its lower end, and furnished with the shaft 10 which is rotatably mounted and has the spiral conveyor screw 11. Provision is made for closing the upper end of the keir by means of the cross member 12 having the lip 13 which affords a support for one edge of the closure 14 which latter is furnished with a bearing, for the shaft 10, and with the deflector 15 positioned above the upper open end of the conduit 8. At its upper end the shaft 10 is connected by means of the shaft coupling 16 or by any other well known means, with the power driven shaft. Member 12 has an opening of any suitable dimensions, determined by the conditions under which the keir is to be operated, and is supplied with the escape pipe 18 having the valve or damper 19 mounted to swing within said pipe and having the counterweighted arm 20 extending through an opening in said pipe and connected with the rod 21 vertically slidable in a guide opening formed in said member 12 and having, at its lower end, the follower 22 adapted to follow and rest upon the upper surface of the pile or quantity of fabric in said keir.

In preparing this keir for the bleaching operation the shaft coupling 16 is disconnected and the closure 14 is moved from position. Bleaching fluid is supplied to the keir and the fabric to be treated is placed therein through the open top of the keir. Closure 14 is now replaced and the shafts 10 and 17 are again connected by means of the coupling 16. The temperature of the bleaching fluid is raised by heat from the steam pipes 7, 7.

When motion is imparted to the shaft 17 the rotation of shaft 10 and its spiral blade 11 is effected and the heated bleaching fluid is elevated by the spiral blade 11 with such velocity that said fluid is driven against the deflector 15, spreads outward and falls in a shower upon the cloth through which it percolates until it reaches the false bottom 6 and passed through the perforations therein and then circulates between the steam pipes 7, 7 and again enters the conduit 8 through the openings 9, 9 again to be elevated by the worm blade 11. During such bleaching process the follower 22, resting on the upper portion of the body of fabric, is free to follow the swelling or shrinking of said body so that when said body of fabric swells or expands sufficiently to unduly increase its height the follower 22 is raised thereby to effect the partial opening of the valve or damper 19 whereby an avenue for the escape of the excess gases is opened and a partial contraction of the body of fabric results with the consequent downward movement of the follower 22 which permits the valve or damper 19 to close. This operation is repeated as often as the follower 22 is moved upward by the undue swelling of the fabric and without undue loss of steam. It is to be understood that the follower 22 is

supported by the body of fabric and that the level of the body of fluid, in the keir is considerably below the upper portion or surface of said body of fabric.

Various forms of valves for closing the vent pipe 18 may be utilized without departing from the spirit of this invention, and it is evident that the follower 22 and its connections with said valve or damper may also be modified.

Having thus described my invention I claim as new and desire to secure by Letters Patent.

A keir comprising a tank having at its upper end a fixed member and a removable closure supported at one end by said member, a vent pipe extending through an opening in said member, a follower having a rod slidably mounted in a vertical guide formed through said member, a valve movably mounted in said vent pipe and having an extension projecting through an opening in the wall of said pipe, and a connection between said extension and the follower rod, substantially as described.

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Witnesses:

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