

1,094,922.

3 SHEETS—SHEET 1.

Fig. 1. A cross-sectional view of a circular device. It features a central shaft (5) passing through a central hub (7). The shaft is secured by a nut (22) on its right end. Surrounding the central hub is a large circular ring (1) with a series of pointed, saw-tooth-like elements (8) arranged radially around its inner circumference.

Witnesses:
Horace A. Groseman.
Carl L. Choate.

Inventor:
Isaac H. Palmer.
By Emily Booth, James & Vaneys.
Attys.

I. E. PALMER.
 KEIR FOR CONDITIONING TEXTILE MATERIAL.
 APPLICATION FILED NOV. 23, 1911.

1,094,922.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 2.

Fig. 3.

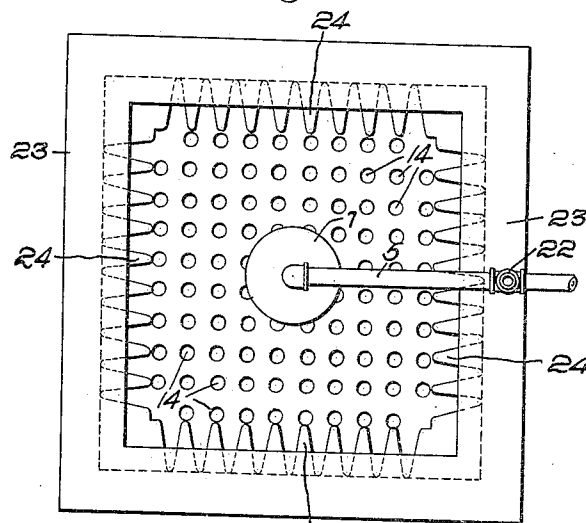
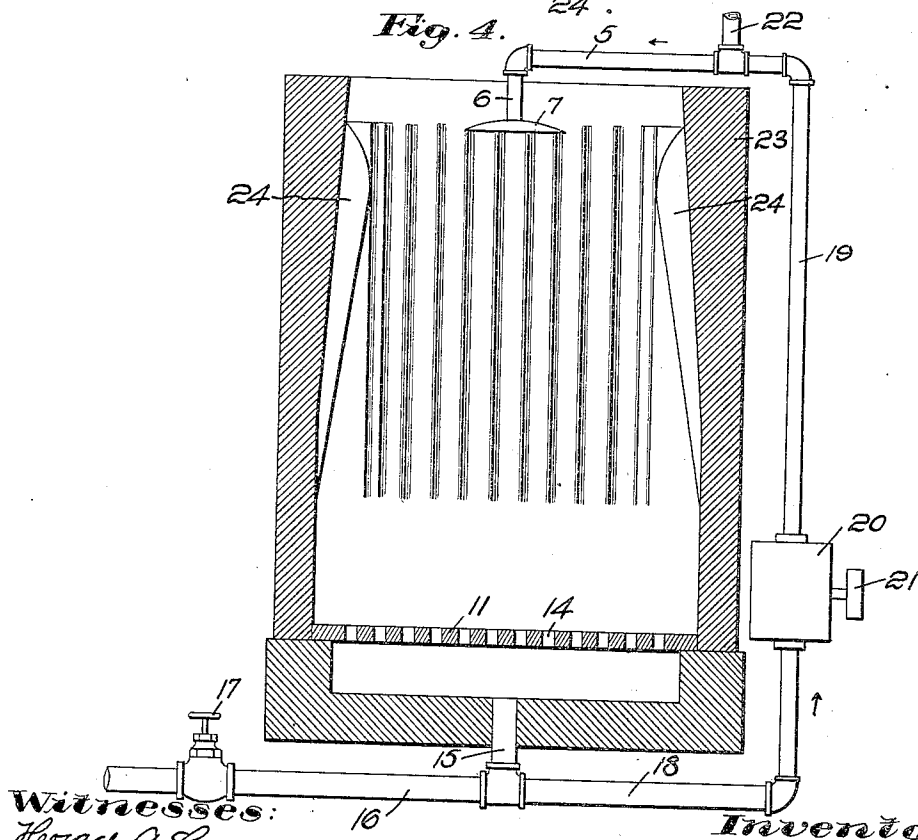


Fig. 4.



Witnesses:

Horace A. Crossman
 Carl A. Choate.

Inventor:

Isaac E. Palmer.

By Emory, Bond, Jarney & Vaneys
 Attys

I. E. PALMER.
 KEIR FOR CONDITIONING TEXTILE MATERIAL.
 APPLICATION FILED NOV. 23, 1911.

1,094,922.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 3.

Fig. 5.

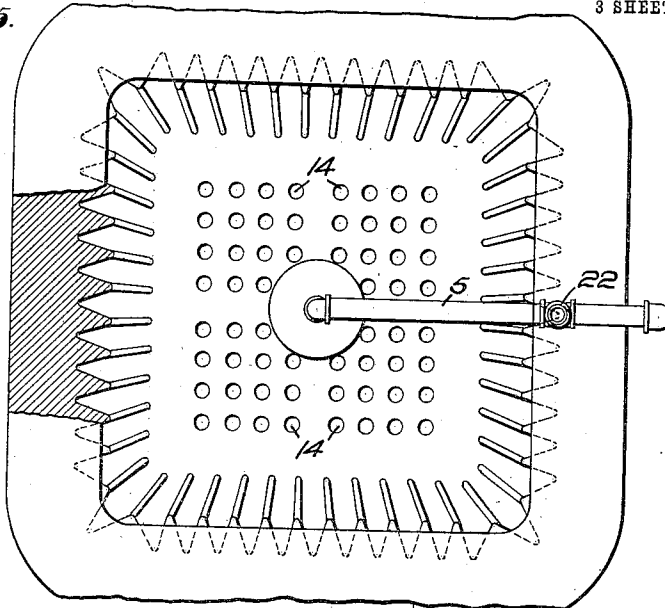
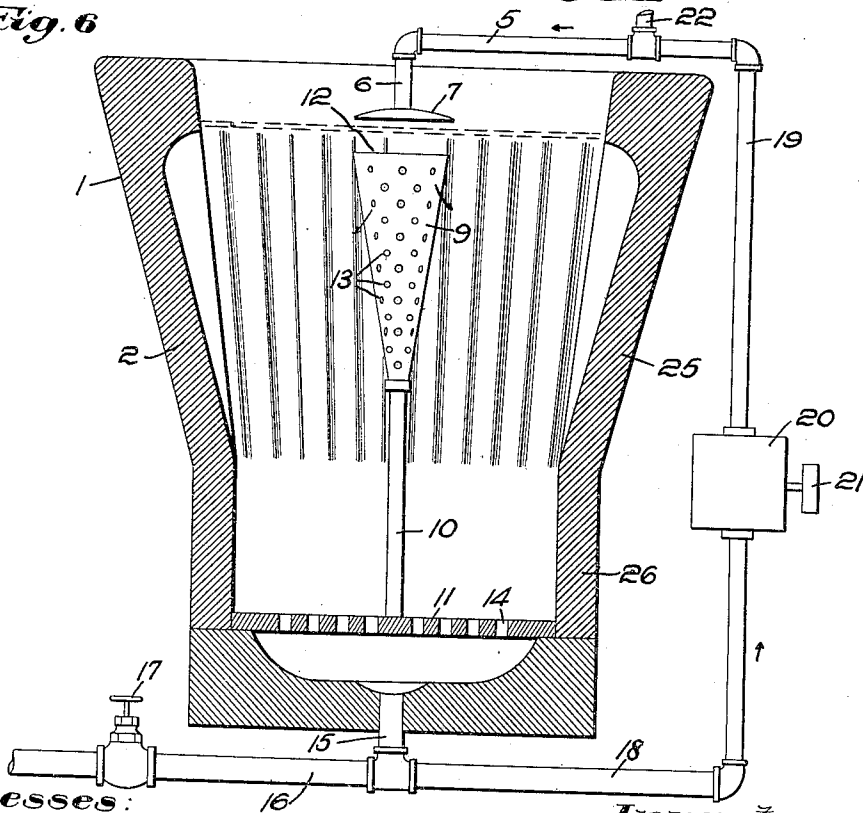


Fig. 6.



Witnesses:

Horace A. Groseman
Carl L. Choate.

Inventor:

Isaac E. Palmer.

by Emory Booth, James W. Vane, Attys.

UNITED STATES PATENT OFFICE.

ISAAC E. PALMER, OF MIDDLETOWN, CONNECTICUT.

KEIR FOR CONDITIONING TEXTILE MATERIAL.

1,094,922.

Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed November 23, 1911. Serial No. 661,923.

To all whom it may concern:

Be it known that I, ISAAC E. PALMER, a citizen of the United States, and a resident of Middletown, in the county of Middlesex and State of Connecticut, have invented an Improvement in Keirs for Conditioning Textile Material, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to keirs for treating textile material by a dyeing, bleaching or other operation, and is more particularly intended for use upon batch work.

In order that the principle of the invention may be readily understood, I have disclosed a single embodiment thereof in the accompanying drawing, wherein,—

Figure 1 is a plan view of a keir constructed in accordance with my invention; Fig. 2 is a vertical central section thereof; Fig. 3 is a view similar to Fig. 1 of a slightly modified form of keir; Fig. 4 is a vertical central section thereof; Fig. 5 is a plan view partially in transverse section of still another form of my invention; and Fig. 6 is a vertical central section thereof.

The keir herein disclosed is particularly intended for use for batch work as distinguished from the continuous process, but obviously the keir herein disclosed may operate upon the material in any desired manner. Preferably, however, the material is introduced in batches into the receptacle and is there subjected to the action of a dyeing, bleaching or other treating liquid which is introduced into the upper portion of the receptacle preferably both peripherally and interiorly thereof, so as to percolate through the material and to be discharged from the lower end of the receptacle, from which point it is preferably re-introduced into the receptacle at its upper portion to be repeatedly circulated and re-circulated.

Referring more particularly to the drawings, and first to that form of my invention shown in Figs. 1 and 2, the keir or receptacle is indicated generally at 1, it being composed of any suitable material, such, for example, as concrete, or metal or wood having a porcelain or other preferably impervious lining. The said receptacle may be of any suitable shape, but preferably is circular in cross section, as indicated in Figs. 1 and 2. Preferably the receptacle is tapered

downwardly or contracted from at or near its upper end to a point 3, preferably above the bottom thereof, so that the treating liquid is gradually forced inwardly toward the central portion of the material under action. Moreover, the downwardly tapering form of receptacle permits the more ready entrance of the treating liquid into the more loosely compacted material at the upper end of the receptacle. From a point at or about the termination of the downwardly tapering portion 2 of the receptacle, the keir preferably is of increasing diameter, as indicated at 4, so as to permit the more ready discharge of the treating liquid and also to insure the thorough penetration of the material at the bottom of the chamber by the treating liquid.

The treating liquid of any suitable nature is introduced into the upper portion of the chamber by an inlet pipe 5, which is here shown as provided with a downwardly tapering portion ending preferably in a discharge nozzle or rose having a number of perforations, so that the entering liquid is broken up into a large number of streams, though, if desired, the liquid may enter in an unbroken stream. The goods are piled in any suitable manner within the keir to a level somewhat below the nozzle or rose 7 and preferably the treating liquid is introduced in such volume as to maintain the level thereof at a point above the level of the goods and preferably close to the nozzle or rose 7. Preferably, the treating liquid is percolated through the material from its periphery inward and also from its center outwardly so that all portions thereof are evenly subjected to the liquid. While this may be accomplished in different ways, I preferably provide the inner wall of the keir with a series of downwardly extending channels 8 which are shown in Fig. 2 as of greatest depth at their upper end and as gradually decreasing in depth toward their lower ends. By forming the grooves of markedly decreasing depth, an enforced inward circulation of the liquid is secured. Preferably said channels 8 extend to the point 3, thus terminating at that portion of the keir that is of the least internal diameter. In this manner, the treating liquid is introduced at all portions of the periphery of the material contained within the tapered portion. In order to introduce the treating liquid directly into the interior of the ma-

terial under treatment, I provide one or more percolating funnels, tubes or pipes adapted to receive the entering liquid at their upper end and to discharge the same into the mass of the material. In Fig. 2, I have shown a single pipe or funnel 9 tapering from its upper to its lower end, where it is supported in any suitable manner, as by a standard 10 rising from the diaphragm or partition 11. Said funnel may be supported in any other suitable manner, but preferably from its extreme lower or its extreme upper end, so as not to interfere with the material being treated. Said funnel 9 is preferably wholly open at its upper end 12 for receiving a portion of the liquid discharged from the rose 7 and is peripherally provided with preferably a large number of perforations 13, through which the liquid may be discharged into the interior of the material under treatment. In this manner the treating liquor is introduced both peripherally and interiorly of the goods.

The material under treatment is supported upon the partition 11, which is provided with a suitable number of perforations 14, which distribute the discharging liquid and compel it to pass substantially evenly through the material resting upon said partition. Below said partition 11 the keir is provided with a preferably central discharge pipe 15 provided if desired with a discharge pipe 16 having a valve 19 whereby the liquid may be at once discharged from the system. Preferably, however, I re-introduce the treating liquid again into the keir, and for that purpose provide a re-circulating pipe 18, the upper end 19 whereof is connected to the inlet pipe 7. Preferably also I provide a pump 20 driven in any suitable manner, for which purpose it may be provided with a pulley 21, whereby the treating liquid may be circulated and re-circulated through a keir. If desired, however, I may dispense with the circulating pump and provide a pipe 22 of sufficient height to receive a column of liquid, the volume and weight of which are sufficient to compel a circulation of the treating liquid through the keir and the re-circulation thereof. If I employ the pipe 22, then obviously I may provide suitable valves to direct the flow of the liquid into the keir and prevent it flowing through the vertical pipe 18, 19.

In Figs. 3 and 4, I have shown a slightly different form of my invention. Therein the keir 23 is rectangular though obviously any suitable cross sectional shape may be employed. I, however, dispense with the interiorly arranged funnel or pipe shown in Fig. 2 and rely wholly upon percolating the treating liquid from the periphery of the mass inwardly, for which purpose I provide the inner walls of the chamber 23 with the downwardly extending channels 24. Pref-

erably also in this form of my invention the keir is of gradually increasing diameter downward, as indicated, to at least the lower ends of the channels 24. I have found the gradually increasing diameter of the keir to be particularly effective in that form of my invention wherein the central or other funnel or tube 9 is omitted. Otherwise that form of keir shown in Figs. 3 and 4 may be and preferably is substantially similar to that shown in Figs. 1 and 2.

In Figs. 5 and 6, I have shown a form of apparatus differing from that disclosed in Figs. 1 and 2, mainly in that the keir below the downwardly tapering portion 25 is of uniform diameter as indicated at 26. I have here shown the keir or receptacle as of rectangular form in cross section.

The square or rectangular form of keir is particularly intended for use with flat goods which may be deposited therein by a suitable traversing device, not herein shown. The circular form of keir, such as shown in Figs. 1 and 2 is more particularly intended for use with goods in rope or chain form. In order to give sufficient pressure to secure the effective percolation of the treating liquid through the goods, a high level of the treating liquid is preferably maintained, as, for example, just below the discharge rose or nozzle 7. By providing means whereby the liquid may enter the material at the periphery and interiorly at various levels, I prevent the "packing" of the goods occasioned by introducing the treating liquid only upon the top of the goods. Obviously the peripheral channels and the funnel or funnels may be extended to the extreme bottom of the keir or receptacle, so as to distribute the liquid in this manner at all points throughout the vertical extent thereof.

Having thus described one illustrative embodiment of my invention, I desire it to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

Claims—

1. A keir for conditioning textile material comprising a receptacle for the material to be treated and a liquor circulating system comprising a pipe and circulating pump connected thereto, said pipe having a point of discharge above said material, and means permitting the percolation through the material of the treating liquor discharged from said pipe the walls of the receptacle being inwardly inclined adjacent the upper portion thereof, thereby to force the treating liquor inwardly toward the center of the receptacle.

2. A keir for conditioning textile material comprising a receptacle for the material to

be treated means to introduce the treating liquor into and to discharge it upon the material, and means to withdraw the said liquor from the receptacle and to reintroduce it therein for additional treatment, the walls of said receptacle having means permitting the percolation of a treating liquor through the contained material.

3. A keir for conditioning textile material comprising a receptacle for the material to be treated, and means arranged interiorly of the contained material for percolating a treating liquor therethrough, said receptacle having imperforate walls with downwardly extending percolation channels.

4. A keir for conditioning textile material comprising a receptacle having means for introducing liquid at the top upon the goods therein, a substantially centrally arranged discharge conduit extending upwardly from the lower portion of the receptacle into the mass of goods therein and perforated for the passage therein of the liquid and means for enforcing circulation of the liquor from the side walls inwardly.

5. A keir for conditioning textile material comprising a receptacle having channeled side walls, inwardly and downwardly inclined adjacent the upper portion of the receptacle, thereby to force circulating liquid toward the center of the receptacle before reaching the lower portion of said receptacle, and means for introducing liquid at the upper portion of said receptacle, for inward and downward circulation therein.

6. A keir for conditioning textile material comprising a receptacle having downwardly channeled walls, means for introducing liquid at the top of the receptacle upon the goods therein, a substantially centrally arranged, downwardly tapering, upright, perforated discharge pipe, and a conduit connecting said discharge pipe with the inlet, whereby the liquid may be circulated and re-circulated through the receptacle, the channels in said walls being inwardly inclined thereby to force the treating liquid inwardly toward said perforated discharge pipe.

7. A keir for conditioning textile material comprising a receptacle for the material to be treated, a pipe for introducing the treating liquid into the upper portion of the chamber, a pipe for discharging the liquid from the lower portion of the chamber, a perforated partition to receive the material and to distribute the discharge of the treating liquid said receptacle having downwardly channeled side walls enforcing inward circulation of the liquid.

8. A keir for conditioning textile material comprising a receptacle for the material to be treated, means for introducing the treating liquid into the upper portion of the chamber, said chamber tapering downwardly for a portion only of its vertical extent and a discharge pipe for the treating liquid below said tapering portion.

wardly for a portion only of its vertical extent and a discharge pipe for the treating liquid below said tapering portion.

9. A keir for conditioning textile material comprising a receptacle for the material to be treated, a pipe for introducing the treating liquid into the upper portion of the receptacle, said receptacle tapering downwardly to a point intermediate its ends and below such point being of gradually increasing diameter, and a discharge pipe for the treating liquid below said downwardly tapering portion.

10. A keir for conditioning textile material comprising a receptacle for the material to be treated, a pipe for introducing the treating liquid into the upper portion of the receptacle, said receptacle tapering downwardly for a portion only of its length, the tapered portion of said receptacle having downwardly channeled walls, and a discharge pipe for the treating liquid below said tapering portion.

11. A keir for conditioning textile material comprising a receptacle for the material to be treated, a pipe for introducing the treating liquid into the upper portion of the receptacle, said receptacle tapering downwardly for a portion only of its length, the tapered portion of said receptacle having downwardly channeled walls, a perforated pipe arranged substantially centrally within said tapered portion and having an open upper end to receive incoming treating liquid to be discharged through its said perforations, and a discharge pipe for the treating liquid.

12. A keir for conditioning textile material comprising a receptacle for the material to be treated, an inlet pipe for introducing the treating liquid into the upper portion of the receptacle, said receptacle having side walls tapering inwardly from their upper portion and also from their lower portion.

13. A keir for conditioning textile material comprising a receptacle for the material to be treated, an inlet pipe for introducing the treating liquid into the upper portion of the receptacle, said inlet pipe terminating within said receptacle, a downwardly extending percolating pipe within said receptacle apertured at its upper end to receive treating liquid from said inlet pipe and peripherally apertured to discharge liquid for percolation through the material and a discharge pipe for the liquid from the lower portion of the chamber, the upper portion of said receptacle being downwardly tapered and having downwardly channeled walls.

14. A keir for conditioning textile material comprising a receptacle for the material to be treated having an inlet pipe at the upper portion, a discharge pipe at the

lower and circulating means connecting
said inlet and discharge pipes, the side walls
of the receptacle being tapered inwardly
from their upper portion to a point substan-
5 tially above the bottom of the receptacle
and inclined outwardly from such point to
substantially the lower end of the receptacle.

In testimony whereof, I have signed my
name to this specification, in the presence
of two subscribing witnesses.

ISAAC E. PALMER.

Witnesses:

CHARLES M. SAUER,
A. I. SMITH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."