Oct. 4, 1932. R. A. BASSETT 1,880,668

APPARATUS FOR TREATING AND CLEANING PILE FABRIC MATERIALS

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Fig. 1.

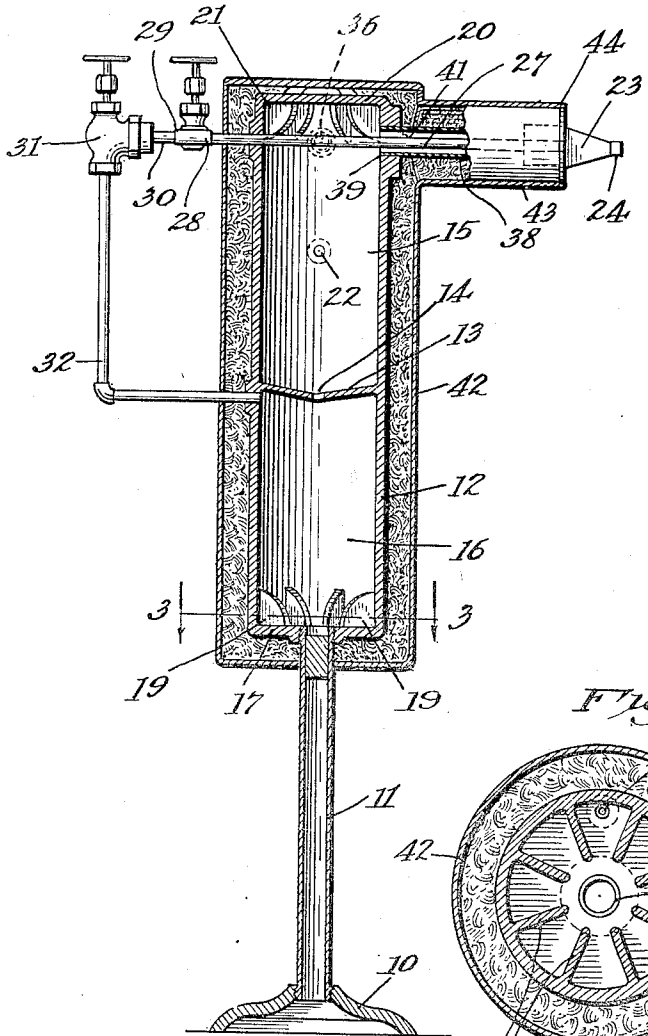

Fig. 4.

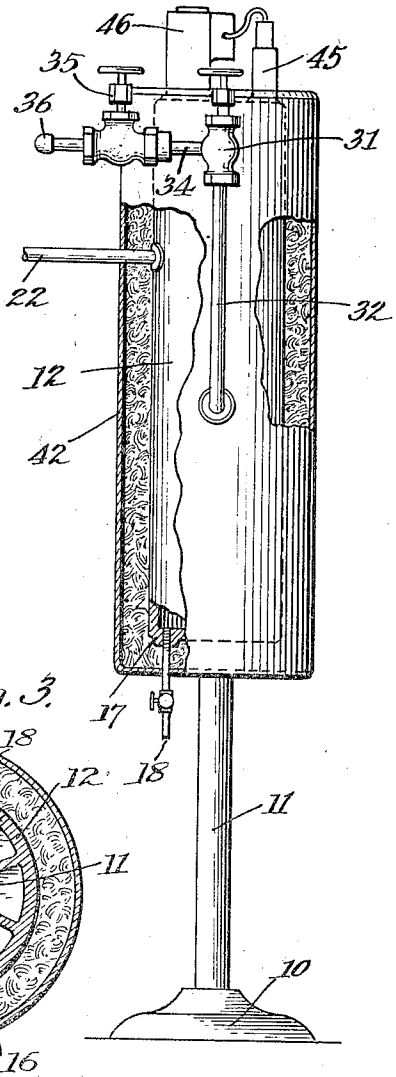

Fig. 3.

Fig. 2.

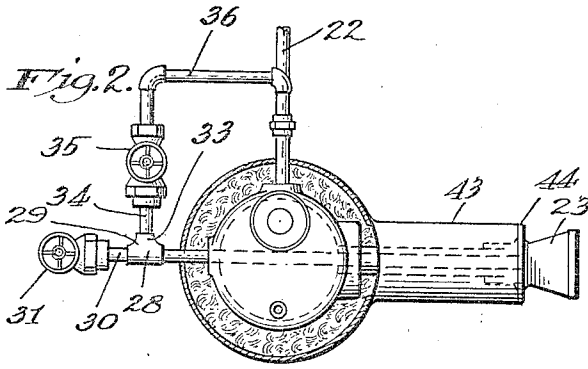

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Fig. 5.

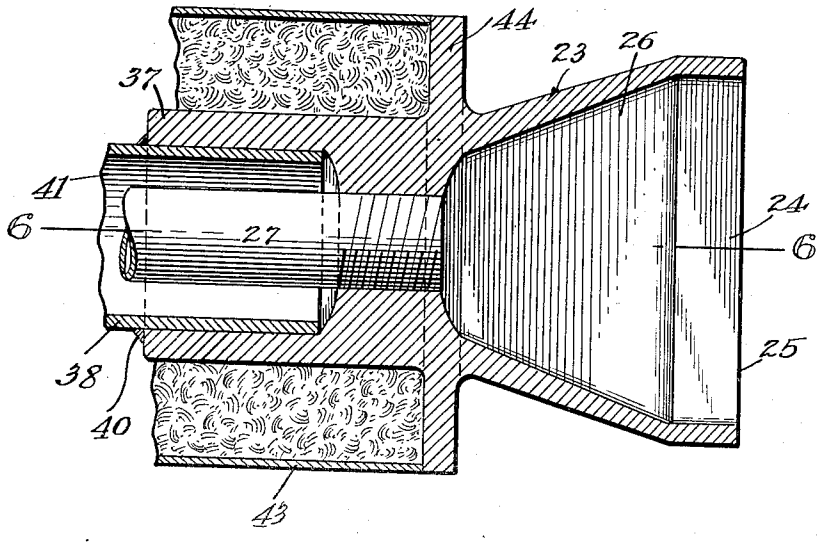
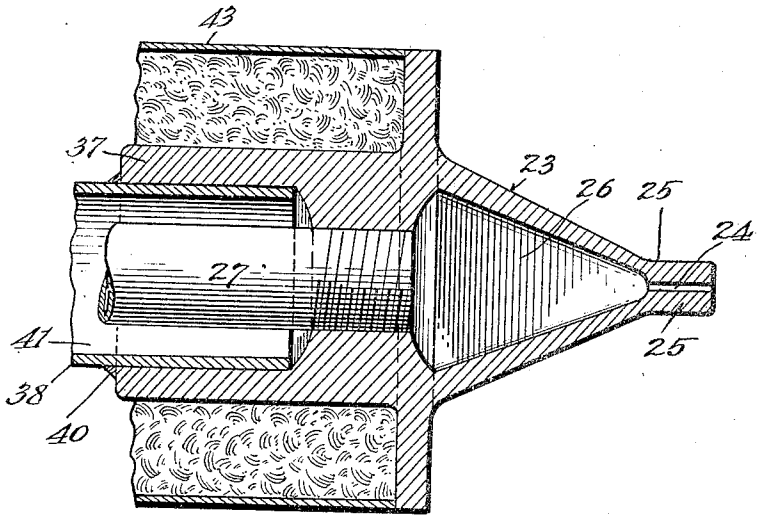


Fig. 6.



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Patented Oct. 4, 1932

1,880,668

UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING AND CLEANING PILE FABRIC MATERIALS

Application filed September 19, 1931. Serial No. 563,876.

This invention relates to apparatus for treating and cleaning pile fabric materials, such as velvets and the like, and has for an object the provision of effective means for subjecting the material to the action of steam at a controlled temperature and in a manner that will quickly and completely restore the pile to its original condition and at the same time thoroughly clean the fabric.

A further object of the invention resides in the provision of means for positively controlling the condition of the steam at its point of discharge at the nozzle of the structure.

A further and important object of the invention is to provide means adapted to be operated according to outside temperature changes so as to prevent the steam from condensing either before or immediately at the time of its discharge from the nozzle and against the material under treatment.

Another object of the invention is to provide an apparatus of the herein described character which is simple of construction and positively acting and of such design that the process of treating the material can be conducted rapidly and with complete thoroughness.

A still further object of the invention resides in the construction of a novel and effective form of nozzle that will cause the steam while at the desired temperature to impinge against the pile side of the fabric and over a considerable transverse area thereof as the material is drawn over the slot or orifice of the nozzle.

A further object of the invention is to provide a structure of this character embodying a novel and effective form of nozzle and means for incorporating same in the system so that the temperature at the discharge end of the nozzle will be substantially the same as the effective temperature of the steam from its source of supply.

In the drawings

Figure 1 is a vertical section through the apparatus showing parts in full lines;

Figure 2 is a top plan view thereof, partly in section;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a side view, with parts broken away;

Figure 5 is a section taken longitudinally through the nozzle;

Figure 6 is a section on line 6—6 of Figure 5.

In carrying the invention into practice, use is made preferably of a base 10 adapted to rest upon a floor or the like, the same carrying a vertical pedestal 11 of a suitable length, upon the upper end of which is mounted a steam reservoir or container 12. The said reservoir or container 12 is subdivided by a partition or diaphragm 13 which is preferably of concavo-convex form and provided at its center with an orifice 14. In this manner, it is observed that the reservoir 12 is divided into upper and lower communicating compartments or chambers 15 and 16, the former of which will be hereinafter referred to as a dry steam chamber and the latter as a wet steam chamber. The bottom wall 17 of the reservoir 12 is provided with a valved drain opening 18 by means of which the water of condensation may be discharged away from the wet steam chamber at the discretion of the operator and according to conditions which may necessitate so doing, as will be described presently. The said wall 17 is provided with fins or gussets 19 which join the vertical side walls of the reservoir so as to lend ample reinforcement to the structure under the pressure of steam contained within the reservoir. The head or wall 20 at the top of the reservoir is provided on its under side with similar gussets or fins 21 which also join the vertical side walls of said reservoir.

Leading into the dry steam chamber 15 is a steam supply pipe 22 which may be led to any suitable source of steam supply by means of which steam under suitable pressure may be supplied to the reservoir. At one side of the reservoir is a nozzle 23, the orifice 24 of which is elongated in a horizontal direction with the walls 25, 25, thereof arranged in parallelism throughout the length and breadth of the orifice thus provided. The orifice opens directly into an expanding chamber 26 of substantially conical configuration with its apex positioned at the rear of the ori-

fice. The opposite end of the chamber 26 opens directly into a feed pipe 27 and, as illustrated in Figure 1, this pipe passes through the dry steam chamber near the upper end thereof and penetrates the same at diametrically opposite points, as will be appreciated upon reference to Figure 2 of the drawings. The said steam pipe 27 is connected with a T-member 28 whose branch 29 is tapped into a pipe length 30 which is provided with a needle valve fitting 31, the same being piped at 32 into the wet steam chamber, preferably at the very top thereof. It is in this manner that moist steam from the chamber 16 may be supplied to the nozzle 23. To the branch 33 of the T-member 28 is connected a short length 34 of pipe which carries a needle valve fitting 35, the same being piped at 36 to the dry steam chamber 15, preferably near the top thereof. It manifestly follows that through the last described arrangement provision is made for conducting dry steam to the nozzle. It is important that it be observed that both of the aforementioned needle valves 31 and 35 are adapted to open to the pipe 27. This is desirable in order that the controlled portions of wet steam and dry steam may enter the pipe 27 for discharge at the orifice of the nozzle. Either one of these valves can be completely closed, whereby either wet steam or dry steam can be delivered to the nozzle.

It is important that the temperature of the steam be uniformly maintained from the time it is taken from the reservoir to the time that it is effectively discharged from the nozzle and in order to satisfy this condition, the nozzle is provided with a skirt 37 in which is accommodated one end of a pipe 38, the opposite end of which is tapped into the dry steam chamber as at 39 and brazed thereto. The forward portion of the pipe 38 is brazed at 40 to the skirt of said nozzle in order that the metals employed may be susceptible to the action of contraction and expansion without disrupting the joint between these parts. The internal diameter of the pipe 38 is in excess of the external diameter of the pipe 27 and the two function as a steam jacket 41. This jacket opens directly into the top of said dry steam chamber so that there is a constant circulation of dry steam throughout the entire area of the jacket. In this manner, the pipe 27 is uniformly retained at a temperature that will prevent the steam from going back to water before it reaches the discharge orifice of the nozzle. In order to conserve the heat about the reservoir, same is provided with an external jacket 42, and between the walls thereof and the walls of the reservoir is contained a heat insulating material which may be in the form of cellular asbestos or any other well-known material. This heat insulating jacket, as it were, has a lateral portion 43 which extends about the pipe 38 and which joins at its forward end to the flange 44 of the nozzle.

An electrical heating element extends into the dry steam chamber 15. This element is conventionally illustrated at 45 and may be of any suitable well-known construction adapted to be placed in a common house circuit in which is included a thermostat 46, the latter also having connection with the dry heat chamber. The thermostat may likewise be of any suitable well-known construction capable of responding to predetermined temperatures. In this manner, it is possible to accurately control the state of dryness of the steam in the chamber 15.

It is a known fact that during certain seasons dry steam at proper temperature may be satisfactorily conducted to a point of egress without going back to water, and that at other seasons it is desirable that there be mixed with the dry steam a certain amount of moisture or that wet steam be employed altogether. Therefore, according to climatic conditions or different seasons of the year, it is possible by means of this invention to accurately control the condition of the steam at its immediate point of egress from the nozzle. Should there be any tendency toward condensation of the steam at the effective discharge orifice of the nozzle which would indicate that the steam is too moist, the valve in the wet steam chamber can be controlled to regulate the discharge therefrom and the valve in the dry steam chamber can be likewise controlled so that an admixture of the steam in the two conditions can be discharged into the pipe 27. On the other hand, should it be found that the steam is too dry, it may be intermixed with steam taken from the wet steam chamber, as obviously follows.

The reservoir 12 is preferably of a height that brings the tip of the nozzle at a convenient position in front of the operator, who may hold the material against the tip and progressively move same across the orifice 24, it being obvious that before so doing either the valve 31 or the valve 35 or both thereof have been adjusted to the required positions. The steam thus discharges against the material being operated upon and it is effectively cleaned and at the same time treated to restore the pile to its normal condition.

By admitting steam to the upper chamber 15 from a source of supply and by providing heating means within the chamber, I am able to heat the steam so as to render it in as dry a state as may be required, depending upon external climatic or atmospheric conditions. The heavier steam, of course, passes to the lower chamber 16 where it may be utilized as previously referred to.

I claim:

1. In an apparatus for treating and cleaning pile fabric materials, a reservoir having a portion adapted to contain wet steam and

a portion adapted to contain dry steam, a nozzle, and valved means for opening one or the other of said portions to said nozzle.

2. In an apparatus for treating and cleaning pile fabric materials, a reservoir having a portion adapted to contain wet steam and a portion adapted to contain dry steam, a nozzle, valved means for opening one or the other of said chambers to said nozzle, and a steam jacket extending between the dry steam chamber and the nozzle and receiving the valved means therethrough.

3. In an apparatus of the class described, a reservoir having a portion adapted to contain wet steam and a portion adapted to contain dry steam, a nozzle, valved means for opening one or the other of said portions to said nozzle, a heating element extending into the dry steam portion, and thermally controlled means for respectively throwing the heating element into and out of operation.

4. In an apparatus of the class described, a vertical steam reservoir, means to permit of the discharge of steam to the reservoir, a radial nozzle extending from the reservoir and including valved means for controlling the discharge of steam therefrom, and a heating element contained within the reservoir.

5. In an apparatus for treating and cleaning pile fabric materials, a vertical reservoir, a steam jacket radiating therefrom near the upper end thereof, means to permit of the introduction of steam to the reservoir, and a nozzle in association with the jacket and including a valved pipe having connection with the reservoir and having a portion extending through said jacket.

6. In an apparatus for treating and cleaning pile fabric materials, a vertical reservoir, a steam jacket radiating therefrom near the upper end thereof, means to permit of the introduction of steam to the reservoir, and a nozzle in association with the jacket and including a valved pipe having connection with the reservoir and having a portion extending through said jacket, the nozzle having an elongated steam orifice whose walls are in relative parallelism with each other.

7. In an apparatus for treating and cleaning pile fabric materials, a vertical reservoir, a steam jacket radiating therefrom near the upper end thereof, means to permit of the introduction of steam to the reservoir, and a nozzle in association with the jacket and including a valved pipe having connection with the reservoir and having a portion extending through said jacket, the nozzle having an elongated steam orifice, the said jacket communicating directly with the reservoir.

8. An apparatus for treating and cleaning pile fabric materials, a vertical reservoir having relatively superimposed chambers in open communication with each other, means for admitting steam to the upper chamber, means for discharging steam from either chamber, and a nozzle connected with the steam discharging means.

9. An apparatus for treating and cleaning pile fabric materials, a vertical reservoir provided with relatively superimposed communicating steam chambers, a nozzle, means leading from the respective chambers for discharging steam from either thereof to the nozzle, a steam jacket connecting the upper chamber with the nozzle and having its walls spaced apart from a portion of the steam discharging means.

10. An apparatus for treating and cleaning pile fabric materials, a reservoir having relatively superimposed communicating chambers, means for admitting steam to the upper chamber, means for heating the steam in the upper chamber to dry same, and a nozzle connected with both chambers and including valved means for discharging steam therefrom through either of said chambers.

11. An apparatus for treating and cleaning pile fabric materials, a steam reservoir including a jacket in communication therewith, a nozzle having a portion embracing the walls of the jacket and a portion formed with an outlet orifice, and a steam discharge pipe passing through the jacket and opening at one end at a point rearwardly of the orifice and at its other end to the reservoir.

12. In an apparatus for treating and cleaning pile fabric materials, a reservoir having a steam inlet, a nozzle, means through which relatively dry steam from one upper portion of the reservoir can be conducted to the nozzle, means through which relatively wet steam from another portion of the reservoir can be conducted to the nozzle, and means for controlling the flow of steam through the first and second means so as to enable steam of variable dryness or moistness to be delivered to the nozzle.

RUDOLPH A. BASSETT.