Sept. 9, 1958 W. M. CISSELL ET AL 2,851,050

STEAM VALVE

Filed Feb. 23, 1954 2 Sheets-Sheet 1

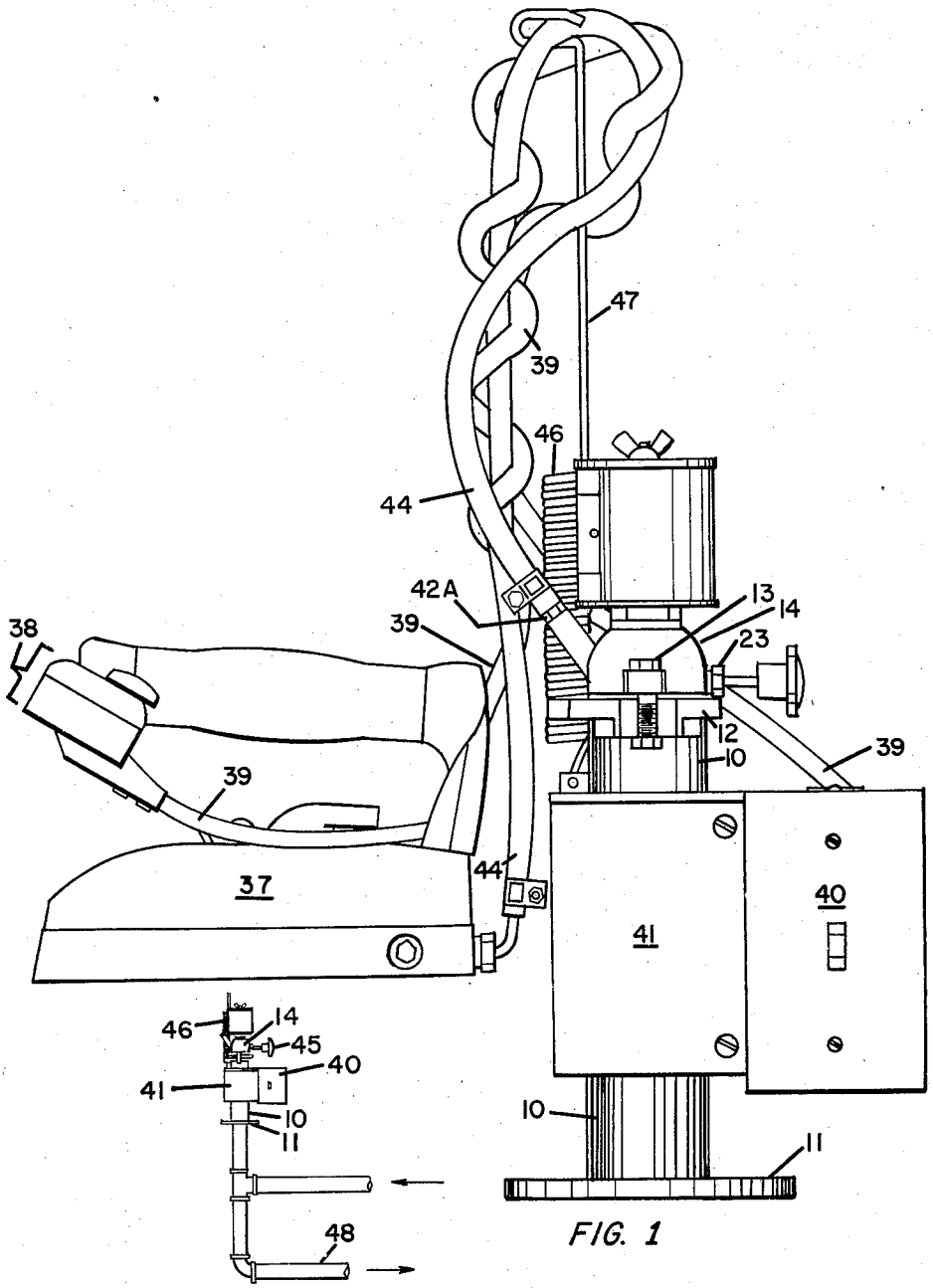


FIG. 1

FIG. 2

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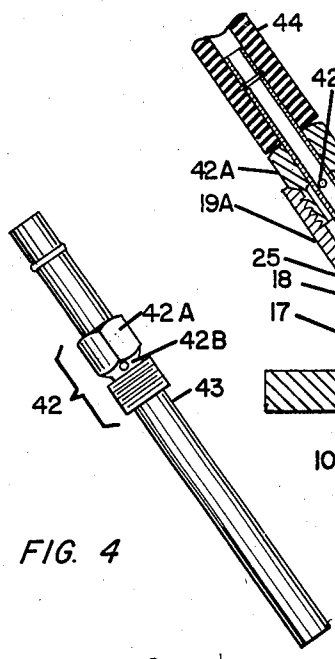


FIG. 4

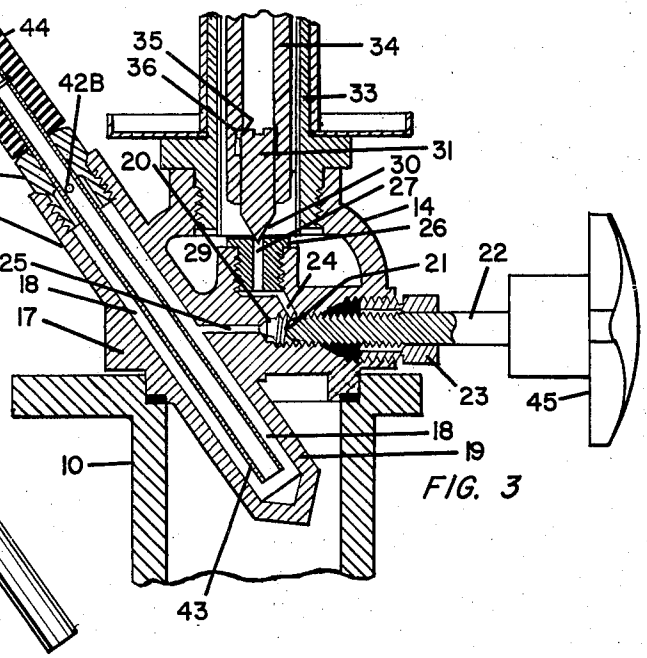


FIG. 3

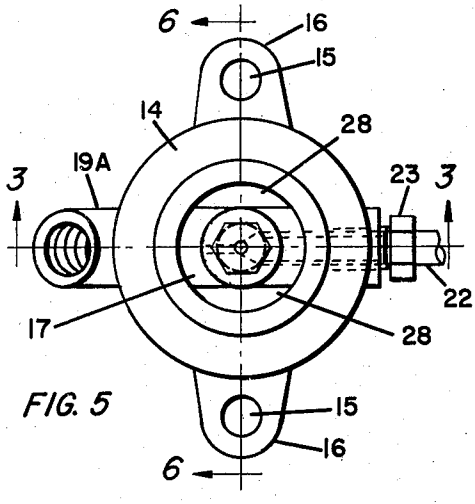


FIG. 5

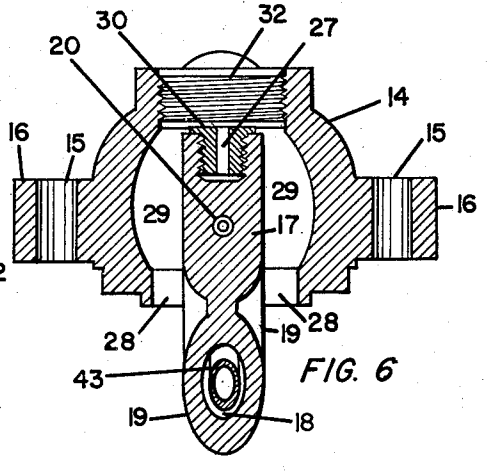


FIG. 6

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STEAM VALVE

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5 Claims. (Cl. 137—154)

Our invention relates to a valved apparatus for supplying conditioned steam for treating fabric materials, and more particularly an apparatus for converting water of condensation formed in the apparatus into steam in order that steam without excessive entrained water can be released from the said apparatus for treating fabric materials.

The main object of our invention is to eliminate, or minimize, the accumulation of water of condensation in the conduit connecting the outlet side of a steam valve, so that when the valve is opened, to allow the free passage of steam from the inlet to the outlet of the valve, a relatively dry steam is obtained in the conduit connecting the outlet side of the valve that is substantially free of water particles and thereby more suitable for treating fabrics and garments.

A further object of our invention is to provide a heated chamber on the outlet side of the valve that will separate and collect water particles from the steam and convert the collected water particles into steam and allow the latter to pass freely into the conduit connected to the discharge side of the valve.

A still further object of our invention is to construct the valved apparatus so that the chamber at the outlet side of the valve, which separates the water particles from the steam received therein, and collects the water of condensation from the conduit connecting the discharge side of the valved apparatus, is heated and liquid in the chamber is evaporated by the steam present at the inlet side of the valve.

A still further object of our invention is to provide the valved apparatus with a main steam chamber suitably connected to steam supply and return lines, in which the valve is mounted upon the main chamber and adapted to control the flow of steam from the main chamber to a conduit connecting the discharge side of the valve, and wherein the valve body is provided with a water collecting chamber on the discharge side thereof, the walls of which extend down into the main steam chamber so that the walls of the said water collecting chamber are continuously heated by the steam present in the main chamber, to convert the collected water into steam.

The invention has other objects which are more particularly pointed out in the accompanying description of a preferred embodiment of the invention as shown in the drawings, in which:

Figure 1 is a side elevation of an apparatus for receiving steam from a central supply and dispensing it to an electric steam pressing iron, or other apparatus, through a control valve in which is embodied the invention.

Figure 2 is an elevation of a preferred piping system for delivering steam to the steam valve and to the steam return line.

Figure 3 is a sectional view of the valve body and associated parts taken along line 3—3 of Fig. 5.

Figure 4 is a side elevation of the delivery conduit 43, shown in sectional view in Fig. 3.

Figure 5 is a top view of the main or central valve body 14.

Figure 6 is a sectional view of the valve body at right angles to that shown in Fig. 3 and along line 6—6 of Fig. 5.

Referring first to Fig. 1, the steam chest 10 is equipped with a flange 11 for permanent installation on a pressing table or ironing board. At the top of the steam chest 10 is an integral flange 12 to which is secured by bolts 13 (only one of two being illustrated), a dome-shaped main valve body 14. The main valve body 14 is equipped with two ears 16, 16 (Figures 5 and 6), having two holes 15—15 for receiving said bolts.

The body 14 is formed with a bridge 17 having: (1) a chamber 18, hereinafter sometimes referred to as a "dispensing chamber," with walls 19A projecting externally of the body, and walls 19 projecting into the steam chest 10; (2) a valve seat 20 for receiving and seating the rounded end 21 of a threaded valve stem 22 that screws into said bridge and is rotatably mounted in packing gland 23 that is also screwed into said bridge; (3) steam ducts 24, 25 that are opened and closed, and/or throttled by the valve stem 22 and rounded end 21; (4) a replaceable inlet valve-seat 26 having a duct 27 communicating with the duct 24. It should be noted (Fig. 6) that passages 28, 28 allow steam to pass around the bridge 17 and into the main chamber cavity 29 of the valve body 14, so that it can be fed into steam duct 27. The top aperture of the steam duct 27 functions as a valve seat 30 for a valve plunger 31. Into the top opening 32 of the body 14 is screwed a non-magnetic chamber 33 (closed at the top end but not shown), for supporting a solenoid (not shown) which, when energized, raises a magnetic plunger 34. The plunger 34 has a recess 35 for receiving head 36 of the valve plunger 31 in order to operate the latter at the will of an operator by means of an electrical push-button switch 38 (Fig. 1) which is connected to a source of electrical power and to the solenoid through wires in the conduit 39. Switch 40, mounted in a housing 41, is provided as a master control for the electrical power supplied to the pressing iron and to the solenoid. Since the electrical equipment of the pressing iron and the magnetically operated valve parts follow conventional practice, further illustration and explanation have been omitted for brevity.

Into the top of the external walls 19A of chamber 18 is screwed a sleeve 42 having a head 42A, for a wrench, and a bore fixedly receiving a tube 43. Onto the outer end of the tube 43 is attached a rubberized hose 44 elevated as shown in Fig. 1 for conducting steam from the valve to the pressing iron, after it has been conditioned within the valve according to the incident invention. The tube 43 is cross drilled at 42B to allow the passage of conditioned steam into the tube 43 and thence to the hose 44, especially when condensate within the chamber 18 blocks the lower end of tube 43.

The valve stem 22 is operated by a hand wheel 45, either to shut off the flow of steam through ducts 24, 25, or to throttle the flow of steam to that required by the steam-iron, or other apparatus. When the solenoid (not illustrated) is energized, the magnetic plunger 34 raises valve plunger 31. Steam flowing from the main steam chest 10 around the bridge 17 via passages 28—28 into the main valve chamber 29, passes through ducts 27, 24 and 25 to chamber 18, then through tube 43 to the hose 44 and thence to the pressing iron. Immediately upon the initial operation of the apparatus, when valve stem 22 is rotated to withdraw end 21 from its seat, condensate collects at the bottom of chamber 18 and thereby effects a liquid closure for the bottom end of tube 43, consequently thereafter, the admitted live steam enters this tube through holes 42B for delivery into the hose.

Condensate in the steam passing into chamber **18** from duct **25** separates and collects in the bottom of chamber **18**. Likewise, at the beginning of each period of the operations the elevated cold hose **44** condenses a portion of the steam therein, and the resultant condensate drains by gravity, through tube **43**, into the bottom of chamber **18**. The live steam constantly surrounding the internal wall of chamber **18**, the bridge **17**, and the walls of the main valve chamber **19**, maintain the parts sufficiently hot to evaporate the water of condensation collected in the lower part of chamber **18**. Since condensate collected in the bottom of chamber **18** could interfere with the flow of relatively dry steam into the steam hose **44**, at least until evaporated, the series of holes **42B** in tube **43** provide a free outlet for the steam from the chamber **18**. Obviously, without these holes, condensate could be forced into the hose, and thence into the ducts of the pressing iron in excess of its capacity to evaporate, and thereby flood the pressing iron with water of condensation and render it incompetent to accomplish the objectives sought. Obviously, since the holes **42B** are relatively small, compared to the bore of tube **43**, condensate draining from the hose **44** falls rapidly over these holes and continues in the tube to the bottom of the chamber **18**. Likewise, it is ovvious that, after the hose **44** or other conduit connecting the outlet of the valve to the apparatus becomes sufficiently heated by steam either continuously or intermittently flowing from the valve, the condensing of steam within the hose **44**, either ceases or reduces to such a minimum that the chamber **18** is required only to evaporate the condensate separating from the steam as it enters the chamber **18** from the duct **25**.

To support the hose **44** and wires **39**, as shown in Figure 1, a coil spring **46** is secured at the lower end thereof to a suitable flange carried by the chest **10**, while the extended upper end **47** thereof embraces said wires and hose.

In summary: This invention, as embodied in the disclosed apparatus, may be viewed as employing some features of a conventional steam trap and of a steam generator for collecting and converting condensate, developed in a service line, into steam and conserved for use by maintaining the device at or above 212° F. by steam from the same line and delivering the evaporated condensate into the said line continuously for treating fabric materials.

Having thus described our invention, we claim:

1. In combination with a steam pressing iron, means for supplying steam substantially free of liquid to said iron and including a steam chest, a steam dispensing chamber mounted in the upper portion of said steam chest and having a closed lower end for trapping condensate, and an upper end in communication with said iron, said closed lower end of said chamber being in heat exchange relation with steam in said chest whereby condensate collecting in said lower end may be evaporated and pass as steam from the upper end of said chamber, a valve body attached to said steam chest, a steam passage through said valve body connecting said steam chest with said dispensing chamber above the lower end of said chamber, and valve means for controlling the flow of steam through said passage.

2. Apparatus as defined in claim 1 including a downwardly extending tube disposed within said chamber in spaced relation to the walls thereof and serving to direct condensate toward the closed lower end of said chamber and means for passing steam into said tube above the lower end thereof whereby said steam may pass outwardly of said chamber while out of entraining contact with condensate collected in said chamber.

3. For use with a steam pressing iron, a steam valve assembly comprising a steam chest, a valve body attached to said steam chest and having a non-horizontal steam dispensing chamber formed of a heat conductive material and closed at its lower end to form a condensate trap at said lower end, and means for directing steam from the upper end of said chamber to said iron, said condensate trap being disposed in heat exchange relation within said steam chest with the steam therein, whereby said steam serves to heat condensate in said dispensing chamber and to evaporate the same, a steam passage through said valve body connecting said steam chest and said dispensing chamber above the lower end thereof, and valve means for controlling the flow of steam through said passage.

4. Apparatus as defined in claim 3 wherein the lower end of said dispensing chamber is disposed in the upper portion of said steam chest and is adapted to be surrounded by steam contained therein.

5. Apparatus as defined in claim 4 wherein said valve body and steam dispensing chamber are integral and formed of a heat conductive material whereby condensation of steam within said body and chamber may be minimized.

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