

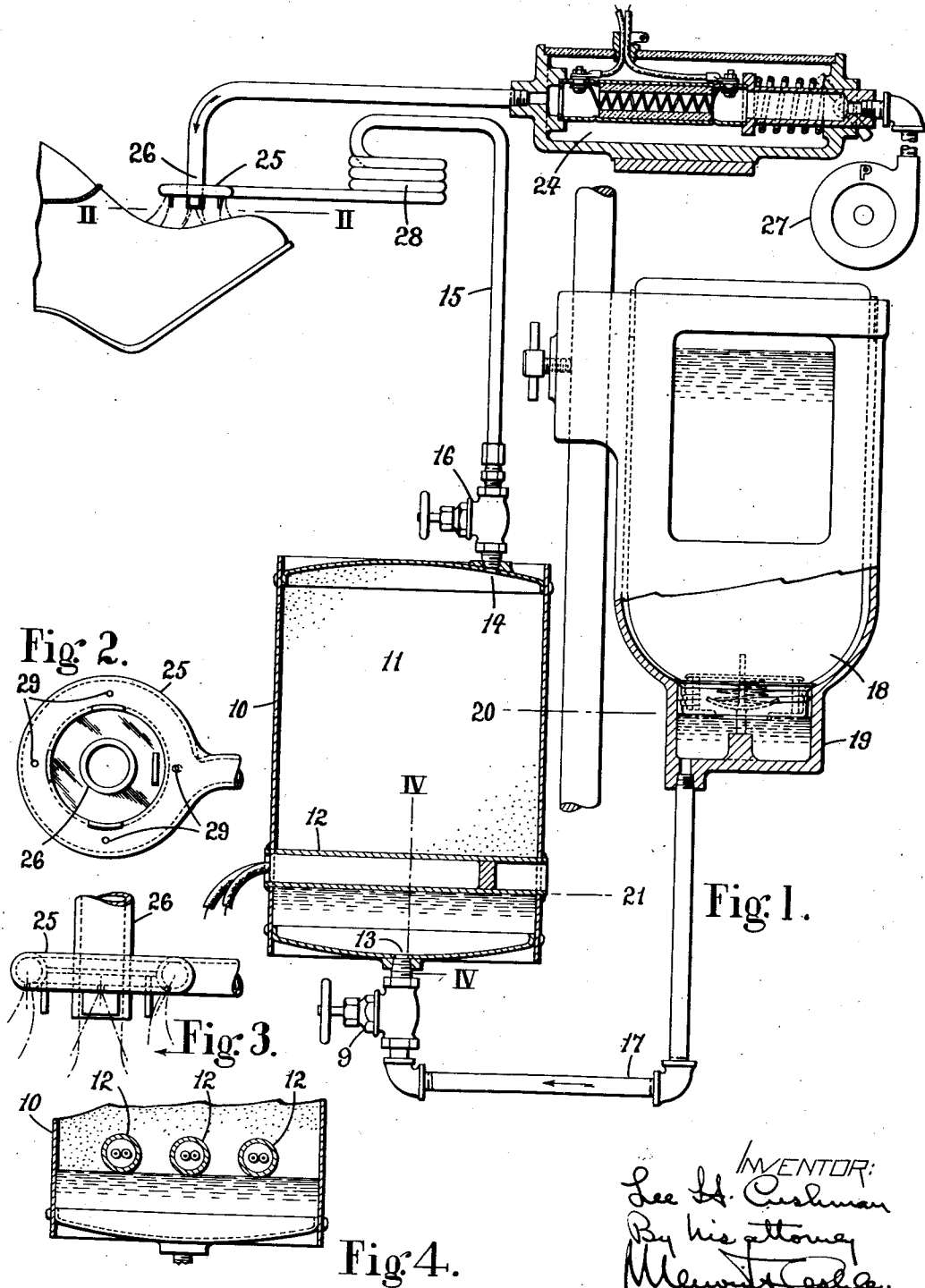
April 28, 1942.

L. H. CUSHMAN

2,280,894

STEAM GENERATOR

Filed Feb. 3, 1941



INVENTOR:
Lee H. Cushman
By his attorney
Melvin S. Cushman

UNITED STATES PATENT OFFICE

2,280,894

STEAM GENERATOR

Lee H. Cushman, Hamilton, Mass., assignor to
United Shoe Machinery Corporation, Flemington,
N. J., a corporation of New Jersey

Application February 3, 1941, Serial No. 377,101

4 Claims. (Cl. 219—38)

This invention relates to steam generators of the flash type, and to the problem of controlling the delivery thereto of the water to be converted into steam.

An object of the invention is to provide an apparatus in which steam will be generated only as needed to maintain a limited supply, and in which the water in the boiler will be automatically replenished only as needed to replenish the supply of steam.

Another object is to maintain a predetermined pressure of the steam in the boiler during those intervals when the outlet of steam is temporarily stopped, as by closing a throttle-valve and to restore the same pressure automatically after every interruption in the discharge of steam from the boiler.

The invention is herein illustrated as embodied in an apparatus to be used in the manufacture of shoes, but it is to be understood that the use to which the steam is put is not of primary importance, and that the principles of the invention may be utilized in other situations. It is also to be understood that the accompanying drawing is elementary rather than a literal picture of actual structure, the better to illustrate the principles involved.

The results above mentioned are obtained by organizing a pressure-sustaining boiler, a flasher and a feed-water to generate steam only when the steam throttle-valve is open and the pressure of steam in the boiler is thereby reduced below a predetermined degree, and to employ steam-pressure in excess of feed-water pressure to arrest the generation of steam by arresting the influx of water. To obtain such control from the steam-pressure the water is supplied to the boiler without being flashed until enough water has been accumulated therein to raise the water-level to the bottom of the flasher. The heating capacity of the flasher and the area of the steam space of the boiler are so proportioned as to maintain a static steam pressure superior to the feed-water pressure so long as the outlet of steam is stopped. Consequently, steam will be generated only when the throttle-valve is open, but if the latter be closed steam already accumulated in the boiler will be maintained at a constant pressure so long as the flasher remains hot.

Referring to the drawing,

Fig. 1 is an elevation, partly in section, of an apparatus for treating shoes with hot air and steam, the steam generator and the feed-water thereof embodying the novel features of the invention;

Fig. 2 is a bottom plan view of the nozzles from which the hot air and steam are emitted;

Fig. 3 is an elevation projected from Fig. 2; and

Fig. 4 is a vertical section of the lower portion of the steam generator. (See line IV—IV in Fig. 1.)

Referring to the drawing, the boiler comprises a shell 10 forming a pressure-sustaining chamber 11 and containing a flasher having a constant output of heat. The flasher comprises a series of brass tubes 12 each containing an electric heating unit. These tubes are welded to the shell 10 and are arranged at a common level in the chamber 11, their major dimensions being horizontal. The shell 10 is provided with a water inlet 13 below the flasher and with a steam outlet 14 above the flasher. A pipe 15 provided with a manually operable throttle-valve 16 is arranged to conduct the steam from the outlet 14 to a point of delivery.

Water under a head of pressure is conducted from a source of supply to the inlet 13 by a pipe 17. This pipe is provided with a shutoff valve 9 which may be left open except when the flasher is out of operation. When constant water pressure is desired the water may be supplied by a barometric feeder comprising an inverted container 18 and a sealing bowl 19. These elements will maintain the water in the bowl at a constant level indicated at 20 which may be at any desired distance above the level of the bottoms of the flasher tubes 12 in the boiler. The latter level is indicated at 21.

When starting the apparatus in operation the shutoff valve 9 should remain closed until the flasher is hot enough to operate as such. Then the valve 9 may be opened. The water in the chamber 11 will then rise until it touches the tubes 12. The immediate result of such contact will be a steam-pressure greater than the pressure of the water due to the head 20—21. This development of steam-pressure is so rapid that the water in the boiler will never rise perceptibly above the level 21. Moreover, the steam-pressure will depress the water in the boiler below the level 21. Once the chamber 11 has been supplied with steam, the throttle-valve 16 may be adjusted according to the demand for steam. When the throttle-valve is closed without turning off the current for the heating units the flasher will maintain pressure of the accumulated steam without generating more steam.

The drawing also includes means for utilizing the steam to eliminate wrinkles from the uppers

of completely fabricated leather shoes. Accordingly, the pipe 15 terminates in an annular nozzle 25 that surrounds a nozzle 26. Air is supplied by a blower 27 to the nozzle 26 to be emitted on the shoe. The air travels through a heater 24 by which it is heated to a temperature of about 450° F. A series of small ports 29 in the bottom of the annular nozzle 25 emit jets of steam at the same time, the central jet of hot air serving to prevent condensation of the steam on the shoe. A coil 28 is formed in the pipe 15 to reduce the temperature of the steam.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A steam-generating apparatus comprising a boiler shell forming a pressure-sustaining chamber, a flasher located in the steam-space of said chamber, said chamber having a water-inlet below and a steam-outlet above said flasher, a throttle-valve arranged to arrest the escape of steam from said chamber, and means by which water is supplied through said inlet to replenish the water in said chamber to the level of the bottom of said flasher.

2. A steam-generating apparatus as specified in claim 1 in which the heating surface and

capacity of said flasher and the steam-space of said chamber are so proportioned that the static steam-pressure, when said outlet is stopped, will maintain the water-level below the bottom of the flasher.

3. A steam-generating apparatus comprising a boiler shell forming a pressure-sustaining chamber, a flasher located in the steam space of said chamber, said chamber having a water-inlet below and a steam-outlet above said flasher, a throttle-valve controlling the escape of steam from said chamber, and means by which water at a constant pressure is supplied through said inlet to replenish the water in said chamber to the level of the bottom of said flasher.

4. A steam-generating apparatus comprising a boiler shell forming a pressure-sustaining chamber, a flasher located in the steam space of said chamber, said chamber having a water-inlet below and a steam-outlet above said flasher, a barometric water-feeder the water-level of which is above the level of the bottom of said flasher, and a conduit through which water is conducted from said feeder to the water-inlet of said chamber.

LEE H. CUSHMAN.