No. 719,638. PATENTED FEB. 3, 1903.

F. BATTER.

PORTABLE FOOT AND BODY WARMER.

APPLICATION FILED AUG. 8, 1901. RENEWED DEC. 18, 1902.

NO MODEL.

Fig. 1.

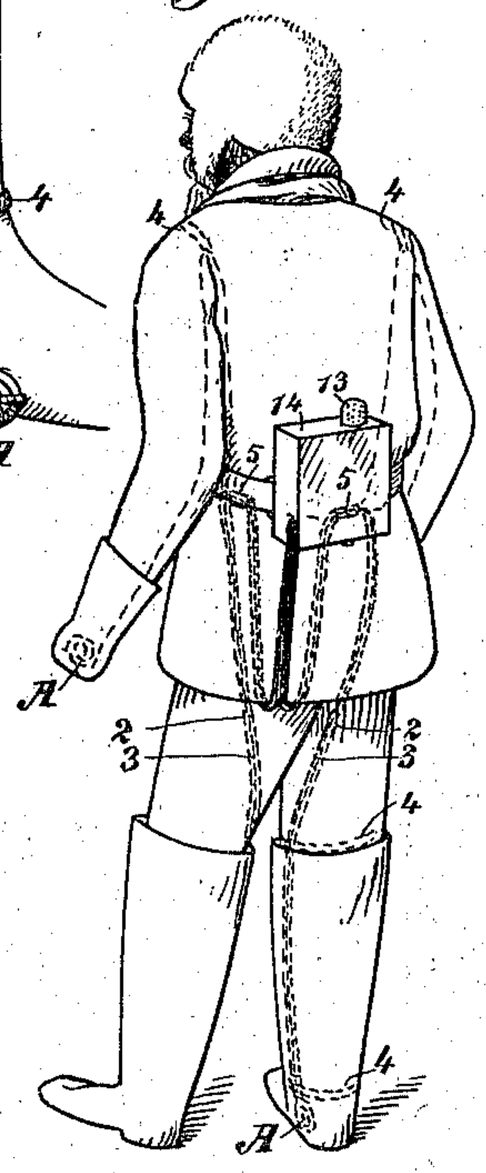


Fig. 2.

Fig. 3.

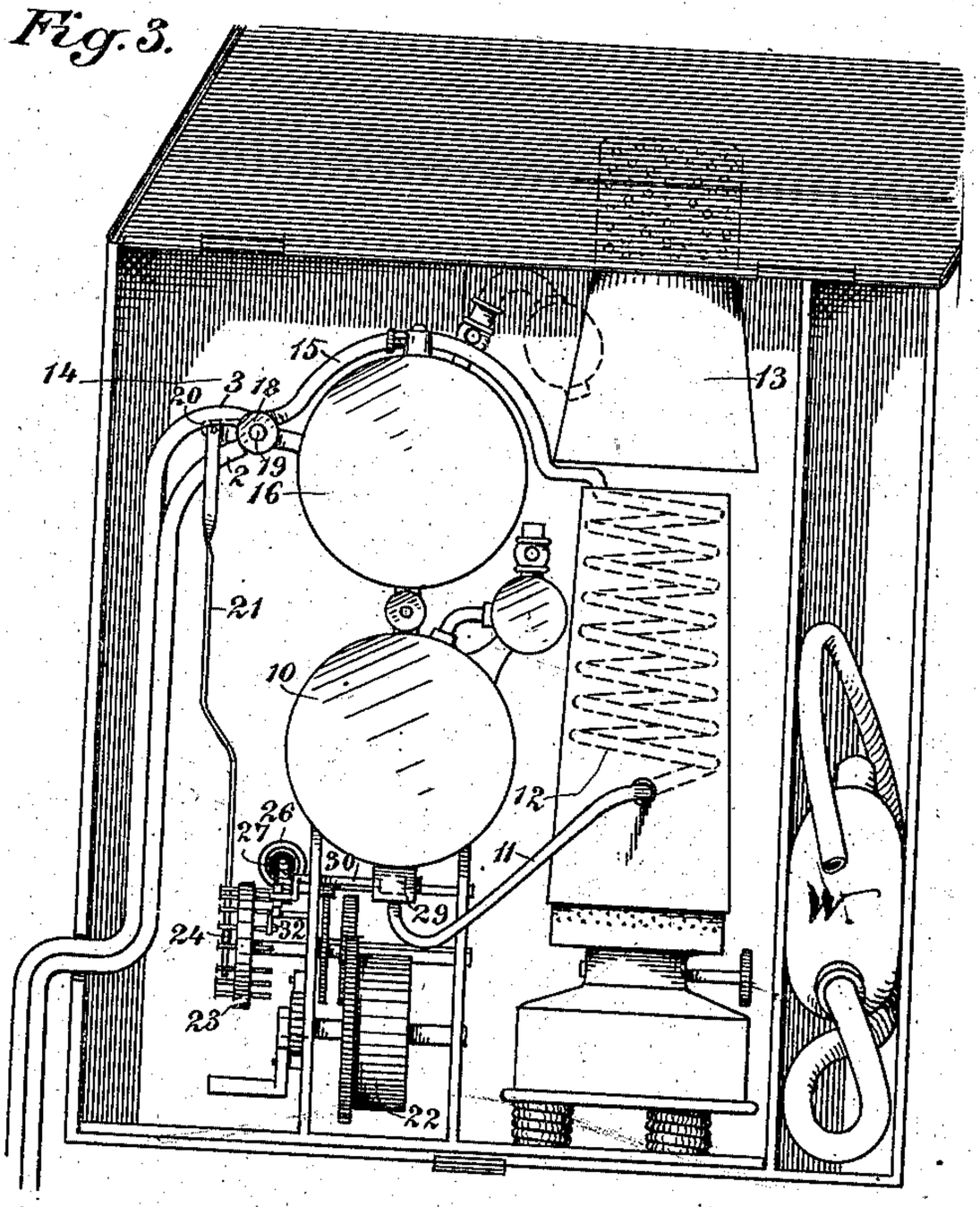


Fig. 4.

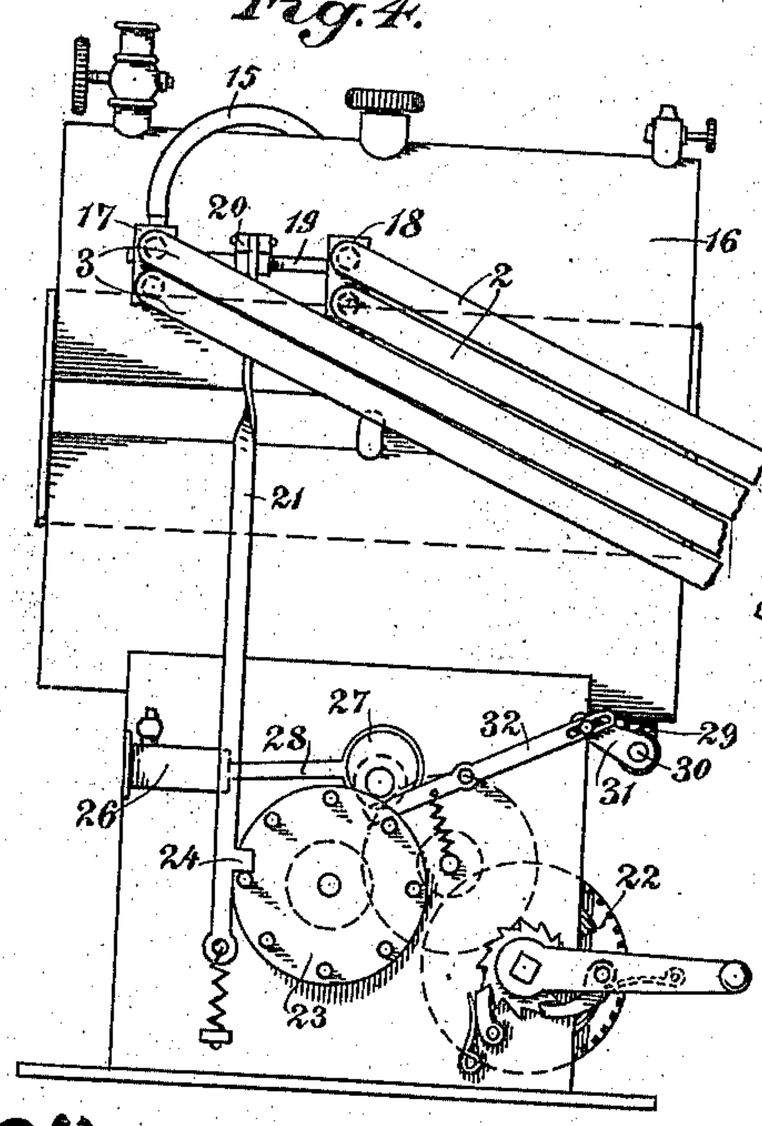


Fig. 5.

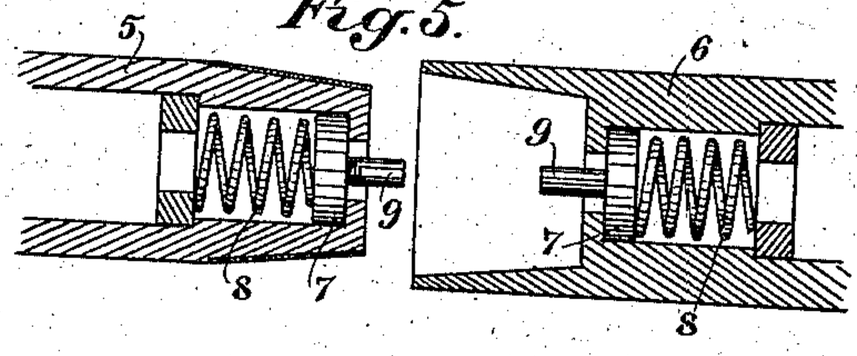
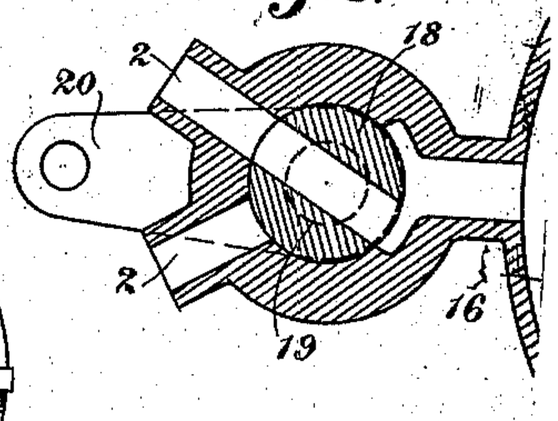
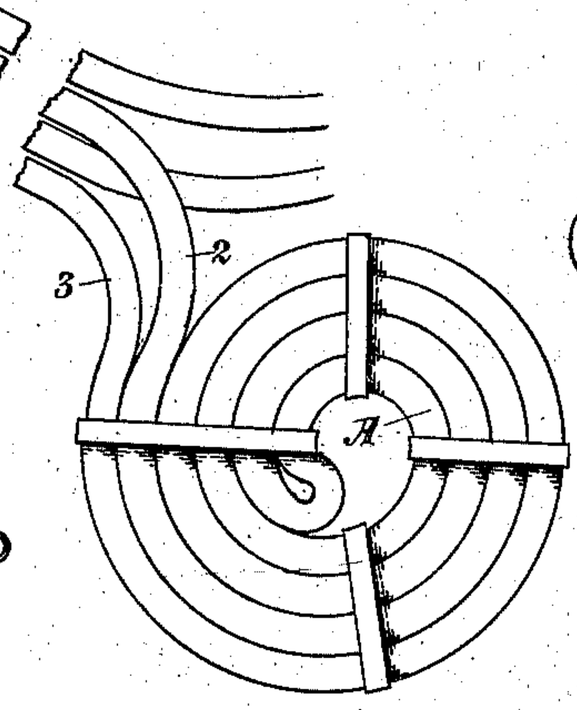


Fig. 6.





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UNITED STATES PATENT OFFICE.

FRANK BATTER, OF TILLAMOOK, OREGON.

PORTABLE FOOT AND BODY WARMER.

SPECIFICATION forming part of Letters Patent No. 719,638, dated February 3, 1903.

Application filed August 8, 1901. Renewed December 18, 1902. Serial No. 135,776. (No model.)

To all whom it may concern:

Be it known that I, FRANK BATTER, a citizen of the United States, residing at Tillamook, county of Tillamook, State of Oregon, have invented an Improvement in Portable Foot and Body Warmers; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device which is designed to be carried or worn by individuals under conditions where the natural heat of the blood is not sufficient or in which there is intense exterior cold against which the person should be guarded.

The invention consists of the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 shows the application of the warmer. Fig. 2 shows it located in the hollow of the foot. Fig. 3 is an interior view of the casing and its contents. Fig. 4 is a side elevation of the valve-operating mechanism and connections. Fig. 5 is a detail of the tube-coupling. Fig. 6 is a section through the two-way valve for returning the heating medium.

A A are pads, which may be made of any suitable material, preferably soft or elastic, so as not to hurt the feet or parts to which they may be applied. These pads are here shown as especially designed to be worn either under the hollow of the foot or at the sides of the ankles in the upper part of the shoe or other footwear and, as illustrated, are composed of chambers or tubes through which the heating medium may be circulated by means of connecting-pipes, as at 2 and 3. These pipes may be carried along the legs within the clothing or between the underwear and trousers and may be supported at intervals by elastic bands, clasps, or attachments, as at 4, to keep them in place. This illustrates the application where the pads are used for the feet. If they are to be carried in the hands, then the tubes would extend up the back and down through the sleeves of the coat in a similar manner. The tubes are connected with a heater carried by the person and conveniently attached by straps or suspenders, so as to be worn upon the back near the waist-line. This heater may be of any suitable or desired description, one form of which will be hereinafter described, and from the heater short tubes extend to a point where a connection may be made with the tubes 2 and 3, previously described. Various means for detachably connecting these tubes may be employed. I have here shown male and female couplings 5 and 6, adapted to slip or lock together. The male portion 5 is here shown as slightly tapered and having an exterior coating of rubber or other joint-forming substance adapted to fit snugly in the correspondingly-tapered female portion of the joint. One of these parts is attached to one of the tubes to be connected and the other to the other tube. These parts have within them valves, as at 7, which are normally closed by springs, as at 8. The valves have stems 9 projecting from them in such a manner that when the two parts of the joint are locked together these stems contact with each other and simultaneously force the valves 7 away from their seats, thus leaving a free passage through the joint; but when the joints are separated these valves are closed by the springs 8, and no passage of the medium employed can take place from either of the separated ends. These joints may also be made near to the pads, so that all parts can be readily separated at will.

The heater may be variously constructed. I do not wish to limit myself to any especial form, since various well-known heating devices might be utilized for this purpose. In my present arrangement I have shown a containing-chamber 10, in which there may be a body of non-congealable liquid, such as spirit or a strong saline solution or other substance which can be employed for the purpose. From this chamber a pipe 11 leads to a heater 12, which in the present case is in the form of a coil, with any suitable lamp or means for applying heat to it and a hood 13 for the escape of the products of combustion through the top of the case 14, in which the device is contained. The liquid passing through the pipe into the coil of the heater is there vaporized and passes through a second pipe 15 into the outward-conducting pipes 3, which lead to the pads. Circulating through these pads the vapor or liquid condensed therefrom will be returned through the second pipe 2 and into a receiver, as shown in

the present case at 16. From this receiver the liquid will flow back into the holder 10, to be again transmitted through the heater, thus keeping up an indefinite circulation as long as heat is applied, and this can easily be made sufficient to counteract the effect of very intense cold upon the extremities or other parts to which the heater may be applied. The flow through the heater and pads may be regular and continuous, or it may be made intermittent. In the present device I have shown a means for making the flow intermittent.

17 and 18 are two valves, one controlling the outflow of the liquid from the heater toward the pads and the other controlling the return from the pads to the receiver 16 or its equivalent. These valves are here shown as having a common rod 19 connecting them, and this has a rocker-arm 20, which is connected by a rod 21 with a means for intermittently moving it, so that one valve is opened and the other closed by each movement of the rocker-arm. Various mechanical devices may be employed for producing this movement. I have here shown a spring-actuated clock mechanism 22, which can be wound up at any time and will run for a considerable period. By means of a pin-wheel 23, turnable by the said mechanism, and the cam 24, connected with the rod 21 and actuated by the pins on the wheel, the movement of the rocker-arm and valves is effected at intervals, depending on the rate of rotation of the wheel. In place of an escapement of the usual sort I may use an air-compression cylinder, as at 26, having a plunger moving therein, and a crank and eccentric 27, connected with the plunger by a rod, as at 28, so that the rotation of the eccentric or crank will compress the air into the end of the cylinder as the piston moves in, and when the eccentric has passed the center the pressure of the air causes a more rapid return of the plunger.

The liquid which passes from the container 10 to the heating-coil through the pipe 11 is controlled in its passage by a valve located in a valve-chamber 29, and the stem 30 of this valve is actuated by a rocker-arm 31 and a centrally-pivoted lever or rod 32, one end of which is connected with the rocker-arm and the other in position to be actuated by the revolutions of the pin-wheel and in unison with the opening of the vapor-supply valve previously described. The liquid is thus allowed to pass from the containing-chamber 10 through the valve at 29 in small quantities, the valve afterward closing, and the liquid being vaporized within the heating-coil will pass through the valves 17 and 18 to the heating-pad and thence return, as previously described.

In order to assist the movement of the liquid from the container to the heater, I can, if desired, bring a certain amount of pressure to bear by means of an air pumping or compressing device, one form of which is shown at W, through which a certain pressure can be maintained in the container above the liquid, so that when the valve is opened the liquid will be promptly delivered to the heater. In the same manner I may, if desired, produce a slight vacuum in the receiver 16, into which the liquid is returned, so as to assist in its circulation through the pads and connecting-pipes.

Various modifications of the described mechanism for operating the valves may be employed without materially altering the character of my invention, the essence of which is the employment of the local pads and a means of transmitting heat through them.

The pairs of pipes connecting with each of the pads are preferably carried together between the heater and the pad and are inclosed in a non-conducting casing to prevent radiation and loss of heat.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a portable heating apparatus, of a case and means for securing it to the body, hollow pads and means for holding them in contact with the extremities, a heater within the case, conducting-tubes leading from the upper part of the heater to the pads, return-tubes and a receiver located in the case into which said tubes discharge, a second receiver and a pipe connecting one receiver with the other, and a pipe connecting said second receiver with the lower part of the heater.

2. The combination in a portable heating apparatus of a case and means for securing it to the person, a heater contained within the case, hollow pads located in contact with the extremities, outflow and inflow tubes, the former connecting the heater with the pads, and a plurality of receivers within the case with which the inflow-tubes connect, a pipe connecting the final receiver with the heater, valves located in the circulating-pipes, and a mechanism by which said valves are alternately opened and closed.

3. The combination in a portable heating apparatus of a case secured to the person, a heater contained within the case, hollow pads applied to the extremities, outflow-pipes connecting the heater with the pads, return-pipes and receivers within the case into which said pipes discharge and through which the circulating medium is returned to the heater, and a valve located between the receiver and the heater and mechanism by which it is intermittently opened and closed.

In witness whereof I have hereunto set my hand.

FRANK BATTER.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.