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M. A. SMITH

1,620,581

CHEMICAL HEATING PAD

Filed Dec. 17, 1924

Fig. 1.

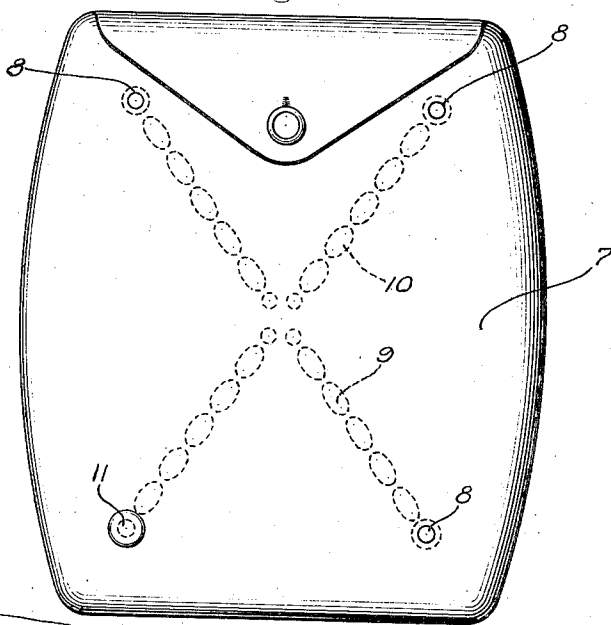


Fig. 2.

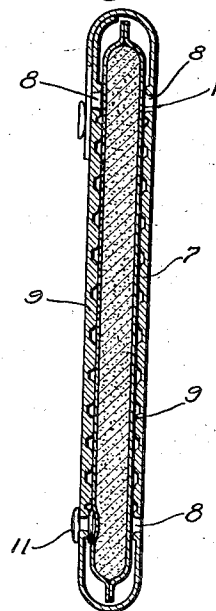


Fig. 3.

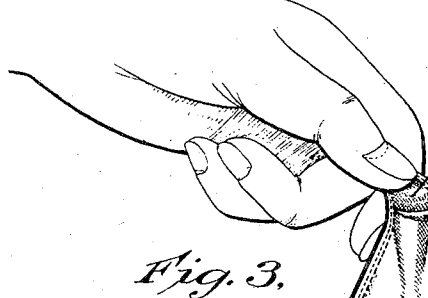


Fig. 4.

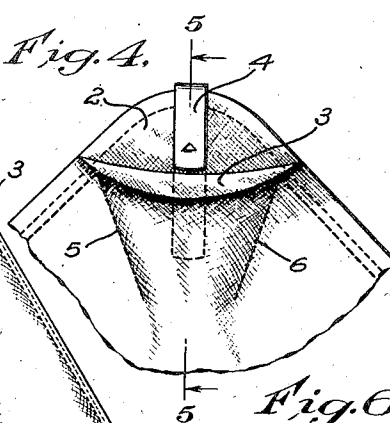


Fig. 5.

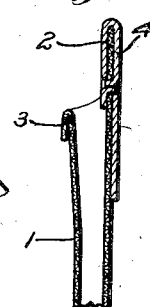
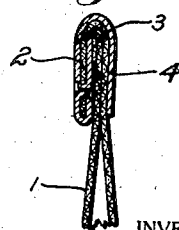


Fig. 7.



Fig. 6.



WITNESSES

E. A. Wilson
Robert D. Hulsizer

INVENTOR
MILDRED A. SMITH
BY *Mumford*
ATTORNEYS

UNITED STATES PATENT OFFICE.

MILDRED AURELIA SMITH, OF ALBANY, NEW YORK.

CHEMICAL HEATING PAD.

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This invention relates to chemical heating pads. An object of the invention is to provide a simple, convenient and efficient means for pouring water into the bag that contains the chemical mixture.

Another object concerns the provision of simple and efficient means for causing the bag to fold when closing, at a point where said bag cannot leak.

A further object concerns the provision of simple and efficient means for maintaining an even temperature in all parts of the chemical mixture.

A still further object concerns the provision of simple and efficient means for preventing the water of condensation inside of the envelope from leaking out while in use.

A still further object concerns the provision of simple and efficient means for regulating the supply of air that enters the device.

The invention is illustrated in the drawings, of which—

Figure 1 is an elevation of the device;

Fig. 2 is a section;

Fig. 3 is a perspective view of the inner bag showing how the layers are forced apart when the bag is held by the flap causing a strain on the bias of the bag;

Fig. 4 is an enlarged elevation of the funnel corner of the bag;

Fig. 5 is a section on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged section of the funnel corner showing the manner in which it is folded when the opening is closed and held closed; and

Fig. 7 is a perspective view of one of the ventilating hole plugs.

The form of the invention shown in the drawings is a preferred form, although it is understood that modifications in the construction and arrangement of the parts and in the character of the materials used may be adopted without departing from the spirit of the invention as set forth in the appended claims.

My invention comprises a fabric bag, canvas or the like, one-third filled with the following chemical mixture. 90 per cent fine iron borings that have previously been coated with a solution of $\text{CuCl}_2 + 2\text{H}_2\text{O}$ and H_2O , 9 per cent KCl or 9 per cent NaCl , and 1 per cent CaCO_3 or 1 per cent $(\text{MgCO}_3), \text{Mg}(\text{OH})_2 + 5\text{H}_2\text{O}$. This fabric bag is preferably rectangular in shape and

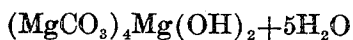
sewed along its edges. In one corner of the bag the two layers of material are separated to form an opening through which water can be forced. Adjacent this opening two layers of material are sewed together along spaced lines which converge inwardly toward the center of the bag to form a funnel. This corner of one of the layers of material is cut away shorter than the corresponding corner of the other layer so that the one corner portion will extend beyond the other to be used as a flap to grip the material firmly in the hand causing a strain on the bias of the pad and forcing the two layers to separate at this point, the edge of the other corner portion being bent over to insure a better seal when closing the funnel.

A U-shaped metallic clip having one long side is attached to the extended flap portion of the bag. The short side of the clip extends down on the inside of the bag to a point where it is to be bent over when closing the bag and the other side extends an equal distance beyond that point. The clip is therefore double for one half its length when fastened on the flap of the bag. The clip is made from a gauge metal that will bend easily in a single thickness but where it is double it will be almost impossible to bend it. For this reason the clip will always bend just where you want it to fold and thus eliminate the danger of spilling out the hot chemicals during use. Therefore it can be seen that this new type of clips performs another function other than merely holding the bag closed.

The bag is then placed within an envelope, which is waterproof. This envelope, on its inner surface, is provided with a plurality of irregular rows of ribs which space a considerable portion of the envelope away from the outer surface of the bag so that air can get to the chemical mixture through the fabric bag. The envelope is provided with a plurality of ventilating openings the inner edges of which have a raised head around them to prevent the condensation which forms on the inside of the envelope from leaking out through the openings while in use.

In starting the chemical heater the funnel is opened by bending back the metal clip, one tablespoonful of water is poured in through the opening. The funnel is closed and the bag inserted into the waterproof envelope. The chemical heater should be kneaded at

once to distribute the water uniformly through the mixture. Spontaneous generation of heat will result by the H_2O starting to oxidize the iron borings. The presence of the coating of $CuCl_2 + 2H_2O$ on the iron borings greatly accelerates the speed in starting but it can not be used in large quantities since it is not stable in air. Therefore a quantity of $NaCl$ or KCl is used to accelerate the oxidization of the iron borings over a long period of time. The heat generated by this oxidization evaporates the H_2O and dries the chemical mixture out thus automatically stopping the oxidization after several hours of heating. This may be repeated several times or the heater may be kept hot continuously for several days by adding more water when it cools down. It may be kept hot until the iron is completely oxidized. The $CaCO_3$ or



is used in the mixture for the same reason it is used in free running salt and that is to keep the mixture from caking up when subjected to dampness. The iron borings would not oxidize if it was not for the oxygen in the air that unites with the iron forming iron oxide. The ventilating ribs on the inner surface of the envelope therefore aids greatly in uniformly distributing the air supplying oxygen to the chemical mixture which in turn generates a uniform temperature throughout the said mixture.

As shown in the drawings, the preferred form of the invention comprises a bag 1 formed of two layers of material sewed together except at one corner (not shown). At this corner the material of one of the layers is cut away, permitting the other corner of the other layer of material to extend therebeyond, as at 2, to form a flap extension which can be gripped in the hand, causing a stress on the bias of the bag and forcing or causing the two layers to separate as shown in Figure 3. The layer which is cut away, however, has its upper edge at the corner turned over, as at 3, to insure a better seal when closing the funnel. The extended flap portion is provided with a metallic clip 4 which is bent double thereover in a manner so as to eliminate at all times the dangers of improper closing of a device of this character. Lines of stitching 5 and 6 extend inwardly toward the center of the bag and converge toward each other. These lines are spaced apart and join the layers together to form a funnel, the water being poured in between the layers of material within an area defined by these rows of stitching. As the flap 2 is held in the hand the layers of material tend to separate and cause the stitching to form a simple funnel. When the water has been poured in, the extended flap 2 is bent over, as shown in Fig. 6, to cover the

shorter flap portion and the opening formed therebetween, the rigidity of the metal clip 4 keeping the opening closed.

The bag 1 is then put in an envelope 7 of waterproof material which is provided with a plurality of openings such as 8 for ventilating purposes. These openings are connected on the inner surface of the bag by rows, such as 9 and 10, of irregular ribs or teats which keep the major portion of the surface of the envelope away from the outer surface of the bag so that air getting in through the openings 8 will supply oxygen to the chemical mixture uniformly which in turn generates a uniform temperature throughout the chemical heater. The envelope 7 is provided with a plurality of ventilating openings 8 the inner edges of which have a raised bead around them to prevent the condensation which forms on the inside of the envelope 7 from leaking out through the openings 8 while in use.

The temperature of the chemical heater may be regulated by inserting or taking out ventilating hole plugs depending on the temperature you desire. The more holes there are closed by inserting ventilating hole plugs, the lower the temperature the heater will operate at.

It will thus be seen that I have provided several improvements in chemical heating bags which are simple and efficient in their nature and produce decidedly improved results in the construction and operation of the bag.

What I claim is:—

1. A chemical heating pad formed of two layers of material sewed together along their edges except at one corner, a portion of the material of one layer being cut away to permit the corner of the other layer to extend therebeyond in the form of a flap, whereby the pad can be supported by this flap, thereby causing a stress on the bias of the pad which forces the two layers to separate at this point.

2. A chemical heating pad formed of two layers of material sewed together along their edges except at one corner, a portion of the material of one layer being cut away to permit the corner of the other layer to extend therebeyond in the form of a flap, whereby the pad can be gripped by this flap, causing a stress on the bias of the pad which forces the two layers to separate at this point, and rows of stitching extending in a converging manner inwardly from this corner of the pad to join the layers and form a sort of spout or funnel passage through which water can be poured.

3. A chemical heating pad formed of two layers of material sewed together along their edges except at one corner, a portion of the material of one layer being cut away to permit the corner of the other layer to extend

therebeyond in the form of a flap, whereby the pad can be gripped by this flap causing a stress on the bias of the pad which forces the two layers to separate at this point, and
5 form a funnel passage, and a U shape metal clip having one side shorter than the other, crimped over the extension flap reinforcing the flap with metal on both sides to a point where the flap portion is adapted to be bent
10 over to close the funnel passage.

4. A chemical heating pad formed of two layers of material sewed together along their edges except at one corner, a portion of the

material of one layer being cut away to permit the corner of the other layer to extend 15 therebeyond in the form of a flap, whereby the pad can be gripped by this flap, causing a stress on the bias of the pad which forces the two layers to separate at this point, and
20 form a funnel passage, and a U-shaped metal clip crimped over the extension flap reinforcing it with metal on both sides to a point where the flap portion is adapted to be bent over with the other layer of material at the corner to close the funnel passage.

MILDRED AURELIA SMITH.