Oct. 11, 1938. F. L. REYNOLDS ET AL 2,133,115

CHEMICAL HEATING PAD FOR PERMANENT HAIR WAVING

Filed May 7, 1938

FIG_1_

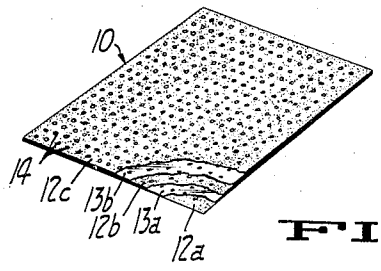


FIG_2_

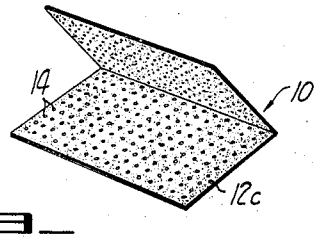


FIG_3_

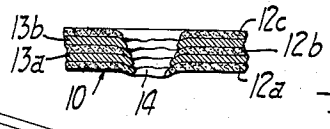


FIG_4_

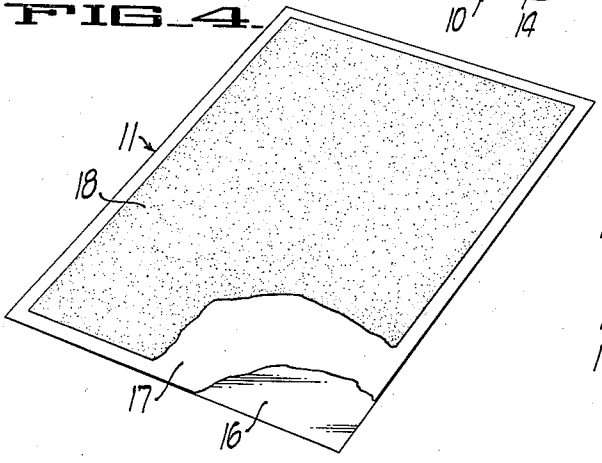


FIG_5_

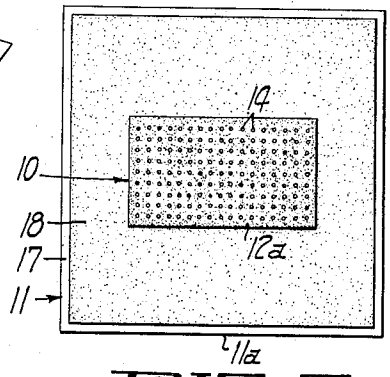


FIG_6_

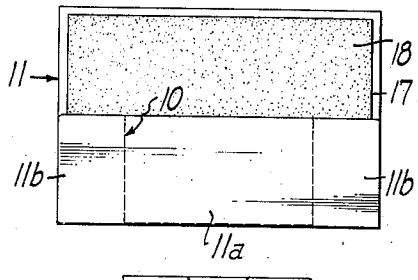


FIG_8_

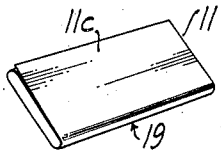


FIG_9_

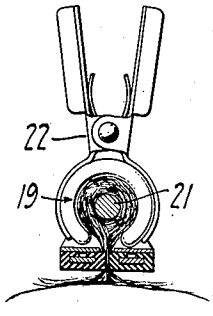
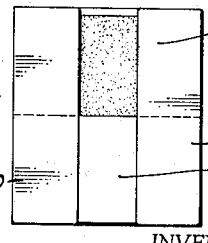


FIG_7_



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2,133,115

CHEMICAL HEATING PAD FOR PERMANENT HAIR WAVING

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Application May 7, 1938, Serial No. 206,604

4 Claims. (Cl. 132—36.2)

This invention relates generally to the construction of so-called chemical heating pads, particularly pads suitable for carrying out heating operations in permanent hair waving.

Chemical heating pads, such as are suitable for permanent hair waving, make use of an exothermic reaction between certain chemicals, to furnish sufficient heat for a waving operation. The type of pad generally employed for this purpose in the past has made use of a metal foil envelope or sachet, containing the necessary chemicals in dry powdered or granular form, and having one perforated side. In using such a pad a sheet of absorbent material like flannel or blotting paper is saturated with water and then applied against the perforated side of the envelope, after which the pad is applied about a curler. Water penetrates into the powdered material to start an exothermic reaction.

Pads of this kind are subject to several serious disadvantages, including the fact that they are relatively expensive to manufacture, due to the use of metal foil envelopes or sachets containing the powdered chemicals. Furthermore they are inconvenient to handle and are subject to relatively rapid deterioration when exposed to the air, due to more or less absorption of moisture from the atmosphere, with the result that some or all of the chemical action takes place before the pads are used.

In co-pending application Serial No. 176,229, filed November 24, 1937, there is disclosed a new type of chemical pad, making use of one or more sheets of absorbent material like asbestos paper, in intimate contact with one or more sheets of reactive aluminum foil. When such pads are used the asbestos paper is saturated with a chemical solution, and the chemicals contained in the solution react exothermically with the aluminum foil, to produce the desired amount of heat for carrying out a permanent hair waving operation. The present invention disclosed herein is in the nature of an improvement over the pad disclosed in the aforesaid co-pending application Serial No. 176,229. Specifically the present invention affords a more convenient arrangement of parts making up the pad, and affords means whereby leakage of chemical solution from the pad is precluded.

Further objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Fig. 1 is a perspective view, illustrating an assembly of aluminum foil and associated sheets of asbestos paper, such as form the inner assembly of my pad.

Fig. 2 illustrates the manner in which the assembly of Fig. 1 is folded, before being assembled with other parts of the pad.

Fig. 3 is a cross-sectional detail of the assembly shown in Fig. 1, on a greatly enlarged scale, showing the manner in which the sheets of asbestos paper and aluminum foil, are perforated.

Fig. 4 is a perspective view showing the wrapper or covering utilized with the assembly of Figs. 1 and 2, together with the sheet of absorbent paper, which is folded into the assembly.

Fig. 5 illustrates the assembly of Fig. 2 applied to the wrapper of Fig. 4, preparatory to folding the wrapper.

Fig. 6 illustrates an initial folding operation of the wrapper, while Fig. 7 illustrates a further folding operation, resulting in the complete folded pad of Fig. 8.

Fig. 9 is a side elevational view, partly in cross-section, showing the manner in which the pad can be applied about a curler for a hair waving operation.

Referring to the embodiment of the invention illustrated in the drawing, we have shown a pad consisting of an inner assembly 10, together with an outer covering 11 (Fig. 5). The assembly 10 is of the type disclosed in said co-pending application Serial No. 176,229. In this instance it consists of three sheets 12*a*, 12*b* and 12*c* of absorbent material, interposed between which are the sheets 13*a* and 13*b* of aluminum foil. The sheets 12*a*, 12*b* and 12*c* are of non-inflammable material, such as absorbent asbestos paper. The thickness or weight of the asbestos paper may vary in different instances, depending upon the requirements or conditions, but in practice for Croquignole hair waving we have used 6 pound asbestos paper, with good results. The gauge of the aluminum foil sheets may also vary depending upon different requirements or conditions, and in practice we have used a gauge of about 0.0015 inch, with good results.

The assembly as shown in Fig. 1, is provided with a plurality of perforations 14. These perforations are formed in a suitable perforating machine, whereby the perforations extend over the entire surface of the sheets. The perforating appliance employed can employ a number of pointed needles which pierce through the sheets of paper and aluminum foil, somewhat in the manner illustrated in Fig. 3. This perforating operation

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facilitates saturating the asbestos paper with chemical solution, as will be presently explained, and it also serves the useful purpose of compressing and locking the sheets together as a compact assembly, without the use of stitching. Novel features of this assembly and its method of manufacture are being disclosed and claimed in copending application Serial No. 210,436, May 27, 1938. After forming the assembly of Fig. 1, it can be folded over or doubled upon itself as shown in Fig. 2, to afford proper over-all dimensions for the pad.

It is possible to furnish the trade with assemblies as illustrated in Fig. 1, together with wrappers to be applied about the assembly, before they are used. However, it is more convenient to furnish the wrappers folded about the inner assembly **10**, whereby an operator partially unfolds the outer wrapper, applies chemical solution to the assembly **10**, and then re-folds the wrapper and applies the pad to the curler. The wrapper **11**, as illustrated in Fig. 4 consists of an outer sheet of metal foil **16**, having its inner surface covered with a relatively thin sheet **17** of waxed paper or parchment. This sheet **17** or liner is comparatively impervious to chemical solution, thus protecting the foil **16** from any chemical action. In addition to the wrapper, and interfolded with the wrapper about the assembly **10**, there is a sheet **18** of relatively absorbent material, such as absorbent paper. By absorbent paper we have reference to paper containing little if any sizing, similar to so-called paper towelling. Note that this sheet **18** as illustrated in Fig. 4 is slightly smaller in the dimensions than the outer wrapper **11**. To incorporate the sheet **18** in the assembly, it is placed upon the wrapper **11**, as shown in Fig. 4, and then the assembly **10** is placed upon the sheet **18**, as shown in Fig. 5, preparatory to folding the outer wrapper. The folding of one edge portion of the wrapper **11***a* is illustrated in Fig. 6. This can be followed by folding the end margins **11***b*, as shown in Fig. 7. The last folding of the projecting margin **11***c* forms the final compact package **19** as shown in Fig. 8.

In making use of the pad described above, a suitable chemical solution must be provided, to saturate the asbestos paper. Solutions which we can employ contain chemicals such as a salt of a heavy metal, like copper sulphate, capable of exothermic reaction with aluminum, together with an oxidizing agent like sodium chlorate, to prevent polarization, and a salt like aluminum sulphate tending to speed up commencement of the steaming period. An example of a chemical solution which can be employed with good results is as follows:

	Grams
Hydrated copper sulphate	3
Sodium chlorate	15
Hydrated aluminum sulphate	½
Ammonium chloride	½
Sufficient water to make 30 cc. of solution.	

The ammonium chloride initially activates the reaction and depresses the pH value of the solution. As the reaction of the solution on the aluminum proceeds, and the solution is heated to an elevated temperature, some decomposition of the aluminum chloride occurs with the result that the pH value of the solution is raised, to temper the reaction and extend the heating period.

Various ingredients can be used to saturate the asbestos paper of the assembly **10**, with the chemical solution. It is desirable for the operator to have a small measuring device by means of which a definite amount of the solution can be applied, such as a small measuring dropper. Thus, when an operator desires to use a pad, the wrapper **11** is partially unfolded to expose to view one surface of the assembly **10**, and then solution is applied to the assembly. The solution immediately penetrates through the perforations to saturate the entire assembly. Following saturation of the assembly **10**, the wrapper is again folded about the inner assembly, and then the packet **19** is bent about a hair curler **21** as shown in Fig. 9, and retained in position by means of a suitable clip or like holding device **22**, such as are well known in the art.

As has been previously pointed out the sheet **18** of absorbent paper is for the purpose of preventing leakage of the chemical solution from the pad, as the pad is being applied to the curler **21**, or while it is in use. Without the use of this absorbent paper there may be a tendency for some solution to leak from the pad, when the pad is applied upon a curler, or while the pad is heating. With the paper **18** incorporated in the pad, any chemical solution tending to leave the assembly **10**, is absorbed by the margins of the paper, and therefore all leakage of solution from the pad is avoided.

It may be noted that leakage of chemical solution from the pad is undesirable, and materially detracts from utility. While such chemical solutions may not be injurious to the hair, the curlers and protectors such as are used in croquignole hair waving operations, are usually made of aluminum or aluminum alloy, for the sake of lightness. The chemical solutions tend to corrode such aluminum parts, thus causing rapid deterioration. As previously pointed out with the present invention, there is no leakage or seepage of chemical solution from the pad, and thus the pad can be used with curlers and protectors having metal parts of aluminum or like metal without causing any corrosive action.

It should be understood that the chemical solution may vary in ingredients and in the proportioning of ingredients, without departing from the spirit of the invention. As previously pointed out the purpose of the chemical solution is to afford such chemicals as are necessary for securing a controlled exothermic reaction with the aluminum foil, thus affording adequate heat generation for a proper hair waving operation. However, care should be taken to avoid use of solution which might evolve toxic fumes or which might cause injury upon contact with the skin.

The use of asbestos paper is desirable for several reasons, as such paper will not be charred during operation of the pad, even though temperatures attained within the pad are considerably above 212° F. It has also been pointed out that the chemical solution makes use of an active oxidizing agent, like sodium chlorate. At the end of the waving operation at least a part of the oxidizing agent is still present. If sheets were used made of ordinary absorbent paper, or like material, impregnation of the cellulose fiber with the oxidizing agent will produce a highly inflammable article, thus creating a fire hazard. This fire hazard is obviously avoided by the use of an inert non-inflammable fiber like asbestos, thus making it possible for the operator to discard the pads after they have been used, without particular care as to the manner of disposal. In this connection it may be noted that the relatively small amount of cellulose fiber represented by

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the sheet 18 of absorbent paper, is not sufficient to cause a fire hazard.

We claim:

1. In a chemical heating pad for permanent hair waving, an assembly consisting of at least one sheet of aluminum foil and at least one sheet of asbestos paper extending in juxtaposition with one side of the aluminum foil, the sheet of asbestos being adapted to be saturated with chemical solution for exothermic reaction with the aluminum foil, a protective wrapper folded about said assembly, and a sheet of absorbent paper interposed between the wrapper and the assembly and likewise folded about the assembly.

2. In a chemical heating pad for permanent hair waving, an assembly consisting of at least one sheet of aluminum foil and at least one sheet of asbestos paper, extending in juxtaposition with one side of the aluminum foil, the asbestos paper being adapted to be saturated with a chemical solution for exothermic reaction with the aluminum foil, a sheet of metal foil forming a wrapper folded about the assembly, a sheet of protective material lining the inner surface of the foil wrapper, and a sheet of absorbent paper interposed between the wrapper and the inner assembly, said absorbent paper being likewise folded about the assembly and serving to prevent the leakage of solution from the assembly, the dimensions of the absorbent paper being comparable to the dimensions of the wrapper whereby marginal edges of the absorbent paper are available for absorbing solution escaping from the assembly.

3. In a chemical heating pad for permanent hair waving, an inner assembly, adapted to be moistened with chemical solution at the time of its use for causing an exothermic reaction, a protective wrapper folded about the assembly, and a sheet of absorbent material interposed between the wrapper and the inner assembly and likewise folded about the assembly, said sheet of absorbent material having marginal edge portions which extend through the folds of the wrapper.

4. In a chemical heating pad for permanent hair waving, an assembly consisting of at least one sheet of aluminum foil and at least one sheet of absorbent material extending in juxtaposition with one side of the aluminum foil, the sheet of absorbent material being adapted to be saturated with chemical solution at the time of its use for exothermic reaction with the aluminum foil, a protective wrapper folded about the assembly, and a sheet of absorbent material interposed between the protective wrapper and the assembly, said material affording marginal edge portions extending through the folds of the wrapper and serving to prevent leakage of solution from the pad.

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