Feb. 21, 1956 F. CREMER 2,735,108

HEAT INSULATING HAND COVERING

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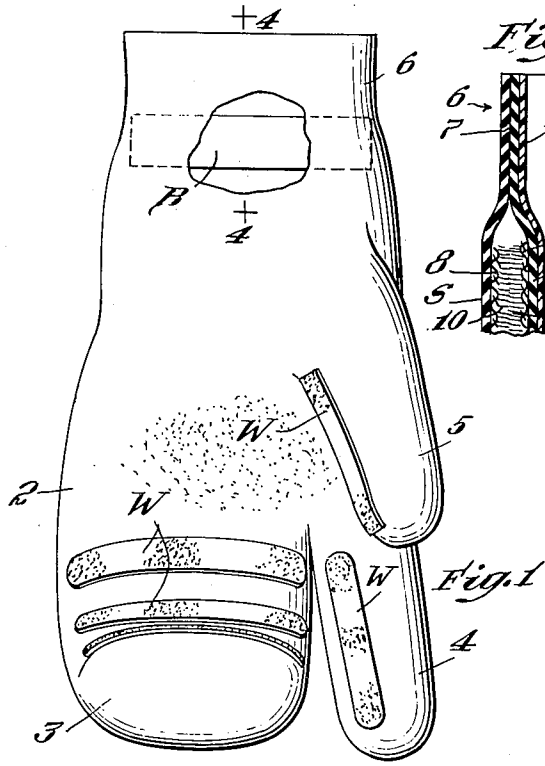


Fig. 1

Fig. 4

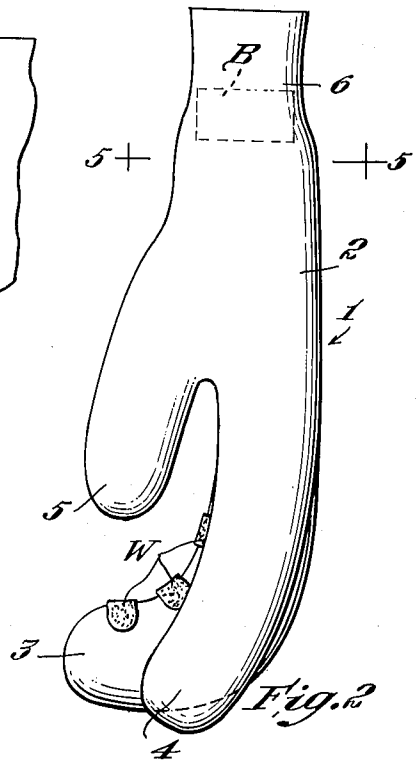


Fig. 2

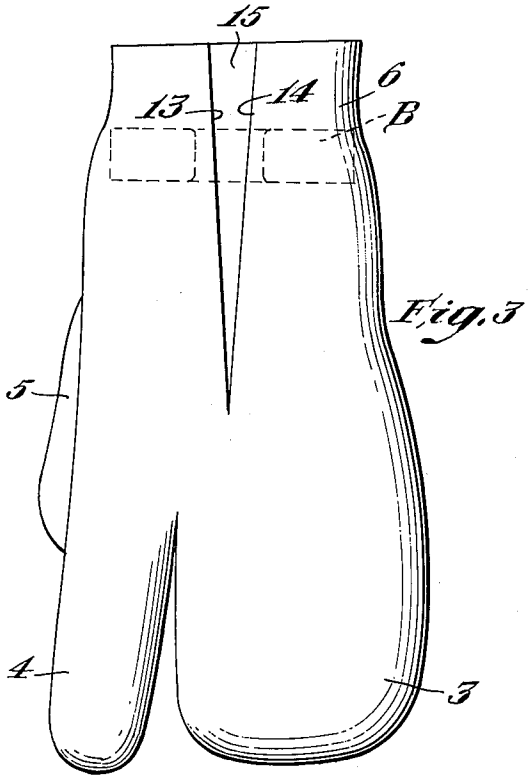


Fig. 3

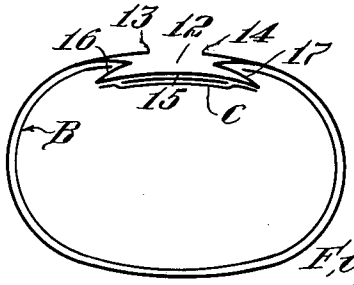


Fig. 5

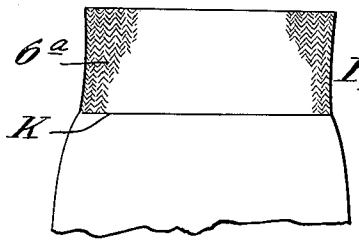


Fig. 6

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HEAT INSULATING HAND COVERING

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12 Claims. (Cl. 2—158)

This invention pertains to apparel, in particular to an improved hand covering designed to protect the wearer's hand from cold. As here illustrated, by way of example, the invention is embodied in a mitt or glove useful, for instance, by out-of-door workers, military personnel or others who are exposed to extreme cold, although the improved hand covering is of general utility. For particular example, aviators are often exposed for long periods to a near-zero atmosphere, where ordinary hand coverings such as woolen gloves or the like are wholly inadequate to cover hands which are of necessity exposed outside of the body garments for manipulating controls or operating firearms or other instruments or appliances.

The present invention has for its principal object the provision of a hand covering such as a mitten or glove so constructed as (while providing adequate protection against extreme cold) to have all requisite flexibility to enable the wearer to handle tools, operate machinery, actuate the controls of an airplane or manipulate firearms, etc. A further object is to provide a mitten or glove comprising heat insulation of a highly effective character whose insulating properties are not lessened by exposure of the glove to external moisture or from the effects of perspiration from the wearer's hand. A further object is to provide a glove or mitten comprising an outer skin and an inner skin which are joined only at their marginal portions, and with insulation interposed between said skins. A further object is to provide a glove which, although normally closely hugging the wrist of the wearer and although comprising an outer skin of a material which does not stretch easily, may nevertheless be donned or doffed without difficulty. A further object is to provide a glove of the above character having at its palm and/or finger portions elements operative to provide a firm grip about a part grasped by the gloved hand. Other and further objects and advantages of the invention will be pointed out in the following, more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a plan view of a glove or mitt embodying the present invention, the glove being shown with its palm side up;

Fig. 2 is a side view of the glove shown in Fig. 1;

Fig. 3 is a plan view of the glove of Fig. 1 with its palm side down;

Fig. 4 is a fragmentary section to large scale on the line 4—4 of Fig. 1, but omitting certain parts;

Fig. 5 is a diagrammatic sectional view substantially on the line 5—5 of Fig. 2 and to larger scale; and

Fig. 6 is a fragmentary view of the back of the glove at its wrist portion illustrating a slight modification.

Referring to the drawings, the numeral 1 designates the glove or mitt as a whole, this glove or mitt comprising the hand portion 2, the finger tip portion 3 and, as here illustrated, a portion 4 for the reception of the index finger, and a portion 5 for the reception of the thumb. Although, as here illustrated, the mitt or glove has a separate portion 4 for the reception of the index finger, it is contemplated that the glove may be made without such separate portion or on the other hand that it may be made with a portion for each individual finger. As illustrated the glove comprises the wrist portion 6 which is designed snugly to embrace the wrist of the wearer.

Referring more particularly to Fig. 4, the improved glove or mitt comprises the outer skin S and the inner skin or lining L. The inner and outer skins S and L are of thin, flexible material which is impervious to moisture and preferably waterproof, it being contemplated that each of these skins may be of vulcanized gum rubber, although if desired, these skins may consist of textile material, for example stockinet fabric, frictioned with rubber, or of gum rubber with inclusion of reinforcing material such as textile fibers. Obviously synthetic rubber may be used, instead of natural rubber, or any other material, for instance a synthetic plastic having the requisite characteristics. In any event these skins would be thin and flexible. As illustrated in Fig. 4, the inner and outer skins are united at the wrist portion, for example, by a suitable adhesive binder 7 or by direct coalescence of the material forming the skins. Thus, if the skins are of gum rubber, they may be joined at the wrist during vulcanization. Preferably, the inner and outer skins are separate from each other at other portions of the glove, although under some circumstances it may be desirable to unite them in direct contact with each other, for example, in forming the part 4 which receives the index finger, in order to insure a proper degree of flexibility at this point.

At all portions where the inner and outer skins are free from each other there is interposed between them a layer or layers of heat-insulating substance. As illustrated in Fig. 4, the heat insulation consists of plies 8 and 9 of textile material, bonded to the opposed surfaces of the outer and inner skins S and L. Preferably each of these textile plies is of a character such that loose fibers 10 or 11 project from one surface of the textile material. For example the textile plies 8 and 9 may be of a napped material, for instance woolen, or they may be pile fabrics in which the pile tufts form the projecting fibers 10 and 11. The textile plies 8 9 are so arranged that the free ends of the projecting fibers 10 and 11, if present, are opposed to each other, thus forming a resilient cushion between the inner and outer skins of the glove and providing a multitude of tiny air spaces thereby insuring a very effective type of insulation between the inner and outer skins.

In order to facilitate the donning and doffing of the glove or mitt, it is preferred to form a slit 12 (Figs. 3, 5 and 6) in the back of the glove, extending from the free end of the wrist portion 6 forwardly toward the finger tip portion, this slit being defined by the edges 13 and 14 which converge forwardly. To close the gap formed by this slit, a bellows tongue 15 is arranged within the mitt, this tongue being united by accordion elements 16 and 17 to the opposite edges 13 and 14 of the back of the mitt. The bellows tongue 15 may be of the same multi-ply construction (indicated at C, Fig. 5) as the other portions of the mitt, that is to say it may have similar waterproof and insulating characteristics thereby providing protection for the wearer's hand at the back as well as at the palm portion. Desirably, the wrist portion is of a normal diameter such that it snugly embraces the wearer's wrist, the accordion elements 16 and 17 possessing inherently resiliency such that they tend to contract and draw the edges 13 and 14 toward each other, but, if more positive constrictive

force be desired than that resultant from the natural tendency of the bellows to contract, a split resilient bracelet B (Figs. 1, 2, 3 and 5) of any appropriate material may be interposed between the insulating plies adjacent to the wrist portion.

In order that the wearer may obtain a firm grip upon any object which is grasped by the gloved hand, it is proposed to provide the palm portion of the glove and also, if desired, the thumb and finger portion, with areas W, formed for example by ribbons of rubber or rubberized fabric having rough, exposed surfaces, for instance pebbled surfaces, which are secured to the outer skin of the glove by appropriate adhesive or by vulcanization. Alternatively, such rough, friction surfaces may be formed by adhesively bonding crumb rubber directly to the skin S at the desired areas, for example, over the entire palm, or only at the finger portion of the palm.

As above suggested, it may be desirable to omit the insulation from the part 4 which houses the forefinger of the wearer in order that the forefinger may be sufficiently flexible for use in manipulating small parts, such for example, as the trigger of a gun. Moreover, since the glove will commonly be employed by persons who, for long periods must grip a part, for example a tool handle, or control lever or wheel, it is preferred to shape the forward portion of the body of the glove to provide a permanent curvature, as illustrated in Fig. 2, so that the user will not be compelled to exert stretching force in conforming the glove to the handle or other part which he grasps.

While, in Fig. 4, the outer and inner skins S and L are shown as extending down into the wrist portion of the glove, it is contemplated that, as illustrated in Fig. 6, the outer and inner skins may terminate at the point K at which point the glove is large enough to permit insertion of the hand without requiring the slit **12**. The wrist portion 6^a of the glove will then consist of some other material, for example ribbed knitted fabric or the like designed to hug the wrist snugly and elastically; in addition, a draw strap at the back of the glove, such as is conventional in certain styles of gauntlet, may be provided.

By reason of the fact that the glove has inner and outer skins which are of waterproof material, the insulating material which is interposed between them is protected from external moisture and also from perspiration exuding from the wearer's hand, and thus the insulating material does not become matted and thus lose its effectiveness.

While napped textile fabric has been suggested as desirable as an insulating material it is contemplated that other materials, for example cellular rubber, felt, or the like may be used for the purpose but in any event it is considered desirable that the insulating material be arranged as separate plies secured respectively to the outer and inner skins of the glove in order thereby to insure a maximum of flexibility.

Desirably the inner surface of the inner skin L of the glove is coated, as indicated at N (Fig. 4) with nylon which is much more slippery than rubber and which thus facilitates the donning and doffing of the glove.

While certain desirable embodiments of the invention have herein been disclosed by way of example it is to be understood that the invention is broadly inclusive of any and all modifications falling within the scope of the appended claims.

I claim:

1. A heat-insulating mitt for protecting the wearer's hand in a cold atmosphere, said mitt having palm and finger portions and comprising outer and inner skins of flexible waterproof material which are free from each other at least throughout the entire palm portion and at that portion which covers the back of the wear's hand and heat insulating material of substantially uniform thickness interposed between the outer and inner skins wherever the latter are free from each other, said heat insulating material comprising independent plies of fibrous textile fabric having loose projecting fibers, the respective fibrous plies being bonded to the inner surfaces of the outer and inner skins respectively, but being freely movable relatively to each other.

2. A heat-insulating mitt comprising outer and inner skins of flexible, waterproof material, and two separate, relatively movable plies of textile fabric intervening between said skins, each ply being bonded to the inner surface of that one of the skins to which it is adjacent, the opposed surfaces of said textile plies having loose projecting fibers defining a multitude of air spaces.

3. A heat-insulating mitt comprising outer and inner skins of flexible, waterproof material, and two separate plies of material intervening between said skins, said plies being bonded to the inner surfaces of the outer and inner skins respectively, the opposed surfaces of said plies having resilient projecting fibers which oppose approach of the plies and thereby maintain an air space between them.

4. A heat-insulating mitt for aviator's use having a wrist portion which is expansible to provide for ready introduction or withdrawal of the hand and also having portions which receive the thumb and fingers, the latter portions comprising inner and outer relatively movable waterproof skins of thin flexible material joined to each other only at the wrist portion, and a plurality of relatively movable plies of fibrous heat-insulating material, having loose projecting fibers, interposed between the inner and outer skins, said plies being so arranged that the free ends of the fibers which project from the respective plies oppose each other so as to form a resilient insulating cushion, the inner surface of the inner skin having a smooth, slippery coating of nylon.

5. A heat-insulating mitt comprising a hand portion and a wrist portion, the hand portion, at least, comprising inner and outer skins of flexible but substantially inextensible, waterproof material, and relatively movable plies of fibrous insulating material interposed between the outer and inner skins, said plies being so arranged that the free ends of the fibers which project from the respective plies oppose each other to form a resilient insulating cushion, the mitt having a slit at its back which extends from the free edge of the wrist portion into the hand portion thereby to permit expansion of the mitt to facilitate donning and doffing it, and an expansible closure for said slit, said closure comprising heat-insulating material.

6. A heat-insulating mitt comprising a hand portion and a wrist portion, the hand portion, at least, comprising inner and outer skins of vulcanized gum rubber and relatively movable plies of fibrous insulating material having loose projecting fibers interposed between the outer and inner skins, said plies being so arranged that the free ends of the fibers which project from the respective plies oppose each other so as to form a multitude of minute air spaces intervening between said plies, said plies being bonded to the inner surfaces of the outer and inner skins, respectively.

7. A heat insulating mitt according to claim 5 having a split, resilient bracelet interposed between the inner and outer skins adjacent to the wrist portion thereby to constrict the wrist portion about the wearer's wrist.

8. A heat insulating mitt according to claim 11 wherein the mitt has a slit at its back extending from the free edge of the wrist portion into the hand portion thereby to permit expansion of the mitt to facilitate donning and doffing it, and which has a bellows tongue connecting the opposite edges of the slit thereby to permit the slit to be expanded, characterized in that the bellows tongue is of multi-ply construction including inner and outer waterproof skins of inelastic material and intervening insulating material.

9. A heat-insulating mitt for protecting the wearer's hand from cold, said mitt having palm and finger portions and comprising outer and inner non-lamellar skins of flexible moisture-impervious material, said skins being free from each other except at the wrist portion of the mitt,

and insulating material providing a multitude of minute air spaces intervening between said skins at all portions of the mitt at which said skins are free from each other, said insulating material being of substantially uniform thickness and comprising distinct plies which are freely movable relatively to each other.

10. A heat-insulating mitt according to claim 9 having areas at its palm portion and at the inner surface of its finger portion which are roughened by inclusions of firmly anchored crumbs of rubber.

11. A hand covering for protecting the wearer's hand from cold and which comprises inner and outer skins of flexible, water-impervious and substantially inelastic material, the skins being united to each other only at the wrist portion of the hand covering, and a plurality of independent, relatively movable plies of heat-insulating material interposed between the skins, the ply adjacent to the inner surface of each skin being bonded thereto.

12. A hand covering for protecting the wearer's hand from cold and which includes a wrist portion and portions which receive the thumb and fingers of the wearer, said hand covering comprising inner and outer skins of flexible, waterproof and substantially inelastic material

and a plurality of plies of fibrous, heat-insulating material having loose fibers projecting from its surface, said projecting fibers opposing each other in the innermost plies to form a resilient insulating cushion, the plies of heat-insulating material being interposed between the skins and being movable relative to each other, said skins and insulating plies being united at the wrist portion of the hand covering.

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