June 28, 1949.

R. G. OLSON

2,474,273

FABRIC REINFORCEMENT

Filed March 7, 1946

Fig. 1.

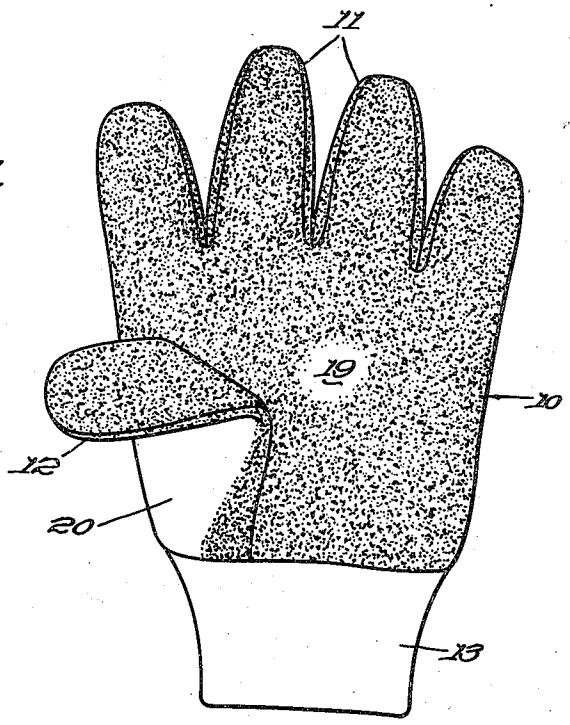


Fig. 2.

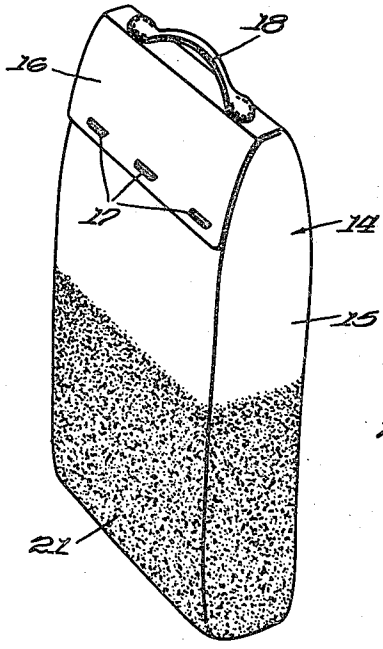
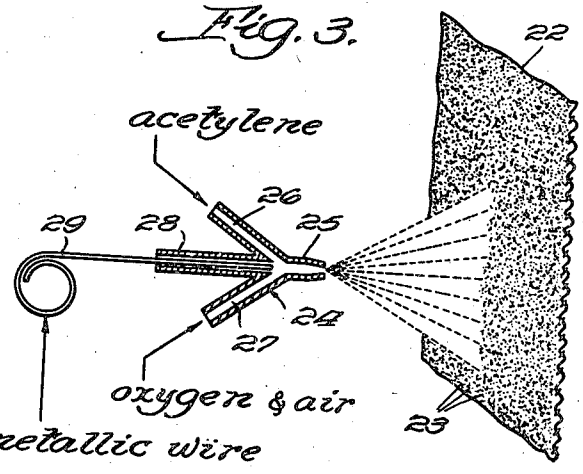


Fig. 3.



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FABRIC REINFORCEMENT

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14 Claims. (Cl. 2—167)

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This invention relates to a new and improved method of reenforcing surfaces of preformed fabric articles.

An important object of the invention is to provide an improved fabric article having metal reenforced surfaces.

A further object of the invention is the provision of reenforcing a fabric article by spraying with molten metal at temperatures and speeds which cause adherence of the metal to the irregular surface of the fabric, thus preparing the surface to withstand much greater wear than the fabric possessed prior to the metal spraying.

Another and further object of the invention is to provide a glove with a metal reenforced palm portion.

A still further object is the method of applying small particles of metal to the palm portion of a fabric glove in a state in which the particles adhere to each other and to the surface of the fabric without penetration through the warp and weft.

A further purpose is the strengthening of the lower exterior of a mail-carrying bag or the like which is sometimes dragged about, by coating these surfaces with metal particles.

Other and further important objects will become apparent from the disclosures in the following specification and accompanying drawing, in which:

Figure 1 is a top plan view of a glove having a reenforced palm according to the principles of this invention.

Figure 2 is a perspective view of a conventional mail bag, showing portions of its surface reenforced with metal.

Figure 3 is a diagrammatic view of the metallic spray device adapted to apply a metallic surface to a fabric material or the like.

As shown in the drawing:

The reference numeral 10 indicates generally a preformed fabric glove, such as a canvas work glove, having usual finger portions 11 and a thumb portion 12. The upper portion of the glove is provided with a wrist band 13 which is adapted to snugly engage the wrist of the wearer.

As shown in Figure 2, a mail bag 14 comprises a body portion 15 and a hinged cover 16 adapted to be locked through hasp members 17 which are attached to the body portion 15 and project through alined apertures in the cover 16. A handle 18 is for the purpose of carrying the bag.

In both of the preformed fabric articles described and shown in Figures 1 and 2 there are certain surface portions which receive more wear

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than other portions of these articles. In the case of the glove 10, the palm portion designated by the numeral 19 receives an infinite amount of wear compared with the back of the glove 20 which receives substantially no wear. This is especially true of work gloves. Many methods have been employed in an effort to sufficiently reenforce the palm portion of a glove to enable it to withstand the wear which the palm necessarily receives in use. In the case of the mail bag 14, the lower portion designated by the numeral 21 receives greater wear than the upper portion. Quite often the mail bag is dragged around on floors, and in many instances the floor is of the concrete type which would quickly cause the fabric mail bag to show signs of great wear and would actually tear through the fibers that go into the making of the bag.

It was with special reference to preformed fabric articles and the reenforcing surfaces thereon that the present invention was developed. As shown in Figure 3, a fabric or other flexible material 22, such as leather or the like, is shown being sprayed or coated with a plurality of finely divided metal particles 23. The equipment used to spray the fabric 22 is termed in the trade today a "metallizing gun." This gun shown at 24 includes a mixing or fusing nozzle 25, a first conduit 26 for the passage of acetylene gas to the nozzle 25, a second conduit 27 for the passage of oxygen and air to the nozzle 25, and a third conduit 28 for the passage of a piece of metal wire 29. The wire 29 is mechanically projected through the conduit 28 to the nozzle 25 where the burning of the acetylene with oxygen and air causes fusion of the metal. The result of the passing of wire into the proximity of the burning oxygen and acetylene causes the metal wire to change into a molten state, and in such state it is expelled or sprayed from the nozzle 25 to the surface of the fabric 22 which is positioned a short distance from the end of the nozzle 25. It will be understood that any metal may be employed in this "metallizing" of fabric surfaces. However, some metals such as aluminum and zinc are more suitable for this process than others, the reason for this being that the temperature at which the metal melts is an important factor in whether it will be usable in conjunction with fabrics. The warp and weft of the fabric must not be decomposed or damaged by the heat of the metal when it is applied to the surface of the fabric. Thus a metal must be used that fuses at a low enough temperature so that after it is

projected across space and onto the fabric, it has sufficiently reduced in temperature to be harmless to the fabric. The metal is thrown out in finely divided particles or globules that are sufficiently hot and plastic to adhere to the irregular surface of the fabric and to each other. Subsequent cooling of the fused metal results in a permanent metal coating for the fabric. A coating of this sprayed metal is sufficiently thin so as to permit the fabric full flexibility after the metal has been applied. However, the metal has surrounded or coated the warp and weft of the fabric to such an extent that the fabric is greatly protected against ordinary wear caused by rubbing or friction or the like, with the result that fabric surfaces reenforced with a metal as herein described will out-last many times a fabric not reenforced.

There are times when it is desired to increase the thickness of the metal coating to obtain various physical qualities for the fabric article. This is accomplished by applying a second coat of the metal spray. This second coat does not contact the fabric surface but rather adheres only to the irregular surface of the first or previous coat of metal. Because of this fact the flexibility of the coated fabric is not materially reduced upon the adding of a second coat of metal.

A further advantage in being able to have two coats of metal is that two different metals may be employed, thus making metal surfaces for fabrics or fabric articles unlimited in scope. As mentioned above, certain metals melt at such a high temperature that they are not acceptable for the first coat on a fabric inasmuch as the threads composing the fabric must not be exposed to great heat. A first coat of zinc or aluminum which melts at relatively low temperatures can be applied to the fabric to cover and protect the threads from the heat created by the application of a second coat of copper, nickel, steel, or iron which melt at relatively higher temperatures. Hence even though the heat of fusion of the second coat of metal is very high it cannot and does not damage the fabric because it does not directly contact it.

As a general rule, metals which melt at high temperatures are possessed of harder wearing qualities. Hence the reenforced fabric will be effectively resistant to abrasion or abrasive action. Conversely it is a general rule that metals which have a low melting point are of the softer type and conducive to flexibility. Hence the first coat of a metal having a low melting point has two functions. First the low melting point metal does not injure the fabric and secondly it maintains the fabric's flexibility. The second coat of a metal having a high melting point provides the long hard wearing surface conducive to prolonged fabric life.

The metallic coating is applied to preformed fabric articles such as the glove and mail bag shown in Figures 1 and 2 respectively. The palm 19 of the glove is shown reenforced by the metal particles as indicated by stippling. This reenforcement extends down and around the fingers and the thumb of the glove to give strength when it is most needed. The mail bag has its lower portion 21 reenforced with the metal coating, and the life of both articles is greatly prolonged. It should be understood that the "metallizing" of other preformed fabric articles or articles made of leather or other similar flexible materials will likewise have their wearing qualities greatly enhanced. Heretofore reenforcing of preformed fabric articles was generally accomplished by applying leather or other sturdier materials to the parts which were to receive excessive wear. It is apparent that with the present invention the preformed articles are more easily and more economically reenforced. The savings in leather alone are enormous and at the present time when leathers are relatively scarce this savings is a vital factor in glove manufacture.

Various modifications may be made herein without departing from the spirit of the invention, and it is the intention not to limit the patent granted hereon otherwise than as necessitated by the scope of the appended claims.

What is claimed is:

1. A method of farbric reenforcement comprising the steps of spraying the fabric with fused metal having a relatively low melting point and subsequently spraying the previously sprayed fabric with fused metal having a relatively high melting point.

2. A preformed fabric article comprising a first coating of finely divided particles of metal adhering to the surface of the fabric and to each other, and a second coating of finely divided particles of metal adhering to the first coating of metal.

3. A fabric reenforcement comprising a coating of a relatively soft fused metal having a relatively low melting point adhering to and around the threads of the fabric, and a second coating of a relatively hard fused metal having a relatively high melting point adhering to the first metal coating, whereby the reenforced fabric possesses the flexibility of the fabric with a soft metal coating and the abrasive resistant qualities of a hard metal.

4. A method of fabric reenforcement comprising the steps of spraying a fabric with a fused metal having a low melting point and being relatively soft, and of spraying the fabric with a fused metal having a high melting point and being relatively hard, whereby the fabric threads are encased in the soft metal and the second coating of metal merely contacts and adheres to the under or base coating.

5. A method of reenforcing the wearing surfaces of a fabric glove comprising the steps of spraying the palm and finger portions with minute particles of a fused metal, said metal having the normal characteristic of being relatively flexible, and spraying the same glove portions with minute particles of a fused metal, said metal having the normal characteristic of being relatively abrasive resistant, whereby the fabric glove retains its flexibility and has a good wearing surface due to the flexible metal enclosing and adhering to the threads on the glove surface and the abrasive resistant metal adhering to the flexible metal.

6. A fabric glove having a first coating of spray metal adhering to the surface of the fabric and a second coating of spray metal adhering to the first spray metal coating.

7. A fabric glove reenforcement comprising a first coating of spray metal of a low temperature of fusion adhering to and around the threads constituting the fabric glove, and a second coating of spray metal of a relatively higher temperature of fusion adhering to the first coating of spray metal, whereby the glove is adequately reenforced.

8. A fabric glove having portions thereof receiving great wear, comprising a first coating for said portions of a spray metal having a soft sur-

face and adhering well to the fabric glove, and a second coating for said portions of a spray metal having a relatively hard surface and adhering well to the first spray metal coating and forming a good abrasive resistant outer surface for the portions of the glove receiving great wear.

9. A fabric reenforcement comprising a first fused spray metal coating adhering to and around the threads constituting the fabric, said first fused spray metal coating contacting the fabric at a temperature sufficiently low so as not to injure the fabric threads, and a second fused spray metal coating adhering to the first fused spray metal coating.

10. A fabric reenforcement as set forth in claim 9 in which the second fused spray metal coating contacts the first fused spray metal coating at a relatively higher temperature than the temperature at which the first fused spray metal coating contacted the fabric whereby the entire coating may be any thickness or hardness.

11. A fabric reenforcement as set out in claim 10 in which the article reenforced is a fabric glove.

12. A fabric reenforcement as set out in claim 10 in which the article reenforced is a fabric bag.

13. A method of fabric reenforcement comprising the steps of spraying a fabric with a fused metal that contacts the threads of the fabric at a sufficiently low temperature so that as the fused metal encases the fabric threads the threads will not be damaged by the heat, and subsequently spraying the initially coated fabric with a fused metal that contacts the metal coated threads at a higher temperature.

14. A method of fabric reenforcement comprising the steps of spraying a fabric with a fused metal that contacts the threads of the fabric at a sufficiently low temperature so that as the fused metal encases the fabric threads, the threads will not be damaged by the heat, and subsequently spraying the initially coated fabric with a fused metal that contacts and adheres to the metal coated threads.

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