May 24, 1949. B. A. WEYL 2,470,963

ATTACHMENT OF BUTTONS TO FABRIC

Filed Dec. 21, 1943

Fig. 1.

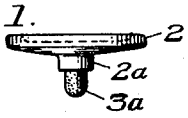


Fig. 2.

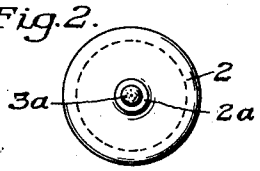
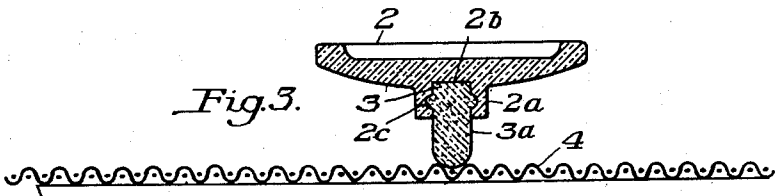


Fig. 3.



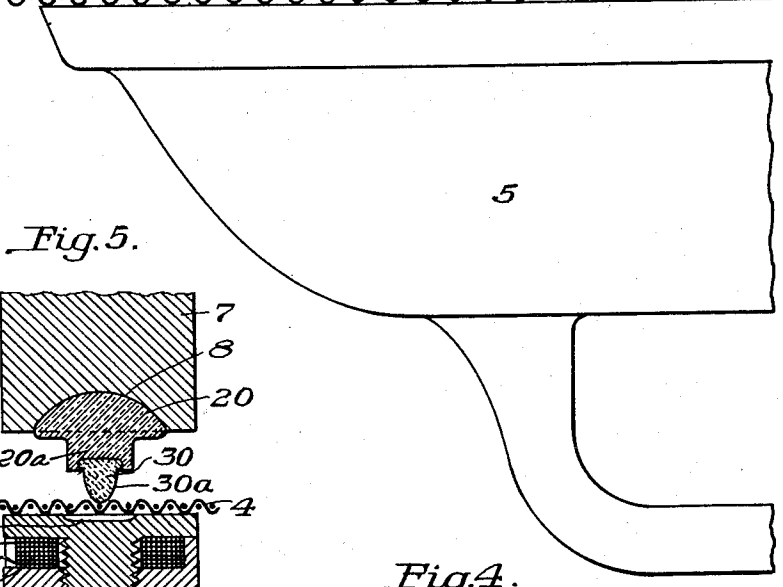


Fig. 5.

Fig. 4.

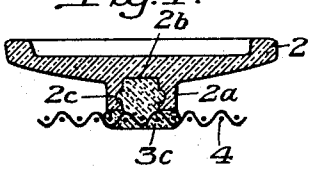


Fig. 6.

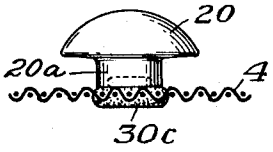
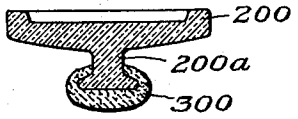


Fig. 7.



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ATTACHMENT OF BUTTONS TO FABRIC

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Application December 21, 1943, Serial No. 515,102

6 Claims. (Cl. 24—90)

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My invention relates to buttons, and my object is to provide a button with improved means for securing it to cloth or other fabric.

By virtue of the new and useful improvements herein disclosed, a button may be readily applied and anchored to cloth, and contrary to the case of buttons secured to cloth by sewing or any of the other usual contrivances, the practice of my invention fortifies or strengthens the fabric at the point or area where the attachment is made. Greater security of attachment is obtained, with decrease in the normal tendency for the fabric to tear or weaken under the effects of the strains imposed upon the button in service.

The invention will be understood upon reference to the accompanying drawings, in which:

Figure 1 is a view in side elevation of a button that provides an exemplary embodiment of the invention;

Figure 2 is a view in plan of the underside of said button;

Figure 3 is a view of the button in medial section and to larger scale, the button being shown in position to be applied and secured to a web of fabric. In the preferred embodiment of the invention, heat is utilized in effecting the attachment of the button to the fabric, and in this view a domestic electric iron is fragmentarily illustrated as the means for supplying the heat;

Figure 4 is a view corresponding to Figure 3, showing the button attached to the fabric;

Figure 5 is a view in medial section of one of the numberless modified forms of buttons in which the invention may be incorporated, and in this view also are shown a web of fabric to receive the button and a pair of special applicating dies;

Figure 6 is a view in side elevation of the applied button of Figure 5; and

Figure 7 is a sectional view, illustrating another modification of the invention.

In accordance with the invention, I provide a device which may be securely united to the body of a button, and which may be rendered sufficiently liquid to enter or penetrate the pervious body of the fabric at the spot where button attachment is to be made, and then solidified to provide a secure anchorage of the button to the fabric, with reinforcement of the fabric in the spot or small area of attachment. Referring to Figures 1 to 3 of the drawings, such a device 3 is shown united to the body of a button 2.

The device 3 comprises a body of plastic material that is secured to the body of the button and extends therefrom in a portion 3a. The button includes a protuberance or protruding body portion 2a to which the device is united. While it is possible under the teaching of my invention to form the entire button body and the protruding portion 3a integrally of a material having the characteristics specified, in the usual case the button will be made independently of bone, glass, metal, plastic or any other suitable material, and the device 3 will be formed of the essential material that is subsequently integrated to the button by welding or fusion through the use of heat or a solvent, or by means of an adhesive, or by means of mechanical anchorage. In Figure 3, I show the body portion 2a of the button as provided with a recess 2b having a wall grooved at 2c in which a portion of the body of the device 3 is shaped and hardened, affording the desired security of union of the parts.

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As already set forth the material of which the device 3 is formed (or at least the portion thereof which protrudes from the button) comprises a normally solid substance that may be partially liquefied or rendered plastic when desired, and then in a relatively short time thereafter resolidified. I contemplate that the material may be one of the known glue-forming substances or cements that may be shaped and solidified in the form of the device 3, and that may by means of a solvent be rendered liquid or semi-fluid to the extent necessary to permit the portion 3a of the device to penetrate the pervious body of the fabric to which the button is to be secured, whereby, when the solvent is evaporated or dissipated, the fluid or plastic body portion of the device resolidifies and forms a secure attachment of the device and button to the fabric, the solidified fabric-impregnating portion of the device serving not only as a button anchorage but also as a fabric reinforcement in the spot or area of the attachment.

While within the ambit of my invention I may use a solvent in plasticizing or liquefying the portion 3a, I preferably use heat, and to such end the material of which the button-attaching device is formed comprises a thermo-plastic or thermo-setting material. As exemplary of either practice alluded to, I shall mention as suitable for forming the device several of the materials now available on the market, with the understanding that many other materials exist which also will prove suitable. Specifically, a vinyl chloride acetate resin, preferably if not necessarily of the flexible type, may be used. This resin is known as a molding plastic, having a molding temperature of from 250 to 340° F., and a com-

pression molding pressure of from 500 to 1000 pounds per square inch. This plastic has, it will be perceived, a molding temperature above the boiling point of water. It is practically unaffected by acids and alkalies, and resists alcohols, aliphatic hydrocarbons and oils, and ketones and esters are solvents. Before considering other of the materials that may be used, the description of the practice of the invention will be completed.

The button 2, to which the device 3 is united, is placed in position over the point on the fabric 4 to which the button is to be attached, and the fabric is supported upon the hot face of an electric iron 5, an electric lamp, or the hot surface of any other suitably heated article that is handy, the requisite being that the heat shall be adequate to soften or liquefy the portion 3*a* of the button structure, without scorching or otherwise harming the fabric. When the button has thus been "spotted" on the fabric, the button is pressed towards the fabric, and the portion 3*a* of the fastening device 3, softening under the effect of the heat, is caused to penetrate the body of the fabric, as indicated at 3*c* in Figure 4. Then the fabric and the applied button are removed from the hot surface of the iron, whereupon the softened plastic material resolidifies and provides the desired attachment of the button, as well as the reinforcement of the fabric at the point of attachment. It will be perceived that the solidified fabric-impregnating body portion 3*c* of the device 3 provides in effect a rivet whose head is embedded in, not merely overlaid upon, the body of the fabric.

In case a solvent instead of heat is used in applying the button, the proper solvent for the material of which the attaching means portion 3*a* is formed, is soaked into the fabric at the point where attachment is to be made, and then the button is pressed against the fabric, with the tip 3*a* of the attaching means applied to the saturated spot of the fabric. The body of the device slowly reacts to the solvent and pressure, and becomes sufficiently liquified or flowable to work its way through the fabric. When the body of portion 3*a* has been intercalated in the fabric, the solvent is allowed to evaporate and the body 3*a* solidifies and provides the desired anchorage of the button to the fabric. This use of solvent is only one of several permissible methods of using solvents in the practice of the invention, but the present indications are that the use of heat is more desirable, since the time required for the solvent and pressure to make the portion 3*a* flow through the fabric is greater than in the case of the use of heat and pressure.

In Figure 5 is shown a different form of button 20 having a modified form of attaching device 30 united thereto. If desired, and as shown in this figure of drawing, a special pair of applicator dies 6 and 7 may be provided for applying buttons to fabric. The lower die 6 may be heated to desired temperature by means of an electric heating coil 60; the heated die may be stationary, while the upper die 7 may be organized in the movable element of any suitable press, a matter with which my present invention is not immediately concerned. The upper die 7 may be provided with a matrix 8 to receive and position the body of the button, and the lower die 6 may be provided with a recess 9 to receive some of the plastic material that is pressed into and through the fabric when the dies are closed, as they are, and the portion 30*a* of the button-attaching device liquefied and forced into and through the pervious body of the fabric. Then the dies are opened and the fabric with the applied button removed. The plastic material, shaped and cured in the body of the fabric, solidifies and provides the desired secure attachment of the button to the fabric, it being noted that, by virtue of the recess 9 in the die 6, a portion of the shaped and cured plastic material advantageously overlies the fabric, as shown at 30*c* in Figure 6.

Figure 7 serves to illustrate one of the many permissible variations in the manner in which the button-attaching device may be united to the button. Here the button 200 is provided with a protruding portion 200*a* having a shouldered tip to which a body of plastic material in liquid state is applied in a dipping operation. The applied material solidifies, forming a button-attaching device 300, by means of which the button may be secured to fabric in substantially the manner described of the structures of Figures 1 to 6.

The protruding portions 2*a*, 20*a* and 200*a* of the buttons serve not only to receive and secure the button-attaching devices, but also serve to provide spacers which position the bodies of the applied buttons at a slight interval from the surface of the fabric to which attachment is made, manifestly a desirable feature.

From the foregoing specification, it will be understood that the portion of the button-securing devices, 3, 30 and 300, which in liquefied or partially liquefied condition are caused to penetrate the fabric, may be said to be in solidified intercalated union with the body of the fabric, and, as indicated at 3*c* in Figure 4 and at 30*c* in Figure 6, the localized but somewhat outspread union of said devices with the fabric may be defined as a mushroomed intercalated union.

It will also be noted that the protruding portions 2*a* and 20*a* of the buttons which engage the button-securing devices 3 and 30 may be termed anchorage portions, and to the extent that such anchorage portions include recesses in which portions of the button-securing devices are received and engaged, such anchorage portions may be properly called female anchorage portions, while the complementary portions of the button-securing devices that enter the female anchorage portions may be known as male anchorage portions. In Figure 7 the anchorage portion 200*a* on the button has the body of the button-securing device enveloped upon it, wherefore the portion 200*a* on the button is the male anchorage portion, and the portion of the securing device 200 which engages it is the female anchorage portion, this interchangeability of the elements of the structure of the invention being within the contemplation of the appended claims.

The term fabric will be understood to include not merely woven or knitted fabrics such as are used in articles of clothing and other articles formed of cloth, but to include webs or bodies of other structure that are sufficiently pervious to receive and retain the fastener of this invention.

The particular service to which the fabric with the applied button is subject will, of course, determine the type of plastic material used in the button-attaching device. For example, if the fabric be in an article of clothing which is laundered in service, the plastic material used will be one that is capable of withstanding boiling and soapy water. Again, if the fabric is dry cleaned in service, the plastic material used will be one that is resistant to naphtha, carbon tetrachloride, or other cleansing fluid that may be used. And so the plastic material of which the button-at-

taching device is formed will be made to meet the particular service conditions, and it will be understood that the plastics art has available thermoplastic and thermo-setting materials capable of meeting all situations in this particular. In addition to the vinyl chloride acetate resins above specified, a few of the other suitable plastic materials may be mentioned, with a brief notation of certain of their principal characteristics:

Polyvinyl chloride resins: Molding temperature ranging from 290 to 350° F., and a compression molding pressure of from 500 to 1000 pounds per square inch. These resins are soluble in ketones and esters, but are resistant or inert to acids, alkalies and the usual organic solvents.

Vinylidene chloride resins: Highly resistant to organic solvents, and resistant to acids and alkalies. Molding pressure varies from 500 to 5000 pounds, and molding temperature from 220 to 350° F.

Polyvinyl butyral resins: Prepared in thermoplastic form to possess the flexibility that is frequently, if not always, desirable in the button-attaching device. This material has a molding temperature of from 250 to 350° F., and a molding pressure of from 300 to 3000 pounds. The polyvinyl butyral resins are soluble in alcohols and are distorted when subject to aromatic hydrocarbons.

It is deemed needless to specify all of the various materials and their properties that are known and available for the practice of my invention. I may mention polyvinyl alcohol, methyl methacrylate resins, organic polysulfide molding compounds, cellulose compounds, phenol-formaldehyde compounds, rubber compounds, urea-formaldehye and phenol-furfurol compounds as exemplary of the various materials that may be used. Practically all of these materials may be pigmented or colored, so that the button-attaching device may be colored to match or blend with the body of the button and/or the fabric to which attachment is to be made.

Notice is given of my copending application, Serial No. 515,101, filed December 21, 1943, containing claims directed to the method of attaching buttons to fabric which is disclosed but not claimed herein.

Numerous variations and modifications, additional to those specifically mentioned above, may be utilized by the artisan without departing from the essence of the invention defined in the appended claims.

I claim as my invention:

1. In the combination of a fabric and a button secured thereto, the invention herein described that comprises a device having a liquefiable body portion solidified in a localized mushroomed intercalated union with the body of the fabric and a body portion extending outward from the face of the fabric into secure engagement with said button.

2. In the combination of a fabric and a button secured thereto, the invention herein described wherein said button is provided with a protruding button-securing device comprising a liquefiable body portion solidified in a localized mushroomed intercalated union with the body of the fabric.

3. In the combination of a fabric and a button secured thereto, the invention herein described wherein said button includes a female anchorage portion, and a device for securing the button to the fabric comprising a temporarily liquefiable body portion solidified in a localized mushroomed intercalated union with the body of said fabric and a male anchorage portion united with the female anchorage portion of the button.

4. In the combination of a fabric and a button secured thereto, the invention herein described wherein said button includes a centrally located socket, and a device for securing the button to the fabric comprising a thermo-plastic portion solidified in a localized mushroomed intercalated union with the body of said fabric and a portion engaged and secured in said socket in the button.

5. In the combination of a fabric and a button secured thereto, the invention herein described wherein said button includes a female anchorage portion, and a device for securing the button to the fabric comprising a thermo-plastic body portion solidified in a localized mushroomed intercalated union with the body of said fabric and a male anchorage portion united with the female anchorage portion of the button.

6. In combination, a fabric, a button of relatively high melting point material having an integral annular bottom portion of the same material, the bottom surface of said portion being disposed in contiguous relationship with the fabric, and a thermoplastic material of relatively low melting point filling the opening of said annular portion and mushroomed through the fabric and onto said bottom surface of said bottom portion to form a rigid localized bond between the button and fabric.

BERNARD A. WEYL.

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