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S. EMSIG

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MOLDED INTEGRAL SEWING HOLE BUTTON OF THERMOSETTING  
SYNTHETIC RESINOUS MATERIALS  
Filed March 1, 1948

FIG.1.

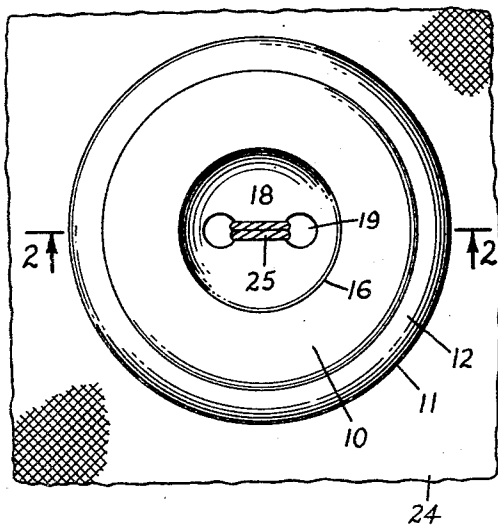


FIG.4.

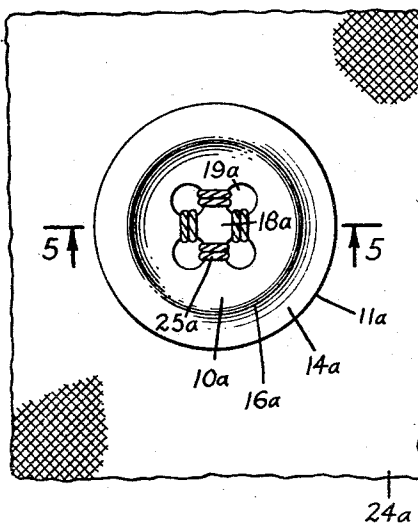


FIG.2.

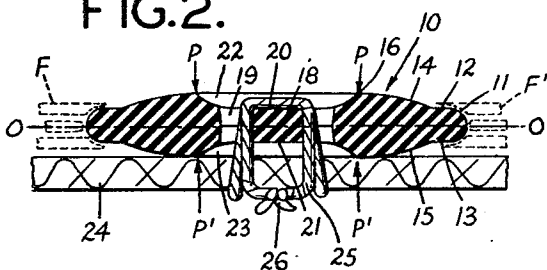


FIG.5.

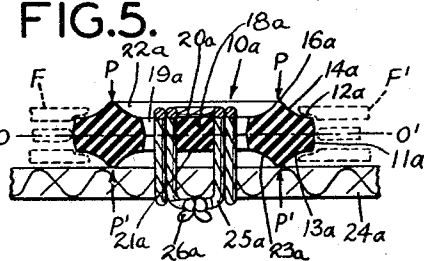


FIG.3.

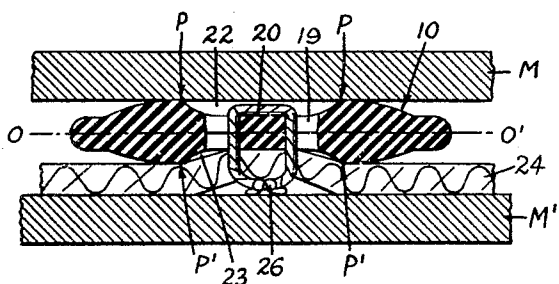
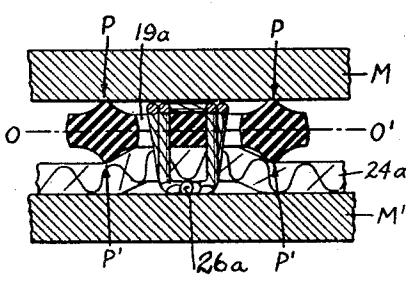


FIG.6.



INVENTOR.  
SIDNEY EMSIG

BY

*J. J. Passerich*

HIS ATTORNEY.

## UNITED STATES PATENT OFFICE

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MOLDED INTEGRAL SEWING HOLE BUTTON  
OF THERMOSETTING SYNTHETIC RESIN-  
OUS MATERIALS

Sidney Emsig, Woodmere, N. Y.

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4 Claims. (Cl. 24—90)

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This invention relates to a button construction; more particularly to buttons which are used in laundry serviced garments.

In the laundry servicing field, such as that involved in providing linen service, including laundered nurses' uniforms, beauticians' uniforms, doctors' jackets, the modern rigorous mechanized and chemical laundering operations place a very substantial burden on the servicing organizations. Especially burdensome is the button replacement and fabric repair adjacent the button zone, such as the anchor portion of the fabric, as well as the buttonholes.

The manufacturing operations of garments also require similar processing and mechanized equipment presenting somewhat similar problems and economic losses.

It is accordingly an object of my invention to provide a button whose construction performs not only the desired function, but also assures economies in applying and servicing of garments in the various manufacturing processes as well as in the cleaning, laundering and maintenance thereof.

My invention is predicated upon my observation that the breakage of buttons and an increase in the wear and tear of the fabric, such as that to which the button is anchored or the buttonholes through which the buttons pass, especially where the buttons are made of materials of low flexural value, is based upon the lack of symmetry or uniformity in the button in the processing of the garment in the various stages of attaching the button, as well as in the finishing of the garment, such as by sewing, pressing, laundering, which may be carried out not only once, but repeatedly. A lack of symmetry or uniform character of the button, especially with respect to those made of materials which have negligible flexural factors to such stresses, has been a deterrent to the general employment of low cost molded rigid buttons of thermo-setting, heat resistant compositions in favor of the more expensive materials of which buttons may be made by machining operations.

Accordingly, it is an object of my invention to provide buttons made by relatively low cost molding operations and of material which may take a high polish and provide chemical stability as well as heat resistance, and despite a negligible flexural factor, be able to withstand rigorous processing operations in the making or servicing of garments employing the same, whereby substantial economies may be effected.

It is an object of my invention to provide a

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button construction which in its application in processing the garments and in use or service effects substantial economies.

To attain these objects and such further objects as may appear herein, or be hereinafter pointed out, I make reference to the accompanying drawing forming a part hereof, in which—

Figure 1 is a plan view of a coat button in accordance with my invention, shown sewn to a piece of fabric;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view similar to Figure 2, with the fabric and button sandwiched between compressive plates;

Figure 4 is a plan view of a shirt button in accordance with my invention, shown attached to a piece of fabric;

Figure 5 is a section taken on the line 5—5 of Figure 4.

Figure 6 is a view similar to Figure 5, with the fabric carrying the button compressed between plates.

Referring now to the drawings, my invention is exemplified in the form of a coat button 10, whose periphery 11 is thin-edged, to provide opposed finger nail prying clearance areas 12 and 13, as well as a narrow rim merging into abruptly flaring faces 14 and 15, having their maximum thickness adjacent an axial zone defined by the circular edges 16 and 17. A web 18, axially positioned of the button, is provided with threaded receiving apertures 19, 19. The faces 20 and 21 of the web 18 define a thickness which forms the cavities 22, 23, respectively, merging adjacent the thickest portions 16 and 17, respectively. The functional relationship of the cavities 22 and 23 to the faces defined by the edges 16 and 17 will be clarified hereafter, the button thus far described being fully symmetrical along the central axis as well as the transverse axis 0—0' which corresponds substantially to the parting line of the mold employed.

The button in the illustration shown is anchored to a section of fabric 24 by convolutions of thread 25, which passes through the fabric and through the apertures 19, 19 and is then knotted by the knot 26.

My button is intended for commercial application to fabric by a button sewing machine which leaves a knot 26 and the thread, with relation to the fabric, presents a rather substantial thickness which an ordinary recess intended to receive the threads and prevent undue wear cannot accommodate, and the cavity intended by

me may be referred to as an anchor zone thread compression cavity.

In Figures 5 and 6, a shirt button 10a has been illustrated in which all functionally corresponding parts to those shown in Figures 1, 2 and 3 are shown with the identical reference characters carrying the superscript (a). The illustration is given in order to show the application of the identical principles contemplated by my invention in buttons of relatively small size and which embodies all of the advantages of the principal invention despite the change in contour of the opposed faces 14 and 15.

In accordance with my invention, the buttons are made from a molding compound and are formed by heat and pressure to a hard, inflexible, infusible state by recommended practice for heat and pressure curing such materials to develop the maximum resistance to deterioration by sunlight, the effects of acids, alkalines or organic solvents. A material which I have employed for its ability to be heat resistant, and to resist the solvents encountered in dry cleaning, as well as the detergents employed in laundering, is a phenolic resin which is thermally set to its infusible condition by compression molding at a pressure of from 1000 to 5000 pounds per square inch under temperatures of from 280 to 400° F. Such material has a tensile strength of from about 5000 to 8500 pounds per square inch; a compressive strength of from 16,000 to 36,000 pounds per square inch; a flexural strength of from 8000 to 15,000 pounds per square inch; impact Izod (foot pounds per square inch) of .2 to .4; modulus of elasticity p. s. i.  $\times 10^5$  ranging from 10 to 25.

Other classes of synthetic resinous materials in the form of filler extended molding mixtures which are molded by thermo-setting processes under pressure to an irreversible, infusible condition are contemplated by me, such as the urea formaldehyde alpha cellulose filled molding resins, or melamine formaldehyde alpha cellulose filled molding resins. These materials, when completely cured, are characterized by their property of taking a high polish even though they have negligible or no flexibility whatsoever. The materials of the class defined, when embodied in the conventional button, particularly for the linen service, including furnishing coats and aprons and uniforms, still leave much to be desired.

While chemical resistance to the detergents employed in the cleaning and laundering operations varied in accordance with the known chemical properties of the various synthetic resins, tending to increase the cost with a selection of the more chemically resistant resins, the minor difference in strength did not justify the larger cost since all of the buttons made from these thermo-setting resinous products exhibited sufficiently pronounced shortcomings by reason of mechanical failure to offset to a large measure the attempted savings in the use of materials for the buttons.

By my invention of making the button symmetrical with regard to the rear face and the front face along the axis 0, 0', as well as axially of the button, the following distinct advantages ensue:

(a) By making the cavity 23 adjacent the anchor zone symmetrical with the cavity 22 on the face, pressure by the plates M, M' which may be the plates of the mangle, is applied uniformly to the oppositely disposed points P, P, P', P', with immaterial or no flexural stresses.

The threads and knot and/or fabric are re-

tained in the cavities 22, 23, not only eliminating small fulcrum points, but a distribution of the fabric and thread material is effected in the opposed cavities during pressure to resist, to the maximum, the flexural and compressive stresses involved in processing the fabric either in completing the same or in repeated laundering operations.

(b) Uniformity in the faces 14 and 15, respectively, to provide symmetrically arranged nail prying rims permits the placement of the button in the button sewing machine gripper fingers diagrammatically shown by the reference letter F in any position, to supply a uniform tension distance for the thread which is used to attach the buttons to the fabric, so that no alteration need be made in the position of the gripper fingers or the tension of the thread. This assures no variation in the fabric in the button sewing operation by the machine, in addition to minimizing the introduction of flexural components in the submission of the garment to the mechanism employed.

(c) Feed of the button to the gripper fingers of the button sewing machine is facilitated as no selection of faces need be made.

(d) Symmetry in accordance with the features outlined makes commercially economically possible the utilization of the more expensive and tougher thermo-setting synthetic resinous materials which may be set by heat and pressure to the fully cured condition, where the surfaces may take a high polish, despite a negligible flexural factor.

Thus, by the provision of symmetrically faced anchor zone thread compression cavities and symmetrically positioned finger nail prying rims, I make acceptable the economical utilization of thermo-setting resinous materials which have heretofore not had considerable commercial displacement of the expensive machined buttons.

It is to be observed that where I have made reference to anchor zone compression cavities, the depth and extensiveness in contour thereof are not to be confused with the depth of recess normally allowed for strands of thread to prevent undue wear or which may house the thread due to relative flexibility of the web against the thread apertures.

Thus, by the provision of symmetrical faces, each of which includes a compression cavity adjacent the anchoring apertures, and more specifically symmetrically graduating to a finger nail prying rim also preferably of symmetrical contour, molded buttons of thermo-setting resinous materials having negligible or no flexibility may be employed, retaining all the desirable heat and chemical resistant properties, to permit the garments to which these buttons are applied to go through the laundering or cleaning operations without warping or distorting or dulling the face of the buttons, and effect substantial economies in processing garments to which these buttons are sewn.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is:

1. A molded integral sewing hole button made of a moulding mixture consisting of thermo-setting synthetic resinous material comprising symmetrically positioned anchor zone thread compression cavities.

2. A molded integral sewing hole button made of a moulding mixture consisting of thermo-setting synthetic resinous material comprising sym-

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metrically positioned anchor zone compression cavities, and a narrow finger nail prying rim symmetrical to the opposed faces, merging into abruptly flaring faces having maximum thickness adjacent said cavities.

3. A molded integral sewing hole button having symmetrically positioned anchor zone compression cavities about an axially positioned symmetrical web, the faces of which are symmetrical with regard to the finger nail prying rim.

4. A molded integral sewing hole button made of a molding mixture comprising thermo-setting synthetic resinous materials, set to the heat irreversible and infusible condition to have negligible flexural factors, a central web, having thread receiving apertures, anchor zone thread compression cavities to each side of the web, leaving thread engaging web faces equidistantly positioned to the opposed button face whereby the button may be positioned in the gripper fingers of a button sewing machine without selection of the face and without adjustment of the

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thread tensioning means of the button sewing machine.

SIDNEY EMSIG.

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