Feb. 29, 1944. F. E. HANSON 2,342,937

GARMENT FINISHING MACHINE

Filed Aug. 22, 1940 2 Sheets-Sheet 1

Fig. 1.

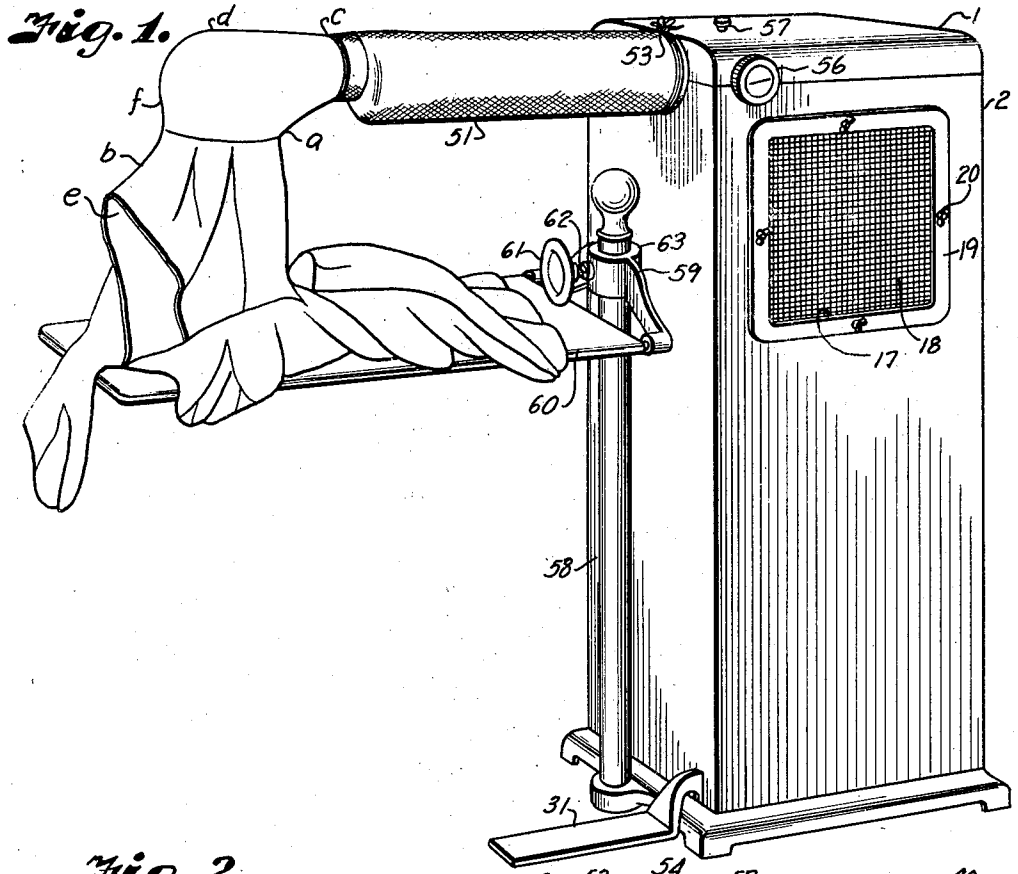


Fig. 2.

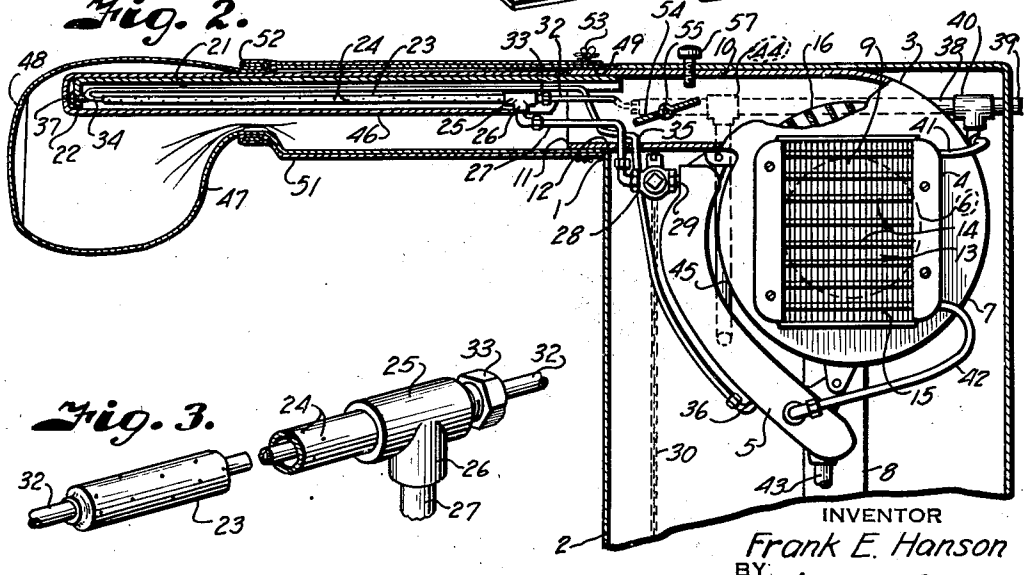


Fig. 3.

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Fig. 4.

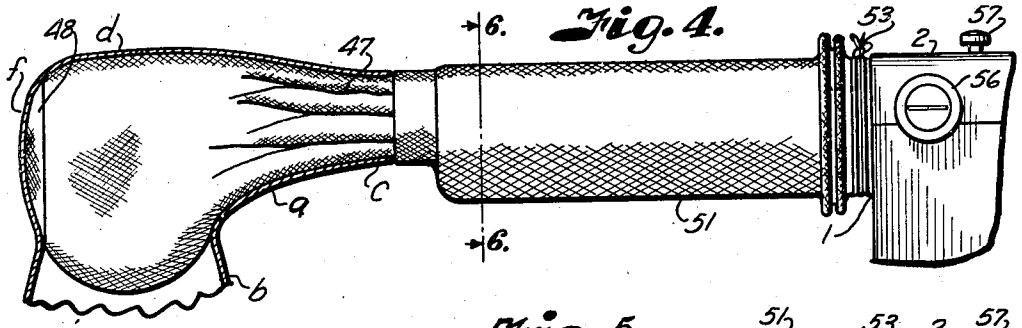


Fig. 5.

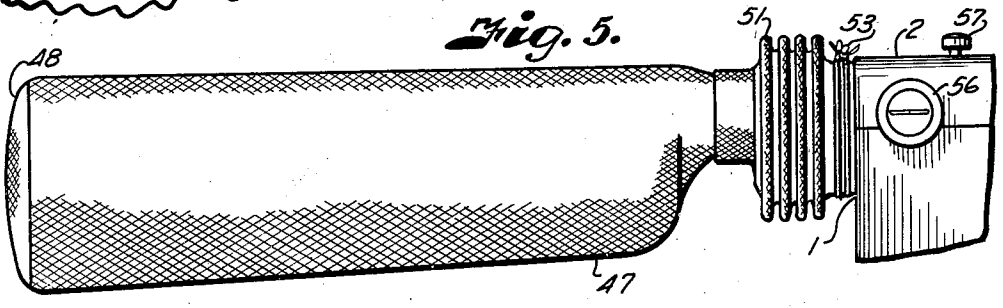


Fig. 6.

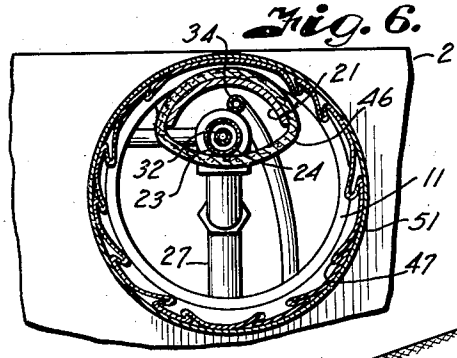


Fig. 7.

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GARMENT FINISHING MACHINE

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Application August 22, 1940, Serial No. 353,589

11 Claims. (Cl. 223—73)

This invention relates to an apparatus for finishing fabric garments, particularly sleeves and other tubular portions thereof as disclosed in copending application Serial No. 293,882, filed September 8, 1939, the present invention being directed to improvements in apparatus and operation thereof which facilitate adjustment of a garment on the inflatable bag.

Other objects of the invention are to limit inflation of the portion of the bag not covered by a garment under treatment; to retard escape of the inflating medium through portions of the bag not covered by the garment under treatment; to provide means for absorbing free moisture and condensate that may be carried with the inflating medium; to provide for uniform distribution of the inflating and steaming mediums; and to provide means for maintaining the bag in partially distended position to facilitate application of a garment thereon.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a garment finishing apparatus embodying the features of the present invention.

Fig. 2 is a section through the apparatus particularly illustrating the expandable bag, the over-sleeve and the nozzle structure wherethrough steam is admitted into the bag.

Fig. 3 is a detail perspective view of the steam distributor, a part of the central portion being broken away to shorten the illustration.

Fig. 4 is a side elevation of the head of the apparatus showing the sleeve of a garment applied to the bag and the over-sleeve moved into position for restricting inflation and discharge of the inflating medium from the portion of the bag not covered by a garment.

Fig. 5 is a similar view showing the garment removed from the bag and the over-sleeve in retracted position.

Fig. 6 is an enlarged section on the line 6—6 of Fig. 4.

Fig. 7 is a detail perspective view of the moisture absorbing and steam distribution pad, oversleeve, and bag, in disassembled relation with an air nozzle and steam distributor to better illustrate the construction thereof.

Referring more in detail to the drawings:

1 designates a finishing apparatus constructed in accordance with the present invention and which includes a cabinet 2 enclosing a blower 3, a heating element 4, a steam separator 5, and a motor 6 as well as the various steam connections later described. The blower includes a casing 7 supported on a post 8 also located within the cabinet and carried on the base thereof. The blower casing 7 has an air inlet opening 9 in a side thereof and a peripheral discharge nozzle 10 that has a neck portion 11 projecting through an opening 12 formed in a side wall of the cabinet. Secured in registering relation with the inlet 9 is a heater 13 comprising a plurality of coils 14 extending transversely across the opening and having radiating fins 15 over which air is drawn into the blower and discharged through the nozzle 10 by a rotor 16, the rotor 16 being rotatably mounted within the casing and operatively connected with the motor 6.

The steam separator 5 may be of any suitable design but is preferably supported on the blower casing as shown in Fig. 2. The blower is positioned on the standard 8 so that the heater carried thereby is in registry with an air inlet opening 17 formed in a side wall of the cabinet and which is preferably covered by a screen 18. In the illustrated instance the screen is carried by a frame 19 which is secured over the cabinet opening by fastening devices including thumbscrews 20 which are readily manipulated to facilitate removal of the screen for permitting access to the interior of the cabinet. Connected with the nozzle 10 and extending outwardly therefrom is an arm 21 of arcuate cross-section and tapering in radius from that of the blower nozzle to an end plate 22 at the outer end thereof. The arm is so positioned that the arcuate portion is uppermost with the side edges facing downwardly as shown in Fig. 7. Supported under the arm is a tube-like distributor 23 having a plurality of orifices 24. The distributor 23 is substantially coextensive with the length of the arm and carries a T fitting 25 on the rear end thereof having its lateral branch 26 connected by a pipe 27 with a control valve 28.

The control valve 28 is located within the cabinet and has its inlet 29 connected with the upper portion of the steam separator 5 as shown in Fig. 2. The valve 28 is operated to allow discharge of wet steam from the separator into the nozzle by means of a flexible connection 30 with a foot treadle 31 that projects from the bottom of the cabinet as shown in Fig. 1, so that it is in convenient reach of the operator. To prevent steam from condensing within the nozzle, the nozzle preferably includes a steam conducting pipe 32 extending through a packing

nut 33 carried by the T fitting 25 and through the nozzle to the forward end where it is provided with a return bend 34 and extends retractively along the outer side of the nozzle and in heating relation with the arm 21. The terminal end of the pipe extends into the interior of the cabinet through an opening 35 in a side wall of the nozzle 10 and connects with the lower portion of the separator 5 as indicated at 36. The nozzle is supported at its outer end by a fastening device such as a screw 37 which connects the plate 22 with the return bend as shown in Fig. 2.

Steam is supplied to the heater pipe from a manifold pipe 38 having its inlet end 39 extending through the rear wall of the cabinet and connected with a suitable source of steam supply (not shown). Formed as a part of the manifold is a T connection 40 which is connected by a tube 41 with the inlet connection of the heater 13. The steam outlet of the heater is connected by a pipe 42 with the lower portion of the separator 5 so that the condensed steam is discharged by way of the separator through a pipe 43. Live steam is also discharged from the manifold through a T connection 44 which is connected with the separator 5 by a pipe 45 as shown in Fig. 2.

With the construction thus far described it is obvious that steam is circulated from the end of the manifold 38, through the pipe which extends through the nozzle and through the return leg thereof to maintain the distributor and arm in heated condition and prevent condensation of steam discharged through the distributor or condensation of the discharged steam on the metal parts when the apparatus is first placed in operation. The steam, after circulating through the heater pipe, is delivered to the separator 5 where the condensate is discharged through the pipe 43 and the steam is used to moisten the relatively dry steam that is admitted through the manifold. When the valve 28 is opened, the moistened steam flows into the distributor 23 and is discharged through the orifices 24. In order to thoroughly disperse the discharged steam and to absorb any condensate which may happen to collect within the distributor, as well as any condensate which may collect on the arm, the arm is preferably covered with an absorbent pad 46. The absorbent pad is preferably in tubular form so that it is sleeved over the arm in covering relation with the steam distributor and is formed of a porous material capable of retaining moisture and giving sufficient porosity to allow uniform escape of the steam therethrough.

The bag 47 may be of a shape corresponding to the shape of the parts of the garment to be finished. For example, the machine illustrated is especially designed for finishing the sleeves and similar tubular portions of garments and the bag is, therefore, of substantially cylindrical form when inflated as shown in Fig. 5. The bag is of large enough diameter to fully distend the largest tubular portion of a garment that may be placed thereon. The bag is closed at its outer end as indicated at 48 and is provided at its opposite end with a tubular neck 49 that is sleeved over the neck of the blower nozzle and firmly secured thereto by a drawstring 50. The bag thus described is formed of a flexible material which is permeable to the steam discharged from the nozzle, as well as a portion of the air discharged by the blower. For example, the bag may be constructed of flexible fabric cloth which is woven with sufficient tightness to provide limited permeability and effect ballooning thereof for maintaining a pressure therein sufficient to distend a garment to its normal size and shape and maintain the distension until the fabric of the garment has set, as later described.

Since the bag must be of sufficient length to accommodate long sleeves as well as short sleeves, the steam and air will escape through the portion of the bag not covered by a garment. This escape of steam and air is not only uncomfortable to the operator of the machine, but the portion of the bag not restricted by the garment tends to expand to its full diameter with the result that the band of the sleeve is stretched or belled out of shape. I therefore provide the bag with an over-sleeve 51 which is formed of material having lesser or no permeability such as a closely woven fabric or a fabric treated to close the meshes thereof. The sleeve 51 is of a size corresponding to the size of the blower nozzle so that when it is pulled forwardly over the bag it does not reduce or restrict the flow of air discharged from the blower, however, I find it desirable to slightly gather in the outer end of the sleeve and secure it to a band 52 which is adapted to facilitate telescoping movement of the sleeve over the bag. While the band 52 slightly restricts the flow of air at the end of the sleeve, it acts as a venturi to increase the velocity of the air and steam discharged into the portion of the bag which is to be expanded within the portion of the garment under treatment. The opposite end of the sleeve is secured over the neck of the nozzle 11 by a draw-string 53. The sleeve need not be as long as the bag but is preferably formed of sufficient length to cover the exposed portion of the bag when a garment having extremely short sleeves is applied thereon. When long sleeves are applied on the bag the surplus portion of the over-sleeve is taken up in the series of gathers as shown in Fig. 4 of the drawings.

In order to control distension of the bag, the nozzle of the blower is provided with a butterfly valve 54 fixed on a shaft 55 that is journalled within the sides of the nozzle and extends outwardly through a side wall of the cabinet to mount a knob 56 by which the valve is manipulated. The extent of closure of the valve is adjustably limited so that a small amount of air is being constantly discharged into the bag and the bag is always partially inflated. This is effected by a stop screw 57 that is threaded through the top of the cabinet and through the wall of the blower nozzle so that the terminal end thereof is in position to be engaged by the butterfly valve when it is moved toward closed position.

Carried by the base of the cabinet, directly below the bag, is a post 58 adjustably mounting a bracket 59 carrying a shelf-like support 60 whereon the untreated portion of the garment is supported as shown in Fig. 1, the bracket being readily adjusted for height by a handwheel 61 having a threaded stem 62 carried in the collar 63 of the bracket and adapted to engage against the post 58.

In operating the apparatus as above described, for example in finishing the sleeve *a* of a garment *b*, it will be noted that the sleeve illustrated is relatively short with a narrow edge *c* while the upper portion *d* is especially full and the shoulder portion is puffed, so that such a garment cannot be pressed in accordance with previous

processes without many lays of the sleeve, and even then it is impossible to remove all of the wrinkles, and especially as additional wrinkles are introduced by overlays of the pressing operations.

If the garment is formed of a material having a pile or nap, the pressing operations are additionally aggravated, and it is impossible to obtain the desired results. However, when the garment is finished in accordance with my improved method, all portions of the sleeve are fully distended to their normal shape and the pile or nap of the fabric is raised, as now to be described.

When the machine is placed in operation, steam is circulated through the legs of the heater 32 to bring the temperature of the steam distributor and arm to a point where steam contacting therewith will not condense. Simultaneously steam passes through the coils of the heater so as to heat the air being drawn into the blower casing and discharged through the nozzle 10 into the bag. The stop screw 57 is so adjusted that the butterfly valve 54 is retained partly open to maintain a slight distension of the bag. The sleeve *a* of the garment *b* is then drawn over the closed end of the bag 47. This is facilitated by the rigid character of the arm 21. Then by reaching through the neck *e* of the garment *b*, a sufficient amount of the bag may be drawn into the shoulder portion *f* of the sleeve *a* to provide sufficient fullness thereof to assure complete distension of the enlarged portions of the sleeve as shown in Fig. 4. The valve 54 is then opened so as to allow greater amount of air to be discharged into the bag and effect inflation thereof while the garment is being smoothed and adjusted thereon. The over-sleeve is then drawn forwardly over the bag until the band portion 52 thereof approaches the edge *c* of the sleeve, so as to control distension of the bag 47, at this point, and prevent belling of the sleeve edge *c*. Upon further opening of the air valve the bag is further distended. At this point the operator places his foot on the treadle to effect opening of the steam valve 28 so that moist steam from the separator 5 is discharged by way of the nozzle into the interior of the bag to permeate therethrough and into contact with the fabric of the garment to soften and enhance pliability of the fabric while it is being expanded to its normal shape. When the sleeve is fully distended and in its normal shape the steam supply to the distributor is suspended, but the air supply is continued so that the warm air maintains distension of the bag and a portion thereof permeates through the fabric thereof to dry and set the sleeve *a*. When the air valve 54 is moved toward closed position the bag 47 collapses so that the sleeve *a* may be readily withdrawn therefrom.

It is apparent that with the over-sleeve 51, distension of the uncovered portion of the bag is limited and permeation of the air and steam is restricted to the portions of the bag covered by the garment. It is also obvious that the absorbent pad covering the steam nozzle and the supporting arm will take up any free moisture that may be discharged with the steam and thereby prevent this moisture from wetting the bag and retarding drying of the garment. The pad 46 also protects the bag from wear that would ordinarily occur if it should rub over the metal arm 21. The condensed steam absorbed by the pad helps to moisten the steam so that it is in proper condition to treat the fabric of the garments. When the steam is shut off from the distributor 23, the pad soon dries so that the moisture does not accumulate.

What I claim and desire to secure by Letters Patent is:

1. An apparatus of the character described, including a support, a blower on the support having an outlet nozzle, a permeable flexible bag having a mouth fixed to said nozzle and adapted for distension by pressure medium discharged by the blower to distend a garment placed over the bag, and a flexible over-sleeve telescoped over the bag and having one end fixed to said nozzle, said over-sleeve being formed of tightly woven fabric to prevent discharge of pressure medium through the portion of the bag covered by the over-sleeve.

2. An apparatus of the character described, including a support, a blower on the support having an outlet nozzle, a permeable flexible bag having a mouth fixed to said nozzle and adapted for distension by pressure medium discharged by the blower to distend a garment placed over the bag, an over-sleeve telescoped over the bag and having one end fixed to said nozzle, and a band fixed to the other end of said sleeve and movable over the bag to carry said over-sleeve in telescoping relation with a selected portion of said bag, said over-sleeve being formed of tightly woven fabric to prevent discharge of pressure medium through the portion of the bag covered by the sleeve.

3. In an apparatus of the character described, a steam distributor, an arm-like support carried by the distributor, a tubular absorbent pad sleeved over the arm and covering the distributor, a flexible and permeable bag loosely sleeved over the arm, means for admitting a pressure medium into the bag to effect distension thereof, and means for supplying steam to the distributor for discharge through the absorbent pad and permeation through the bag.

4. In an apparatus of the character described, a steam distributor, an arm-like support carried by the distributor, a heater coextensive with the distributor, a flexible and permeable bag loosely sleeved over the arm, means for admitting a pressure medium into the bag to effect distension thereof, means for supplying steam to the distributor for permeation through the bag, and a tubular absorbent pad sleeved over the arm and heater in covering relation with the distributor for absorbing moisture carried with the steam.

5. An apparatus of the character described including an expandable bag formed of fabric material having limited permeability, means for introducing a pressure medium into the bag to distend the bag within a garment applied over a portion of the bag, and a fabric sleeve of less permeability than the bag and sleeved over the bag for restricting permeation of pressure medium through the portion of the bag not covered by the garment.

6. In an apparatus of the character described, a support, a flexible and permeable bag on the support adapted to receive a garment thereover and distendable in response to pressure of a fluid medium introduced thereinto to restore the garment applied thereover to normal shape, means for supplying a fluid medium to the bag for effecting distention thereof, an over-sleeve upon the bag formed of fabric material, a draw-string connected with one end of the over-sleeve for connecting the over-sleeve with the support, and a band carried by the opposite end of the over-sleeve and adjustably movable over the bag.

7. In an apparatus of the character described, a support, a flexible and permeable bag on the support adapted to receive a garment thereover and distendable in response to pressure of a fluid medium introduced thereinto to restore the garment applied thereover to normal shape, means for supplying a fluid medium to the bag for effecting distention thereof, and a single over-sleeve having longitudinal and circumferential flexibility and having one end connected with the support and having its opposite end movable over the bag to limit distention of the bag to a selective portion thereof, said over-sleeve being continuous from said connected end to the end movable over the bag to confine said fluid medium tending to be permeated through the portion of the bag covered by said over-sleeve.

8. An apparatus for finishing garments including, a flexible bag adapted to receive a garment thereover and distendable in response to pressure of a fluid medium introduced thereinto to restore the garment applied thereover to normal shape and having limited permeability for restricted discharge of fluid medium into contact with the garment, a flexible over-sleeve formed of fabric material and having lesser permeability than the bag, and means fixing one end of the over-sleeve relative to the bag with the other end movable over the bag to cover that portion of the bag not covered by the garment applied to the bag, said over-sleeve being of continuous unbroken formation to limit permeation of said fluid medium tending to discharge through the portion of the bag covered by said over-sleeve.

9. In an apparatus of the character described, a support, a bag formed of flexible and permeable material and having a mouth at one end thereof for attachment to the support, a single over-sleeve adapted for adjustment on the bag and formed of a material having flexibility longitudinally and circumferentially thereof and of a character to limit permeation of fluid medium through the bag when the over-sleeve is moved over a selected portion of the bag, a band carried by the opposite end of the sleeve to facilitate movement of the over-sleeve on the bag, and means for affixing the opposite end of the over-sleeve relative to the mouth of the bag, said over-sleeve being continuous in formation from one end to the other and capable of forming in gathers when the band carrying end of the over-sleeve is in retracted position on the bag.

10. In an apparatus of the character described, a support, a flexible permeable bag carried by the support, means for introducing a pressure medium into the bag for effecting distention thereof, a valve for controlling admission of said pressure medium, an over-sleeve having longitudinal and circumferential flexibility and adapted for movement over the bag to limit expansion of the portion of the bag not covered by a garment applied on the bag, and means for limiting extent of closure of the valve to admit pressure medium in slight excess of the pressure medium permeated through the bag for maintaining partial distention of the bag to facilitate adjustment of said flexible over-sleeve on the bag.

11. An apparatus of the character described including, an expandable bag formed of a material having limited permeability, means for introducing a pressure medium into the bag to distend the bag within a garment applied over a portion of the bag, an over-sleeve of less permeability than the bag and having one end fixed relatively to the bag and the other being movable over the bag for restricting permeation of the pressure medium through the portion of the bag not covered by the garment, and a band in the free end of the oversleeve and of less diameter than the oversleeve and bag to produce a slight restriction in the bag to increase velocity of the pressure medium entering the portion of the bag covered only by the garment.

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