Dec. 30, 1947. A. S. MANN 2,433,470

HOSIERY DRYING FORM

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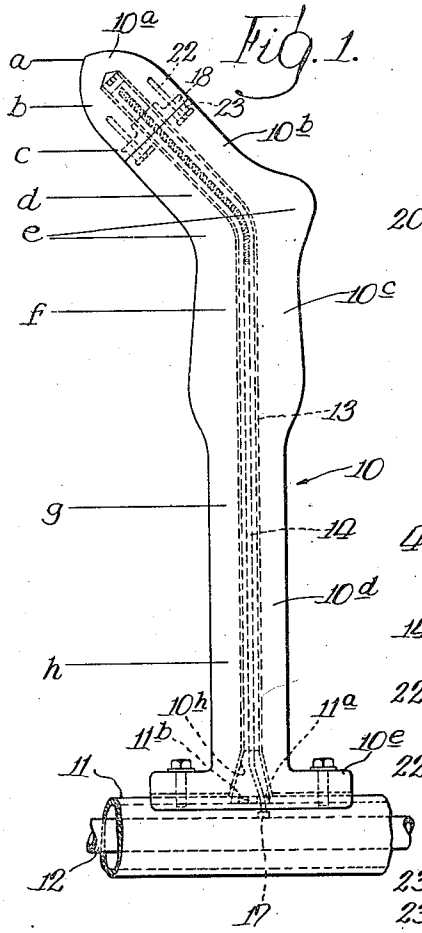


Fig. 1.

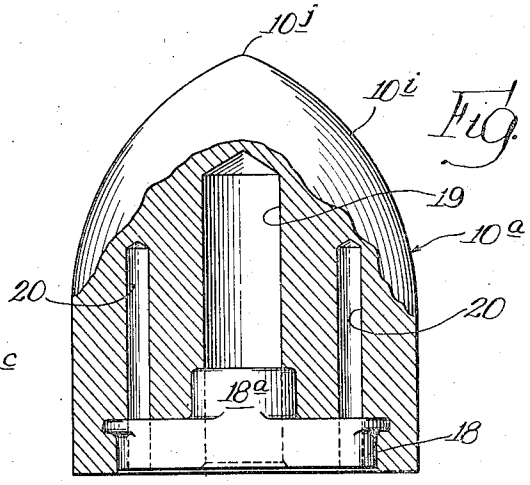


Fig. 2.

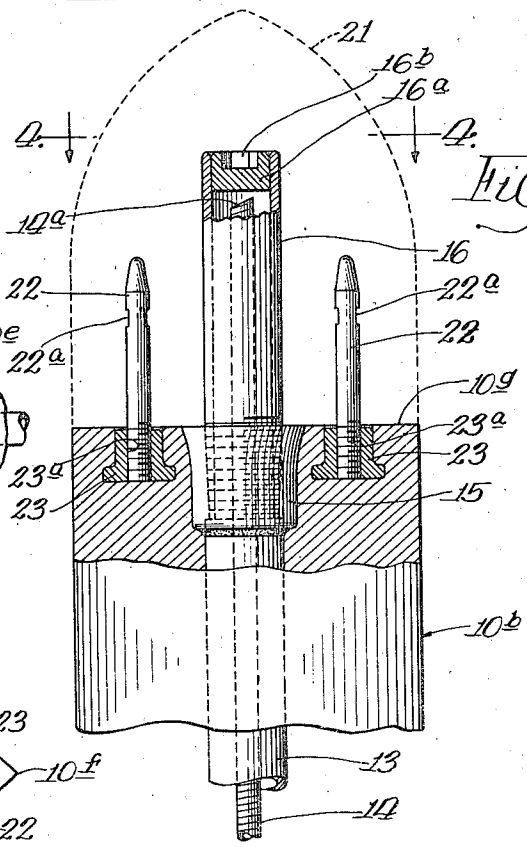


Fig. 3.

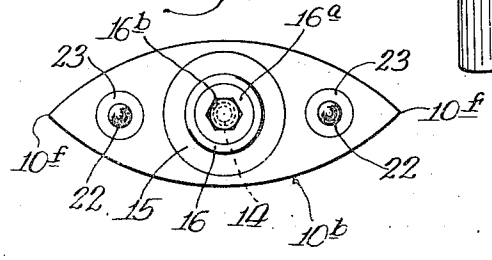


Fig. 4.

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HOSIERY DRYING FORM

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12 Claims. (Cl. 223—76)

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This invention relates to improvements in forms for shaping, setting and drying hosiery and other like articles, and its purpose is to provide means for effecting a more rapid and perfect drying operation than has heretofore been possible with the use of drying forms which are adjustable for use with hosiery and other articles having a wide range of sizes.

It has heretofore been common practice in the manufacture of knitted hosiery and the like to place the completed hose in a wet condition on drying forms which have been internally heated and which have performed the functions of shaping and drying the finished articles. These drying forms employed in the drying of hosiery have been provided with internal heating chambers and have usually been arranged in rows on a supporting table or the like and have been connected to common steam supplies so that they have been heated internally during the drying operation. In many instances, these drying forms employed in the drying of hosiery have been provided with detachable toe portions and a given form has thereby been made capable of use for drying hose of a wide range of sizes merely by interchanging the toe portions. The operation of such drying forms equipped with interchangeable toe portions has not been entirely satisfactory, however, in commercial use because the internal heating chambers have not extended into the toe portions of the forms and the toe portions of the hose, which are usually of greater weight and thickness than most other portions of the garment, have not been dried as quickly and as satisfactorily as the remaining portions because of the lower temperatures existing in those regions.

It is the principal object of the present invention to overcome the above-mentioned difficulties by providing drying forms, for drying hosiery and other articles, which are provided with detachable portions making them adjustable for use with articles of different sizes, in which the detachable toe portions have means for permitting the circulation of steam or other heating fluid therethrough, so that all portions of the drying form are heated substantially to the same temperatures at the same time and the drying operations proceed uniformly in all parts of the garment. Another object of the invention is to provide a drying form having a detachable portion, which may be interchanged with other similar portions of different sizes, in combination with heating means extending through the body portion of the form and into the detachable portion so that the detachable portion is internally heated when it is placed in position on the body portion. Still another object of the invention is to provide a drying form comprising a body portion and a detachable portion having a cavity, in combination with an internal heating connection which extends through the body portion and into the detachable portion and which is adapted to effect the heating of the detachable portion when it is interchanged with another such portion of different size. A further object of the invention is to provide a drying form comprising a body portion, which may constitute the shank and the major portion of the foot of a hosiery drying form, for example, in conjunction with a detachable portion which may be the toe portion of a hosiery drying form, wherein the two portions of the form are internally heated by steam or other heating fluid supplied through a pipe which extends loosely through a pipe of larger diameter embedded in the body portion and having communication with a cap member extending into a cavity of the detachable portion, the pipe conveying the heating medium discharging into the cap portion and the exhaust of the heating medium flowing out through the larger pipe, thus permitting a continuous circulation of the heating medium to be maintained through the body portion and the detachable portion. Another object of the invention is to provide a drying form for hosiery or the like comprising a body portion and a detachable portion in combination with an exhaust pipe extending through the body portion and a supply pipe for steam or the like extending loosely through the exhaust pipe and continuing beyond the body portion into a cap member which occupies a cavity in the detachable portion and which has a detachable connection with the exhaust pipe so that it may be interchanged with other cap members of different sizes when the detachable portion of the form is interchanged with other detachable portions of different sizes. Other objects relate to various features of construction and arrangement which will appear more fully hereinafter.

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The nature of the invention will be understood from the following specification taken with the accompanying drawings in which one embodiment is illustrated. In the drawings,

Figure 1 shows a side elevation of a hosiery drying form embodying the present invention attached to conduits for supplying and exhausting the steam or other heating medium;

Fig. 2 shows a partial vertical axial section

and partial side elevation of the detachable toe portion of the hosiery drying form illustrated in Fig. 1;

Fig. 3 shows a partial front elevation and partial axial section through the upper part of the body portion of the form illustrated in Fig. 1, the position of the detachable toe portion being illustrated by dotted lines; and

Fig. 4 shows a top plan view or end view of the body portion of the drying form illustrated in Figs. 1 and 3.

As illustrated in the drawings, the invention comprises a drying form 10 comprising a detachable toe portion 10a, a foot portion 10b, a shank portion 10c and a stem portion 10d. The parts 10b, 10c and 10d are formed integrally with each other and the stem portion 10d is provided with flanges 10e which rest upon and conform to the curvature of an exhaust conduit 11 through which steam or other heating fluid is exhausted from the form 10 and other similar forms which are mounted upon the conduit 11 along its length. These flanges are secured by studs to the conduit and within the conduit and spaced therefrom is a supply conduit 12 of smaller diameter for conveying steam or other fluid to all of the drying forms which are mounted on the conduit 11. All of the parts 10a, 10b, 10c, 10d and 10e of the drying form are formed preferably of cast metal such as aluminum, Monel metal, stainless steel, or other metallic material which is comparatively light in weight and not apt to rust or corrode through contact with the wet articles which are placed on the form for drying purposes. The body portion and the toe portion of the form are provided with smooth external surfaces and the outer surfaces of the toe portion 10a are adapted to lie flush with the outer surfaces of the foot portion 10b when the toe portion is in place thereon, as shown in Fig. 1. The dimensions of the form measured transversely to a plane containing the longitudinal axis of the form and the axes of the conduits 11 and 12 are comparatively limited so that the form is somewhat flat or narrow in this direction, as shown in Fig. 4. The meeting edges of the opposite surfaces of the flat form may be comparatively sharp, as shown at 10f, in order to provide longitudinal creases in the front and rear edges of the finished and dried hose.

During the casting of the body portion of the form, which includes the parts 10b, 10c, 10d and 10e, there is embedded therein a pipe 13 which is centrally located in the cross section of the form and which is adapted to serve as an exhaust pipe for the steam or other heating fluid, being connected at its lower end to the exhaust conduit 11. The steam or other heating fluid is supplied through a supply pipe 14 which extends through the pipe 13 and which is of substantially smaller diameter, thus leaving a substantial exhaust channel between its outer surface and the inner surface of the pipe 13. The pipe 13 terminates somewhat short of the transverse end face 10g of the foot portion 10b of the form and is welded at its end to the inner or lower end portion of a hollow internally threaded metal fitting 15 which is also embedded in the foot portion of the form at the time of casting it.

The internally threaded fitting 15 is detachably engaged by a hollow cap member 16, adapted to form a continuation of the pipe 13, which is cylindrical in form and which is closed at its outer or upper end by a plug 16a welded or otherwise secured therein and provided in its outer surface with a hexagonal or other non-circular recess 16b adapted to be engaged by a wrench or the like so that the cap member may be unscrewed from the fitting 15 and replaced by another cap member of different length when it is desired to change the size of the toe portion 10a. The steam supply pipe 14, which is formed as a flexible tube at its upper end, extends through the fitting 15 and terminates near the upper and outer end of the cap member 16, being cut off at an angle to its longitudinal axis, as shown at 14a, to reduce the possibility of the pipe becoming clogged when it is in proximity to the plug 16a while a relatively short cap member is being employed. The supply pipe 14 is connected at its lower end to the supply conduit 12 through a fitting 17, the base portion of the form being provided with an enlarged channel 10h which accommodates the lower part of the pipe 14 and also provides a communication between the lower end of the pipe 13 and the openings 11a and 11b in the upper wall of the exhaust conduit 11. The pipe 14 extends through the opening 11a and the opening 11b provides a passage through which the exhaust steam and condensate flows into the exhaust conduit 11.

The detachable toe portion of the form is shaped transversely to conform to the shape of the foot portion 10b, shown in Fig. 4, and it is tapered from its longitudinal edges along the lines 10i to the tip or point 10j. A metal block 18 of steel or the like is embedded in the base part of the toe portion 10a at the time of casting and after the casting has been completed the block 18 and the toe portion are drilled to form a central cylindrical cavity 19 and two parallel holes 20, the cylindrical cavity 19 extending through the central stem portion 18a of the block and terminating in the aluminum or other metal of which the toe portion is primarily formed. The holes 20 are of cylindrical form and extend through the end portions of the block 18 and then into the aluminum or other material of which the toe portion is primarily formed, terminating somewhat below the upper end of the cavity 19.

When the detachable toe portion 10a is placed upon the foot portion 10b, as shown by the dotted line 21 in Fig. 3 and by full lines in Fig. 1, the cylindrical cavity 19 is closely fitted by the tubular cap member 16 and the cylindrical holes 20 are closely fitted by a pair of dowel pins 22 which are secured in the end of the foot portion 10b of the form. These dowel pins 22 and the cap 16 have free sliding fits in the holes 20 and the cavity 19, respectively, so that when the toe portion is in place on the foot portion the outer surfaces of the toe portion lie flush with the outer surfaces of the foot portion, as heretofore mentioned.

Although the dowel pins 22 might be cast in the foot portion 10b at the time of casting the body portion of the form, it is usually preferable to mount the dowel pins afterward in metal inserts 23, of steel or the like, which are embedded in the end of the end portion 10b at the time of casting in transverse axial alignment with the fitting 15 and with their end faces in proximity to or flush with the end face 10g of the foot portion. After the casting has been completed, the foot portion is placed in a jig and apertures 23a are formed to receive the lower ends of the dowel pins 22. These apertures are internally threaded to receive the externally threaded lower ends of the dowel pins and each dowel pin is preferably flattened at its sides as shown at 22a for engagement by a wrench or the like so that the dowel

pins may be conveniently removed and replaced. By this method, it is possible to obtain a greater accuracy of fitting of the dowel pins in the holes 20 which are formed in the toe portion 10a. The cavity 19 should also be drilled with accuracy and in proper location with respect to the holes 20 so that it will be properly fitted by the cap member 16 when the dowel pins 22 are fitted into the holes 20. After the walls of the holes 20 have become substantially worn through continued use, the tight fit may be continued by removing the dowel pins and replacing them by others of slightly larger size.

With the construction and arrangement of the parts as described above, the drying form may be quickly heated to substantially uniform temperatures throughout by steam having a comparatively low pressure, although the form is capable of operating with steam pressures up to 100 pounds per square inch. It is now preferred to operate drying forms constructed according to this invention with steam pressures of from 25 to 35 pounds per square inch, the higher pressures being employed when woolen garments are being dried. For example, with a pressure of 35 pounds per square inch, the drying form constructed according to the present invention, and adapted to dry men's hose ranging in size from 10 to 12½, was found to produce temperatures, measured by a thermocouple at points *a*, *b*, *c*, *d*, *e*, *f*, *g* and *h* on Fig. 1, as follows:

At the tip *a*—254° Fahrenheit;
At the point *b*—254° F.;
At the point *c*—255° F.;
At the point *d*—265° F.;
At the point *e*—265° F.;
At the point *f*—260° F.;
At the point *g*—260° F.; and
At the point *h*—260° F.

thus indicating only a slight variation in temperature between the base of the stem portion 10d and the tip of the toe portion 10a.

A single size of the body portion of the form may be employed for drying hose having a wide range of sizes; for example, those ranging by half sizes from size 10 to size 12½. When the toe portion 10a is changed to accommodate a different size of hose to be dried, the cap member 16 should preferably be changed to agree in length with the size of the toe portion being used. In the drawings, the cap member 16 is shown as being employed with a toe portion 10a which is of the minimum size for use on that form. As the toe portion is increased in length with change in size of the hose being dried, the cap member 16 should preferably be detached and another one of greater length put in its place so that the direct heating action of the steam supplied through the pipe 14 will at all times be extended to a point as near as possible to the tip of the toe portion of the drying form.

Although one form of the invention has been shown and described by way of illustration, it will be understood that it may be constructed in various other embodiments coming within the scope of the appended claims.

I claim:

1. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a supply pipe extending through said body portion and into said cavity for conveying a heating fluid, and an exhaust pipe extending from said cavity through said body portion for exhausting said heating fluid, said supply pipe extending through said exhaust pipe and spaced therefrom.

2. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a pipe extending through said body portion and into said cavity and having its end closed, and a second pipe extending through said first pipe and having an opening positioned within said cavity for discharging a heating medium conveyed therethrough.

3. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a cap member secured on said body portion and extending into said cavity, and a pipe extending through said body portion and communicating with said cap member.

4. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a cap member secured on said body portion and extending into said cavity, a pipe extending through said body portion and communicating with said cap member, and a second pipe extending through said first pipe and spaced therefrom, said second pipe extending into said cap member and having an opening for discharging a heating medium into said cap member.

5. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a cap member detachably secured on said body portion and extending into said cavity, and a pipe extending through said body portion and communicating with said cap member.

6. A garment drying form comprising, a body portion, an end portion detachably mounted on said body portion and having a cavity therein, a cap member detachably secured on said body portion and extending into said cavity, a pipe extending through said body portion and communicating with said cap member, and a supply pipe of smaller size than said first-named pipe extending through said first-named pipe and into said cap member, said supply pipe having an opening within said cap member for discharging a heating fluid.

7. A garment drying form comprising, a hollow body portion having an end surface, an end portion seated on said end surface and having a cylindrical cavity extending transversely to said end surface, a cap member secured to said body portion and fitting said cavity, and a pipe extending through said hollow body and communicating with said cap member.

8. A garment drying form comprising, a hollow body portion having an end surface, an end portion seated on said end surface and having a cylindrical cavity extending transversely to said end surface, a cap member secured to said body portion and fitting said cavity, a pipe extending through said hollow body and communicating with said cap member, and a pair of dowel pins secured to one of said portions and extending parallel to said cap member, the other of said portions having recesses detachably fitted by said dowel pins.

9. A garment drying form comprising, a hollow body portion having an end surface, an end portion seated on said end surface and having a cylindrical cavity extending transversely to said end surface, a cap member detachably secured to said body portion and fitting said cavity, said cap member being closed at its end which is located

within said cavity, a pipe extending through said hollow body portion and communicating with said cap member, and a supply pipe extending through said first pipe and opening within said cap member.

10. A hosiery drying form comprising, a foot portion, a detachable toe portion having a cavity therein, a hollow cap member projecting from said foot portion into said cavity, means for introducing steam into said cap member, and means for positioning said toe portion on said foot portion.

11. A hosiery drying form comprising a foot portion, a detachable toe portion having a cavity therein, a hollow cap member projecting from said foot portion into said cavity, a pipe extending through said foot portion and communicating with said cap member, and a supply pipe extending through said first-named pipe and opening into said cap member within said toe portion.

12. A hosiery drying form comprising, a foot portion, a detachable toe portion having a cavity therein, a hollow cap member projecting from said foot portion into said cavity, a pipe extending through said foot portion and communicating with said cap member, a supply pipe extending through said first-named pipe and opening into said cap member within said toe portion, said toe portion having holes therein on opposite sides of said cavity, and dowel pins detachably secured to said foot portion and fitting into said holes.

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