

(No Model.)

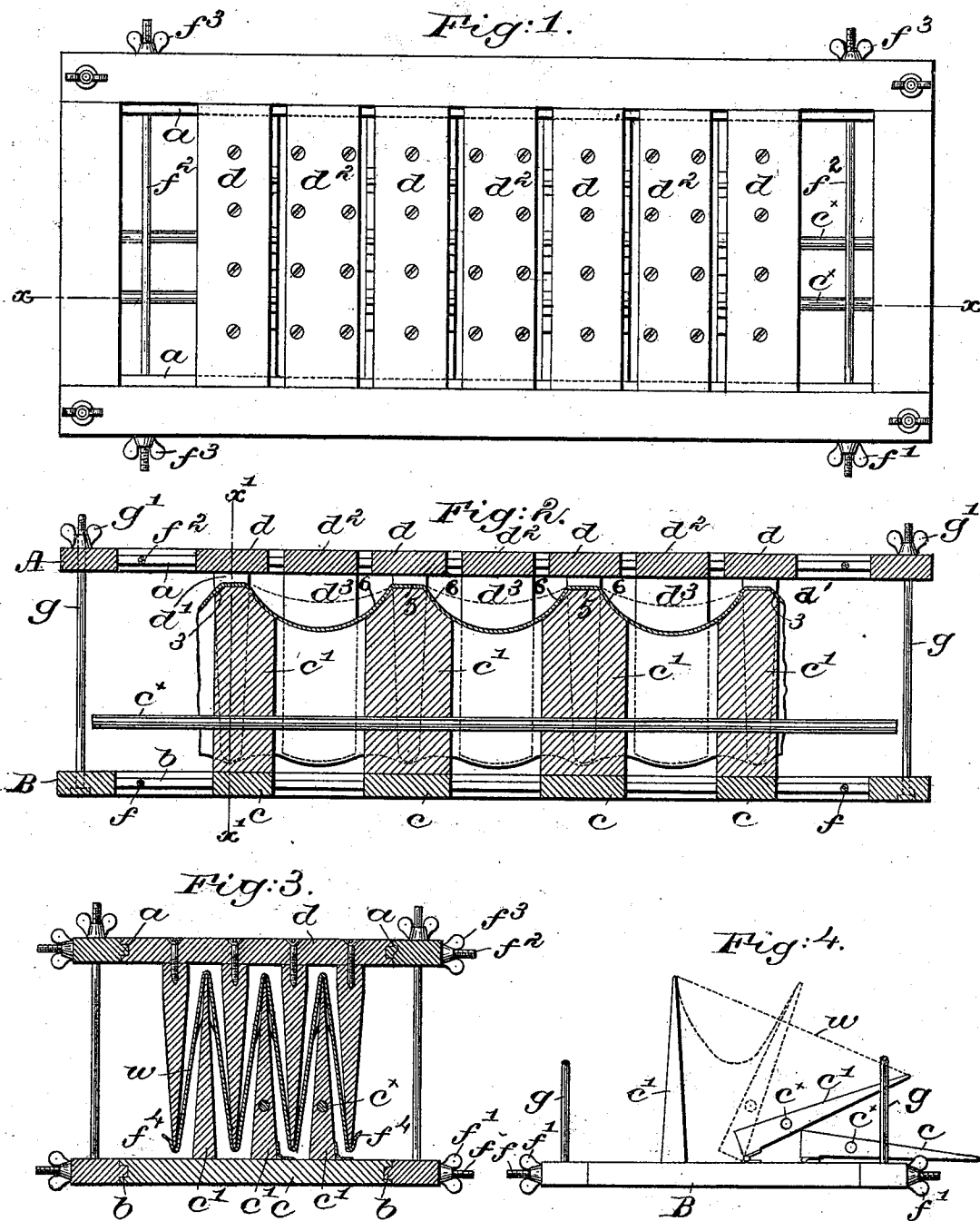
2 Sheets—Sheet 1.

G. S. SQUIRES.

METHOD OF AND DEVICE FOR FORMING DRESS SHIELDS.

No. 510,099.

Patented Dec. 5, 1893.



Witnesses,

Fred. S. Greenleaf.
Edward F. Allen.

Inventor,

George S. Squires,
by Crosby & Gregory
Attys.

(No Model.)

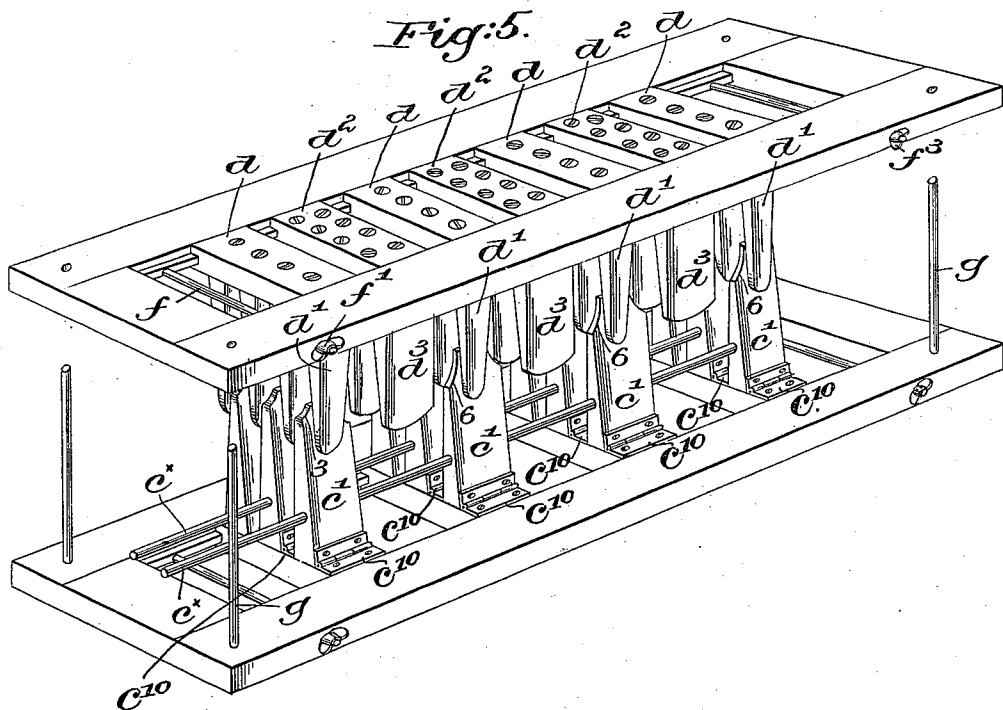
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witnesses.

Fred L. Grunkaf.
Louis N. Cowell.

Inventor.

George S. Squires,
by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

GEORGE S. SQUIRES, OF BOSTON, MASSACHUSETTS.

METHOD OF AND DEVICE FOR FORMING DRESS-SHIELDS.

SPECIFICATION forming part of Letters Patent No. 510,099, dated December 5, 1893.

Application filed February 29, 1892. Serial No. 423,223. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. SQUIRES, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Methods of and Devices for Forming Dress-Shields, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention relates to methods of and devices for forming dress shields.

Prior to this invention devices of this class, as usually constructed have had one or more fixed vertical forms each made concave, or curved at one edge to correspond with the shape or curve it is desired to give to the folded edge of the completed dress shield. The material from which the dress shield is to be formed is laid upon this form and is looped down at each side thereof leaving a folded edge stretching across from one to another of the highest points of the form, which folded edge is, when curved, to constitute the curved folded edge of the completed shield.

The fabric is then acted upon at each side its folded edge, and of course at each side the form which is within or in the line of the said folded edge, by formers which are made convex in form they being given a curvature which is exactly the same and the counterpart of the curvature of the concave form. These formers by reason of their convex shape, act upon the fabric first between the points of support of its folded edge, that is, the formers act upon and stretch the fabric first at or from the middle portion of the unsupported folded edge of the fabric between the points of support, which is at the middle of the folded edge of the completed shield, the fabric being thereby drawn down between the high points of the form until it touches the bottom of the concavity when further stretching causes the folded edge to be drawn tightly over the fully developed concave form, thereby giving to the folded edge the desired curvature for the completed shield. The pressure in these devices is, therefore, first applied between the ends of the shield, while the stretching to permit the fabric to be curved must take place wholly or substantially so, at the ends of the shield; therefore, greater movement and pressure must take

place at the middle in order to cause the stretching at the ends, than would necessarily be required were the pressure applied at the ends where the principal stretching must take place. Furthermore, in devices of this construction in which the forms are given the full curvature of the completed shield a separate form must be used for each different size or curve of shield. These full forms also completely fill the space between the folds of the fabric and prevent free access to the interior of the shield of the vulcanizing vapors when acid vapors are employed for vulcanizing purposes.

This invention has for its object, first, to provide an improved method of forming dress shields, and second, an improved device by which to carry out such method.

My improved method consists essentially in folding the fabric in the direction of the length of the shield, supporting said fabric in the line of said fold, but at points distant from each other substantially equal to or slightly in excess of the desired length of the shield, and while so supported applying pressure at each side of the longitudinal fold and of the supporting points therefor, and close to the latter to thereby stretch or pull the fabric adjacent its points of support, at which points the stretching must take place and in the direction of the depth of the shield to thereby cause the unsupported middle portion of the fold which is to form the middle portion of the curved folded edge of the shield to assume a natural curve extending from one point of support to the other without the necessary application of pressure at such intermediate or middle portion.

A device constructed in accordance with this invention and to form dress shields in accordance with the above method, comprehends various features of construction, principal among which are, first, a device which is adjustable to permit shields of various forms and curvatures to be shaped upon a single device; second, a device which shall be sufficiently open to permit free access of the vulcanizing acid vapor to all parts of the curved or folded edge; and third, a series of fabric supports attached at their bases by means of hinges whereby they may be turned down into horizontal positions when not in

use and for convenience in applying the rubber fabric prior to the formation of the shield.

The above together with other minor features will be more fully hereinafter described and pointed out in the claims.

In the drawings, Figure 1 represents in plan view a device for forming dress shields in accordance with this invention; Fig. 2, a vertical section of the same taken on the dotted line $x-x$; Fig. 3, a vertical cross section taken on the dotted line $x'-x'$, Fig. 2; Fig. 4, a sectional view showing two series of the supports turned down into their horizontal positions, this figure illustrating the method of applying the fabric to the supports, and Fig. 5, a perspective view showing the top frame partially withdrawn from the bottom frame.

Referring to the drawings, A and B represent preferably rectangular frames, of one form of device embodying this invention. The bottom frame B, as herein constructed, has its opposite side bars provided at their inner or adjacent edges with beads b which serve as guides for the adjustable supporting plates c , each carrying a series of fabric supports c' , best shown in Fig. 3. These supports are preferably narrow at their upper supporting ends, as shown, and need not necessarily be of any particular shape, they serving simply to support the fabric in its folded, edge at regular intervals, as will be fully hereinafter set forth. The number of supports carried by each plate c and constituting a cross row will vary according to the length of the plate, and in practice all the supports but one, the latter an end or outside support, will preferably be attached to their respective plates c by hinges c'' , so that they may be turned down into substantially horizontal positions, as shown by Fig. 4, for a purpose to be described. Each support c' is preferably shaped, as represented in Fig. 2, to present a flat central high portion 5, to thereby form as small a support as possible and a concave angular portion 6 at each end of said central portion to thereby permit the support to be of sufficient width to give firmness and rigidity. The outside angular portions 3 of the end supports of each longitudinal row or series are, however, somewhat shorter and sharper than the others to more firmly catch and hold the fabric against longitudinal slip during the operation of forming shields. The top frame A has its opposite side bars also preferably provided with beads a which serve as guides for the adjustable former plates d , each of which carries a series of formers d' .

In practice the plates c and d are so adjusted that each cross series of formers d' will be in line with a corresponding cross series of front of the axle, so as to provide a lug or ear supports c' , so that as the two frames A and B are brought together the formers d' will enter between but in line crosswise with the supports, as shown in Figs. 2 and 3. The upper

frame A also carries a second series of adjustable plates d^2 which are arranged between the plates d referred to, each of the said plates d^2 carrying a cross series of smoothers d^3 which resemble the formers in shape but are preferably wider than the latter. See Fig. 2. It will be seen that while the smoothers d^3 are in line longitudinally with the narrower formers d' , yet the cross rows of smoothers lie between the cross rows of formers, and also, therefore, between the cross rows of fabric supports c' .

The operation of the device is as follows, viz:—The plates c are first adjusted in the bottom frame B, so that their distance between centers will correspond with or be slightly in excess of the desired outside lengths of the completed shields, the said plates being then clamped in position by suitable means, as for instance, the bolts or rods f extended through the frame from side to side and provided with clamping nuts f' outside thereof, see Fig. 1. The supports c' carried by the several plates c are then turned down into their horizontal positions, as shown by Fig. 4. The rubber fabric w from which the shields are to be formed and cut is then laid over the tops of the longitudinal row of rigid supports, of which there is one at the end of each cross row of supports, a sufficient portion of the fabric being left overlying the outer side to permit it to be attached to the formers, as will be hereinafter described, the said fabric now stretching from the tops of these rigid supports down across and lying upon the downturned supports, as shown in Fig. 4. The first longitudinal row or series of hinged supports c' , preferably connected together to move in unison by a rod c^* extended longitudinally of the device loosely through all the supports in line with each other, will then be turned into its vertical position, as in Fig. 3, the fabric which previously rested upon the ends of the downturned supports being thereby looped down between the row of supports thus turned into vertical positions and the row of fixed supports adjacent thereto, as shown by dotted lines Fig. 4. The next and all subsequent rows of supports are turned into their vertical positions in a similar manner, the fabric being looped down in between each two rows, as is clearly shown in Fig. 3, and where the fabric is bent or folded over the tops of the longitudinal rows of supports, as the loops are formed as described by the turning of said longitudinal rows of supports into their vertical positions, longitudinal folds or folded edges are formed in the fabric which extend from support to support and constitute what are to be the folded edges of the completed shields. After all the rows of supports have been thus turned into their vertical positions, with the fabric looped or folded down between and supported in the lines of its folds upon the tops of the several longitudinal rows of supports, the top frame A carrying the

formers d' and smoothers d^3 previously adjusted into positions to correspond with the adjusted supports c' , as shown in Fig. 2, and clamped in such positions by the rods f^2 and nuts f^3 , is placed in position with its cross rows of formers in line with the cross rows of fabric supports, and with such formers resting in the bottoms of the loops in the fabric, between the supports therefor. The outer edges of the fabric are then turned up on the outer sides of the formers and fastened upon suitable hooks f^4 , as shown, or by other suitable fastening devices, the said top frame being then pressed down toward the bottom frame by suitable means herein shown as threaded rods g furnished with nuts g' . When the two frames are pressed together the longitudinal rows of formers resting in the loops between the longitudinal rows of fabric supports act to pull or draw the fabric down over said supports or away from the longitudinal folds in the fabric in the direction of the depth of the shield, and by reason of each cross row of formers being in line with a cross row of fabric supports the pulling pressure is first applied to the fabric at its points of support and not between the points of support, the stretching of the fabric at its points of support in this manner causing the unsupported portions of the longitudinal folds or folded edges of the fabric, and which extend from support to support along each series or row to be carried bodily downward, thereby causing each folded edge to assume a series of natural easy curves extending from one to another of the supporting points or supports, the curves thus given to the folds or folded edges being the curves which it is desired to give to the folded edges of the several shields being formed. When the two frames have been sufficiently pressed together to give the desired curvature to the shields, the two frames, held together by means of the clamping rods g , are placed in a vulcanizing oven or chamber, and vulcanized to retain the fabric permanently in proper shape. The device is then withdrawn from the vulcanizing chamber, the top frame A carrying the formers and smoothers removed, and the looped fabric with its curved folded edges removed from the several supports on the frame B and laid in folds or layers upon a suitable table where the properly shaped shields are cut therefrom, a single die or cutting instrument at one movement passing through several layers or loops of the fabric piled upon the table, and cutting one or more shields at a time from each, there being practically no waste of material. According as the two frames A, B, are pressed together with greater or less force will the curves given the folds in the fabric be greater or less. For example, referring to Fig. 2, if the two frames are pressed together with less force than illustrated by full lines, the fabric will be stretched across from one support to another somewhat, as indicated by dotted lines, forming shields of

less curvature than before, so it will be seen that by varying the pressure applied adjacent the points of support the curves may be varied at will. 70

Another great advantage of my improved device is its adjustability to produce shields of different sizes, so that a single device may be employed for a wide range of work. 75

While for general use I prefer to make the device adjustable, as shown, yet it is, of course, evident that it is within the scope of this invention to omit the feature of adjustability entirely, and construct the device with the formers and fabric supports always remaining in the same fixed relation to each other. 80

It will be noticed that the shields are not formed over fully developed curved forms as heretofore employed, but that each shield is formed by stretching the fabric at two points distant from each other substantially equal to the length of the shield and adjacent the points of support, thereby causing the unsupported portion of the fold between the points of support to assume a natural easy curve due to the pressure applied at the ends of the shields, the curvature produced depending not upon forms of any particular shape but rather upon the degree of pressure with which the two frames are pressed together. 85 90 95

The absence of full forms between the folds or loops of the fabric permits a fuller vulcanization of the curved or formed shields than heretofore, especially when the vulcanization is accomplished with acid or other vapors, such vapors having free and easy passage over all parts of the fabric. 100 105

While I prefer to use the intermediate cross rows of smoothers d^3 to prevent the fabric wrinkling or puckering, thereby making it easier to handle the fabric and to cut the shields therefrom, yet excellent results may be obtained without the use of these intermediate smoothers, for the application of pressure at the ends of the shields or at the points of support causes an excellent curve to be given the folded edge between the points of support, and the puckering which might result without the use of the intermediate smoothers, while it would make it somewhat more inconvenient to manipulate the shields thereafter, would not seriously interfere with the formation of the shields or the sale of the same thereafter. 110 115 120

It will be seen that a device constructed to operate in accordance with the above description forms the shields in a peculiar manner or by a peculiar method. 125

In the methods heretofore employed the fabric is folded or bent over two points of support which are the raised or high ends of a concaved form. Two formers are then brought down upon the fabric at each side of the form, which formers are convex in shape and act upon the fabric first at its intermediate points, thereby drawing the intermediate or middle 130

portion of the folded edge extending between the points of support first down to the bottom of the concavity in the form, pressure being thereafter further applied to cause the folded edge thus drawn down at its middle only to be further curved between such middle portion and its ends to fully conform to the rest of the concavity in the form. The stretching of the fabric which permits the folded edge to be thus curved must necessarily take place at the ends of the shields, which are the portions of the shield resting upon and adjacent to the points of support or the elevated ends of the concaved form, but in the method just referred to, and pursued universally at the present time, the pressure which is to stretch the fabric is not applied at or near the points at which it is to be stretched, but is applied at the intermediate or middle portion of the shield where little or no stretching need take place, the result being that such intermediate or middle portion, which, in fact, need only be carried down bodily is not only so carried bodily down but is also further stretched and pulled in order to sufficiently stretch the fabric at the ends of the shield to permit its folded edge to be drawn over the fully developed form. In my improved method, however, as disclosed in the foregoing description of my method of forming dress shields the formers, through which the pressure is applied, instead of acting upon the fabric which is to form a shield at the middle portion of the shield between the points of support, are located in line crosswise with the points of support so that the pressure is applied at the ends of the shield, or at such portions of the shield as must necessarily and only be stretched to form the shield. By applying the pressure and stretching the fabric at the ends of the shield the unsupported middle portion of the folded edge which is to be curved is necessarily carried bodily downward and gradually assumes a natural, easy curve due to the stretching at the ends of the shield, which curve extends from one to another of the points of support. Therefore, whereas in the old method pressure is first applied at the intermediate portion of the shield, in my improved method the pressure is first applied at the ends of the shield. The difference is material, for less stretching and less pressure are required and the liability of fracturing the fabric is reduced to a minimum and practically removed entirely.

While I prefer to employ a device for forming dress shields in accordance with the above improved method, constructed substantially as herein shown and described, yet such a construction is not essential, for the device may be varied in many particulars and still form the shields in accordance with my improved method.

I claim—

1. In a device for forming dress shields, two or more separated fabric supports arranged in line and over which the fabric may be

folded to leave the folded edge extending from one to another of and sustained upon said supports, portions of the fabric at each side its folded edge extending down at opposite sides said supports, combined with formers arranged in pairs, one pair for each of said supports, the formers of each pair standing at opposite sides of, and with their lowest points in line laterally with said supports, means to move said formers to cause the same to act upon the fabric at opposite sides of and immediately adjacent the separated supports to stretch the fabric downwardly from the tops of said supports to thereby cause the unsupported middle portion of the folded edge of the fabric between the said separated supports to assume a natural, easy curve extending from one support to the other, substantially as described.

2. In a device for forming dress shields, a series of separated supports arranged substantially in line and over which the fabric is folded, the folded edge of the fabric extending from one to another of said supports, said supports being made adjustable to thereby vary the distances from one to another, combined with a series of formers to act upon the fabric at opposite sides of the said supports and also made adjustable, and means to move said formers to stretch the fabric adjacent and at opposite sides of said supports to cause the fabric to assume a series of natural curves extending between the several supports of the series, substantially as described.

3. In a device for forming dress shields, a frame and a series of fabric supports attached thereto by hinges and adapted to be turned down laterally thereupon, said supports when turned into positions perpendicular to said frame causing the fabric previously laid upon them to be looped down between them, combined with a series of formers to act upon and draw the fabric at opposite sides of each support, substantially as described.

4. In a device for forming dress shields, a bottom frame, a series of plates adjustably mounted therein, each plate carrying a series of fabric supports, combined with a top frame, a series of plates adjustably carried thereby, each carrying a series of formers, to operate, substantially as described.

5. In a device for forming dress shields, a bottom frame, its side bars provided with beads, a series of plates mounted to slide on said beads, clamping devices therefor, and a series of fabric supports carried by said plates, combined with a top frame having its side bars also provided with beads, a series of plates mounted to slide on said beads, clamping devices therefor, and a series of formers carried by said plates, to operate, substantially as described.

6. In a device for forming dress shields, the combination with a frame, of a series of fabric supports hinged thereto, and means whereby by two or more hinged supports located in the

same line with each other may be moved in unison, and a series of formers, substantially as described.

5 7. A frame, a series of fabric supports hinged thereto, a rod c^x extended loosely through two or more supports arranged in line with each other, combined with a series of formers, to operate, substantially as described.

10 8. In a device for forming dress shields, a series of fabric supports arranged in line and over which the fabric is folded, the folded edge of said fabric extending unsupported from one support to another, combined with
15 a series of formers to act upon the fabric at opposite sides of the said supports to thereby stretch the fabric adjacent said supports and cause the same to assume a natural curve extending from one support to another, and a
20 series of smoothers to act upon the fabric intermediate said supports and further stretch the same slightly to prevent wrinkling or puckering, substantially as described.

25 9. In a device for forming dress shields, a bottom frame, a series of fabric supports adjustably mounted thereon, combined with a top frame, a series of formers adjustably mounted thereon to act upon the fabric at opposite sides of the fabric supports, and a
30 series of smoothers intermediate said first series of formers and also adjustable to act upon the fabric intermediate said formers, substantially as described.

35 10. The herein described method of forming dress shields, which consists in folding the fabric in the direction of the length of the shield, supporting said fabric in the line of said fold but at points distant from each

other substantially equal to or slightly in excess of the desired length of the shield, and
40 while so supported applying pressure at each side of the longitudinal fold and the supporting points therefor and close to the latter to thereby stretch or pull the fabric in the direction of the depth of the shield to cause the
45 unsupported middle portion of said fold to assume a natural curve extending from one point of support to the other, substantially as described.

11. The herein described method of forming dress shields, which consists in folding
50 the fabric in the direction of the length of the shield, supporting said fabric in the line of said fold but at points distant from each other substantially equal to or slightly in excess of the desired length of the shield, and
55 while so supported applying pressure at each side of the longitudinal fold and the supporting points therefor and close to the latter to thereby stretch or pull the fabric in the direction of the depth of the shield to cause
60 the unsupported middle portion of said fold to assume a natural curve extending from one point of support to the other, and further stretching or pulling the fabric slightly
65 at each side of its longitudinal fold but midway the length of the fold to prevent the fabric wrinkling or puckering, substantially as described.

In testimony whereof I have signed my
70 name to this specification in the presence of two subscribing witnesses.

GEORGE S. SQUIRES.

Witnesses:

GEO. W. GREGORY,

FREDERICK L. EMERY.