Aug. 25, 1936. H. KOPLIN 2,052,354

METHOD OF AND APPARATUS FOR STARCHING GARMENTS

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Fig. 6

Fig. 2

Fig. 5

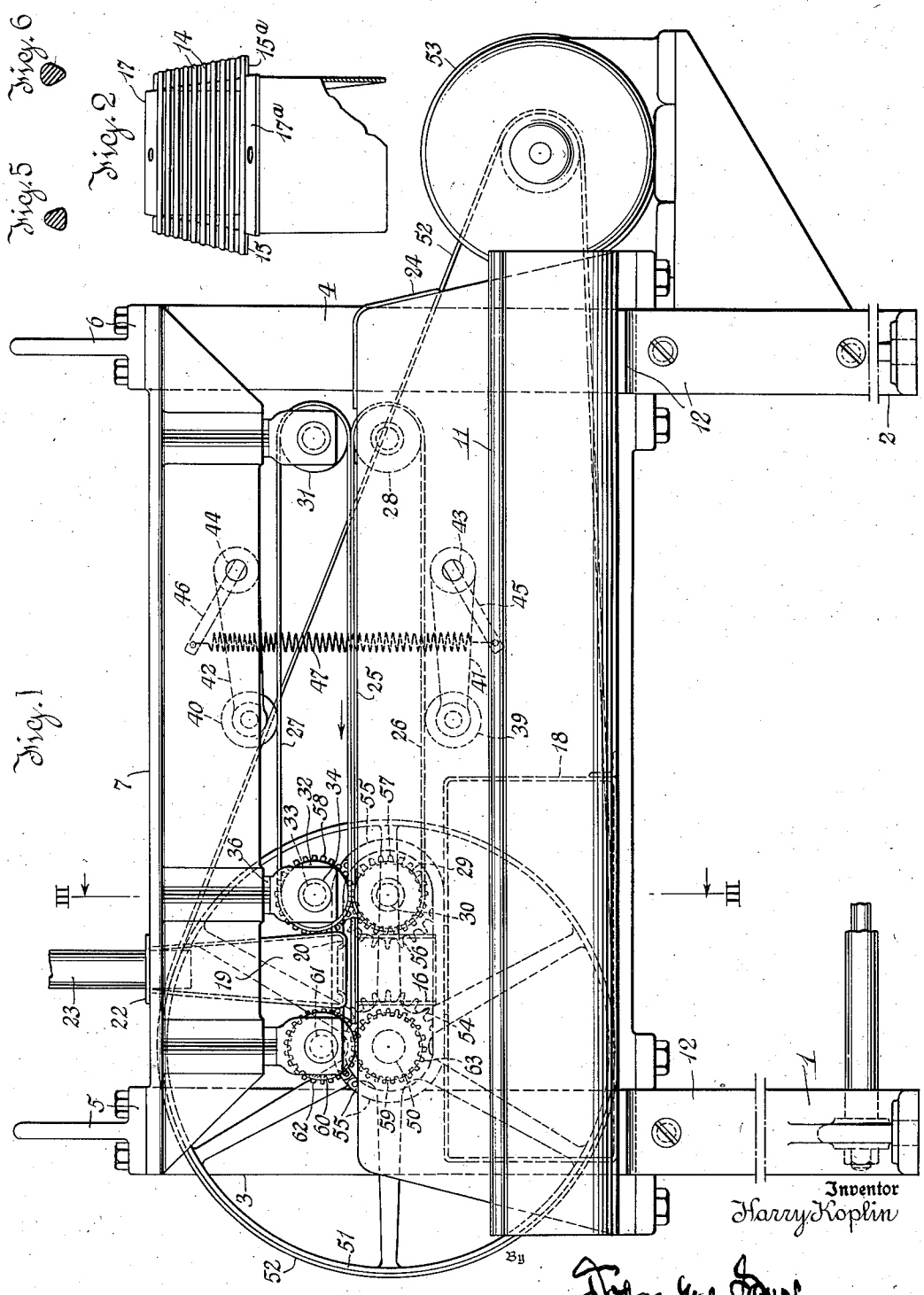


Fig. 1

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Fig. 4

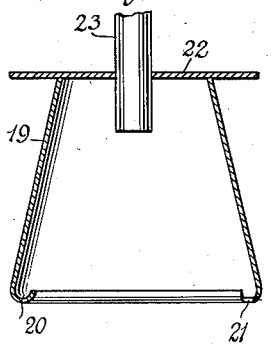


Fig. 3

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UNITED STATES PATENT OFFICE

2,052,354

METHOD OF AND APPARATUS FOR STARCHING GARMENTS

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Application September 4, 1934, Serial No. 742,668

17 Claims. (Cl. 68—28)

This invention pertains to an improved method of and apparatus for applying starch to garments, and more particularly to definite portions thereof, with a view of securing uniform and complete impregnation of such portions, and likewise to prevent, to a greater or less extent, the application of starch to those portions of the garment which are adjacent the definite portions which are starched.

The method now commonly in vogue in laundries where say a shirt is to be starched, may be said to be as follows:

After the washing operation has been completed, the last rinse is commonly impregnated with starch or sizing, and as a consequence the entire shirt is thus starched or sized. If the customer desires a special starched collar and/or cuff, the method employed, insofar as I am aware, is to dip these portions or sections into bowls containing a starch solution, where they become charged with starch, after which the shirt is wrung out by hand and placed in an extractor where all surplus moisture is removed. This last step, incidentally, produces starch spots throughout the body of the shirt and does not, moreover, bring about a uniform saturation or impregnation of the starch in those sections which have been hand-dipped. The weight of moisture and starch in a garment thus treated is equal to approximately one and one-half (1½) times its dry weight. By the method of my invention, as hereafter set forth, the weight of the starch and moisture should and will not be over 75% of the dry weight of the fabric, thereby materially reducing the time necessary to iron such starched elements or parts. What is more, my method ensures a uniform and complete impregnation of the elements,—cuffs, collar, etc., without causing or permitting the starch to pass into the immediately adjacent portions of the garment.

Stated somewhat broadly, the invention contemplates spraying a starch solution onto an outstretched, unwrinkled garment element, maintaining the impingement of the spray thereon for a fixed interval of time, preferably effected by the speed of movement of the outstretched, unwrinkled element through the spray and finally (though not necessarily) subjecting the element to a compressive action, preferably a rolling one, whereby the starch is caused to flow and permeate the element evenly throughout. The outstretching of the garment element necessarily does away with any wrinkling and opens up the same, putting threads running in the direction in which the feed takes place under more or less tension, while separating or temporarily spacing the transversely extending threads.

Means is provided whereby the spray is localized upon the element which is being sprayed, so that adjacent portions of the garment are unaffected, or in other words, remain unstarched. The invention as above noted is designed to starch definite portions of a garment, which in usual practice are the marginal portions, as the collar band, the cuffs and the button-hole strip, when a shirt is the article considered.

The annexed drawings disclose a machine by which the method above outlined may be practiced though, as will be readily appreciated, equivalent mechanism will suggest itself to those skilled in the art.

In the drawings:—

Figure 1 is a side elevation of a machine which has been employed to carry out my invention;

Fig. 2, a perspective view of the work supporting grid and the underlying open bottom supporting member;

Fig. 3, a transverse vertical sectional view of the machine taken on the line III—III of Fig. 1;

Fig. 4, a vertical sectional view of the spray directing and confining chamber; and

Figs. 5 and 6, transverse sectional views illustrative of different forms of bars or rods which may be employed in the formation of the work supporting grid.

Referring to the drawings, the main frame of the machine may be said to comprise two vertically disposed frame members 1 and 2, each provided with an upstanding column-like member denoted by 3 and 4, respectively, which terminate at their upper ends in overhanging and forwardly extending arms 5 and 6, respectively. The under faces of the arms lie in a common plane and have secured thereto longitudinally disposed frame members 7 and 8, which members also serve as a carrier for certain elements, hereafter referred to.

Mounted upon and secured to the upper portion of the base elements of the frame members 1 and 2, are two longitudinally disposed frame members 9 and 10, which form the support for certain of the operating and other elements of the machine.

As will be best seen upon reference to Fig. 3, said members 9 and 10 are substantially of inverted T-shape form, and to the outer portion of the member 9 there is secured a trough-shaped member 11 supported in part by brackets 12. Said trough-shaped member is preferably formed of non-corrodible metal and at its inner portion it extends upwardly in line with the upwardly

extending element of the member 9 and is turned inwardly, forming a flange as at 13 (Fig. 3), which overlies a part of the upper face of the vertically disposed element of the member 9.

The machine is so designed as to provide a grid or screen surface over which the portion of the garment which is to be starched is passed, and cooperating therewith is a spray chamber which directs the fluid starch in sprayed form upon the section of the garment which is undergoing treatment.

In Fig. 2, the grid surface is illustrated. It may be said to comprise a series of rods or bars 14 spaced from each other and secured as by spot-welding or otherwise to the oppositely disposed outwardly projecting flanges 15, 15a formed upon the upper portion of a rectangular shaped member 16. This member, as are the rods, will preferably be formed from non-corrodible metal, and in addition to the flanges heretofore referred to, is provided with side flanges 17, 17a, which lie in the same plane with the flanges 15, 15a.

The bars may be round in cross-section, or of the cross-section shown in Fig. 5 or Fig. 6. In the former, it will be noted that they taper toward the upper end; while in the latter, the reverse form is shown. Preferably the bars will present a smooth or planished surface, in order to facilitate the movement of the garment element being starched thereover.

The box-like member 16 is seated upon the upper end of the members 9 and 10 (see Fig. 3), being open at the bottom and standing above a removable receptacle 18 supported by the inwardly projecting flanges of the oppositely disposed members 9 and 10.

Located above the grid and spaced slightly therefrom is a spray-directing chamber, designated generally by 19 and produced from non-corrodible metal. As will be seen upon reference to Figs. 1, and 3 and 4, said chamber tapers or flares in both directions toward its lower end, said lower end being upturned inwardly, forming a groove or channel 20 extending around such lower end and leading to a cut-out portion or drainage opening 21 (see Fig. 4).

The chamber 19 is open at its lower end and the opening formed by the upturned lower edge thereof will be of such dimension as not to extend fully in either direction, laterally or transversely of the grid surface.

The upper end of the body 19 is secured to a plate 22 which rests upon the inwardly projecting flanges of the frame elements 7 and 8 (see Fig. 3) by which it is supported. A spray nozzle of any approved form and indicated generally by 23 extends through the plate 22 and terminates in the upper portion of the spray-directing member 19 centrally with reference to the oppositely disposed sides of said chamber, which, as above stated, is preferably oblong in cross-section with the major axis extending transversely of the grid composed of the bars 14.

It will, of course, be understood that the starch solution will be supplied to the nozzle element 23 under a given head or pressure and will, likewise, have a definite or fixed consistency so that the elements of the garment or garments being starched will be evenly treated and impregnated. Inasmuch as the starch supplying and projecting means, as well as the mechanism or means for maintaining the starch in its proper consistency form no part of the present machine, they are not illustrated.

At the forward end of the frame of the machine and secured to a fixed portion thereof is a guide and guard plate 24 which extends across from the member 9 to the member 10, said plate facilitating proper placement of the garment with reference to the infeeding devices about to be described.

Overlying the members 9 and 10 and extending from the intake end of the machine toward the grid is a plate 25 which likewise bridges the space between the members 9 and 10. Said latter plate, 25, forms the support for the upper run of an endless belt 26. Located above said belt is a second belt 27, the lower run whereof is held in close juxtaposition with reference to the belt 26 and moves in the same direction with the upper run thereof. This forms the intake or initial feeding mechanism for the garment element which is to be starched, and positions and moves such element onto and over the grid or equivalent open support.

Belt 26 passes around an idler roller 28 and about a driven roller 29 secured upon a shaft 30. Belt 27 at the intake end of the machine passes about an idler roller 31 and adjacent the grid about a roller 32 secured to a driven shaft 33. The ends of the shaft 33 are supported in bearings 34 and 35, respectively, carried by the lower end of spring-pressed plungers 36 and 37, respectively. These plungers are mounted in vertically disposed bearing recesses formed in the members 7 and 8, respectively, and the compression springs are held in position by threaded elements 38, 38a, respectively. By this means, the belts 26 and 27 are held close together adjacent the forward end of the grid and any suitable belt-tightening connection may be used in conjunction therewith, as for instance rollers 39 and 40, carried upon arms 41, 42, secured to shafts 43, 44. Pins or arms 45, 46 are likewise secured to said shafts, and a spring 47 interconnecting the outer ends of said arms, tends to rock the shafts and force the rollers 39, 40 toward each other and against the outer runs of the belts.

Mounted in the frame members 9 and 10 at the discharge end of the machine is a shaft 50, said shaft having secured thereto a relatively large pulley 51 about which passes a belt 52, the belt likewise passing about a pulley secured to the shaft of a variable speed electric motor 53. Any suitable means may, however, be employed for imparting motion to the shaft 50.

Secured to the shaft 50 is a sprocket wheel 54 about which passes a sprocket chain 55, the chain likewise passing about a sprocket 56 secured to shaft 30. Shaft 30 also carries a gear 57 which meshes with a similar gear 58 secured to shaft 33. As a consequence, the rollers 29 and 32 rotate in unison and impart equal speed of travel to the belts 26 and 27, feeding any article which may be placed between them forwardly without wrinkling or displacement onto the grid bars 14.

Secured upon shaft 50 is a roller 59 which cooperates with a roller 60 secured to a shaft 61 carried by spring-pressed plungers similar to the plungers 36, 37 which are mounted in suitable housings or bearings in the frame elements 7 and 8, respectively. Shaft 61 also carries a gear 62 which meshes with a gear 63 secured to the shaft 50, so that equal peripheral speed is imparted to the rollers 59 and 60, which rollers bite the edge of the advancing goods and tend to draw the same forwardly over the grid surface.

It will be appreciated, of course, that any driving means may be employed and in fact in the

broader aspect of the invention, the initial feeding belts 26, 27 may be omitted and the goods placed over and upon the grid by hand, the drawing of the element to be starched over such grid being effected by the final combined feed and compression rollers 59 and 60. As above indicated, the degree of impregnation is dependent upon several factors, to wit, the consistency of the starch, the force with which it is sprayed upon the article being starched, the speed of travel of the goods over the grid and beneath the spray chamber, and also upon the tension exerted between the compression rollers 59, 60. If said rollers are so set as to exert considerable pressure upon the article, there will be a tendency for the rollers to squeeze out the starch solution. In any event, said rollers tend to cause the starch to permeate the goods evenly throughout, this owing to their pressure action.

If one portion happens to be carrying too much starch and another portion too little, the overcharged portion will be depleted of its charge and the other, uncharged portion will in all likelihood be properly charged as the surplus will tend to well up between the downgoing surface of the roller 60 and the forwardly traveling garment element charged with starch.

As above noted, the opening or mouth of the member 19 is such as to preclude the starch spray from passing beyond the edge thereof, or in other words, beyond the edge or margin of the supporting grid upon and over which the garment element is being drawn. Thus, the starch does not pass outwardly into the adjacent portion of the garment, except perhaps to a very slight extent by conduction.

Any excess starch will be caught by the trough 20, flowing around the same and outwardly of the opening 21 and down into the receptacle 18 which may be emptied from time to time, either automatically or by removal and manual emptying.

The trough 11 is designed to receive the bulk of the garment, while the particular element, cuff, collar or lapel, is being placed within the machine and treated. It sustains the major weight of the wet garment and allows the operator to give his undivided attention to the placement of the particular sector or section of the garment which is to be starched.

It is manifest that insofar as the broad invention, particularly as it may be expressed in method, is concerned, it is not to be limited to the present showing.

What is claimed is:

1. That method of applying starch to a definite portion only of a garment while leaving the remainder unstarched, which consists in holding such portion in an unwrinkled, outstretched condition, passing it while in such condition through the path of a spray of fluent starch, and thereafter subjecting such starched portion to compressive action whereby uniform or homogeneous and complete impregnation of the definite portion by the starch is effected.

2. In an apparatus of the character described, the combination of an open-work support; means for traversing material to be starched thereover; and means for projecting a spray of starch upon the exposed surface of the material.

3. In an apparatus of the character described, the combination of an open-work support for the article to be starched; means for traversing said article thereover; means for projecting a spray of starch upon the exposed surface of the article; and means for thereafter subjecting the body so starched to a compressive action.

4. In an apparatus of the character described, the combination of an open-work support; means for traversing material to be starched thereover; means for projecting starch onto the material; and means for confining the effective area of the spray within predetermined limits.

5. A structure as set forth in claim 4, wherein means is provided for subjecting the starched material to a compressive action to secure thorough impregnation of the material by the starch.

6. In an apparatus of the character described, the combination of an open-work support; means for traversing a definite portion of a garment to be starched thereover; means for projecting starch onto said portion; and means cooperative with the starch projecting means acting to prevent application of starch upon the garment outward of such portion.

7. A structure as set forth in claim 6, wherein means is provided for subjecting such garment element to a compressive action after starch has been applied thereto.

8. In an apparatus of the character described, the combination of an open-work support for the article to be starched; means for traversing said article thereover; a spray chamber located above said support, the lower end whereof opens directly above said support; and means for projecting a spray of starch into said chamber and directly therethrough onto the article on the support.

9. A structure as set forth in claim 8, wherein the lower portion of the chamber is provided with means for confining the spray as it passes therefrom within given limits laterally with reference to the chamber.

10. A structure as set forth in claim 8, wherein the chamber at its lower end is provided with a gutter to receive any excess starch, said gutter being provided with a drainage opening.

11. A structure as set forth in claim 8, wherein the lower end of the chamber is upturned inwardly, forming a restricted opening for the lower end of the chamber through which the starch spray may pass and likewise forming a gutter to receive excess starch, said gutter having a drainage opening formed therein.

12. In an apparatus of the character described, the combination of a grid-like support for the article to be starched; means for traversing material to be starched thereover; a spray chamber located above said grid; means for projecting starch into and through said chamber onto the article on the support; and a receptacle for receiving starch which may pass through the article and grid.

13. A structure as set forth in claim 12, wherein the grid-like support is formed of a series of bars secured to the open upper end of an open-ended chute; and the receptacle is placed below said chute.

14. In an apparatus of the character described, the combination of an open-work support; means for traversing material to be starched thereover; means for projecting starch onto the material within predetermined confined limits thereon; and a pair of rollers for thereafter subjecting the starched material to compressive action, at least one of said rollers being urged toward the other through spring action.

15. In an apparatus of the character described, the combination of a supporting frame; a pair of

feeding belts arranged in superposed relation with reference to each other in said frame; means for driving said belts to effect movement of the adjacent runs of the belts in the same direction; a support for the article to be starched, said support being located adjacent the point or plane of the discharge of the belts and in line therewith; and means for projecting starch upon the article as it passes onto said support from the belts.

16. A structure as set forth in claim 15, wherein a pair of positively driven rollers are located to that side of the support opposite that upon which the article is introduced by the feeding belts, said rollers receiving the article from the support, drawing the same thereover, and subjecting the starched work to a compressive action.

17. In a machine of the character described, the combination of a main frame; a trough-shaped member located to one side thereof and extending substantially throughout its length; a support for the article to be starched; means for traversing the article thereover; and means for projecting a spray of starch upon the exposed surface of the article as it is moved over the support.

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