Aug. 4, 1931. M. SPUHR 1,817,855

METHOD OF AND APPARATUS FOR SHRINKING CLOTH OR CLOTH GOODS

Filed Sept. 28, 1929 2 Sheets-Sheet 1

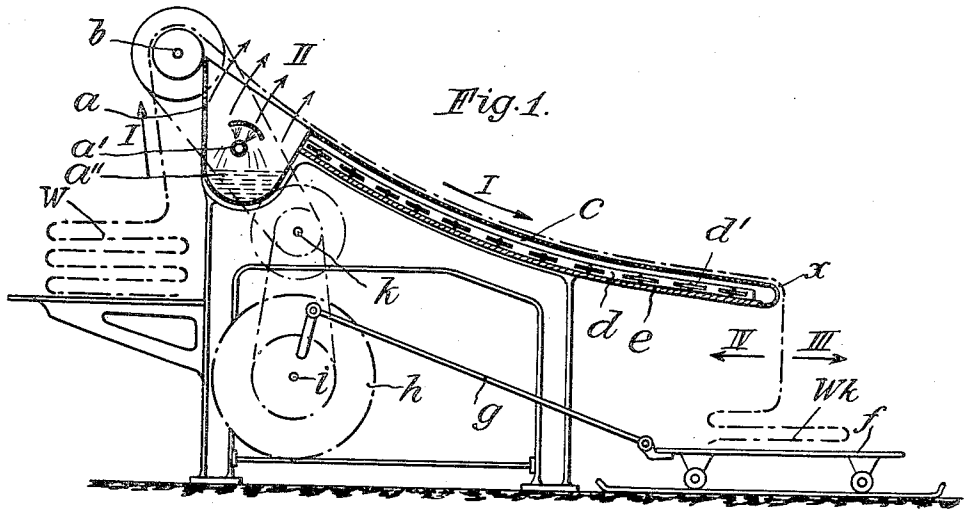


Fig. 1.

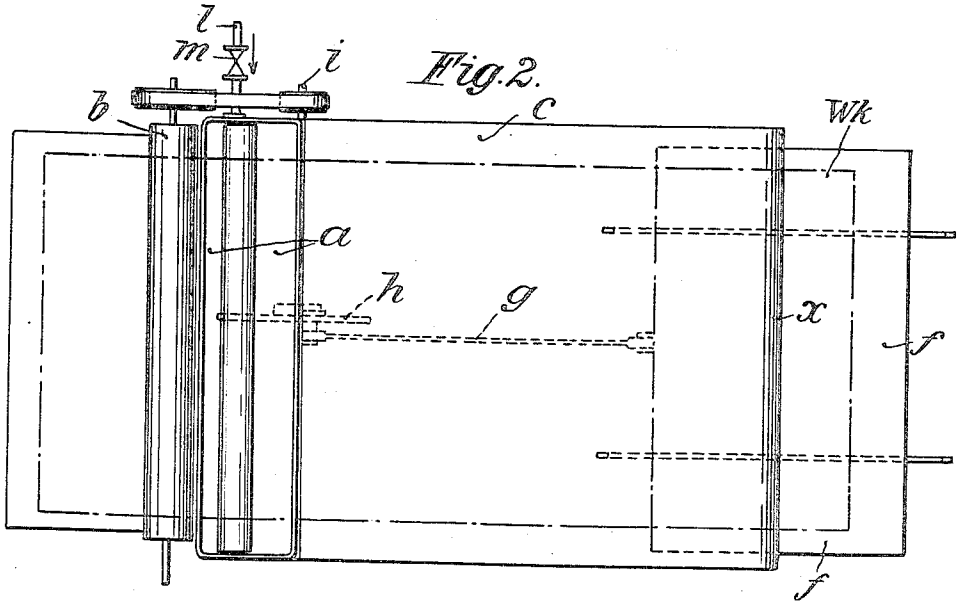


Fig. 2.

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Filed Sept. 28, 1929 2 Sheets-Sheet 2

Fig. 3.

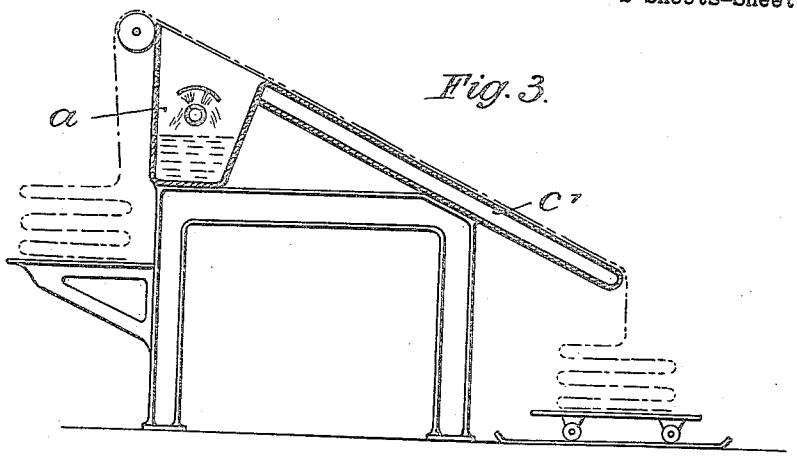


Fig. 4.

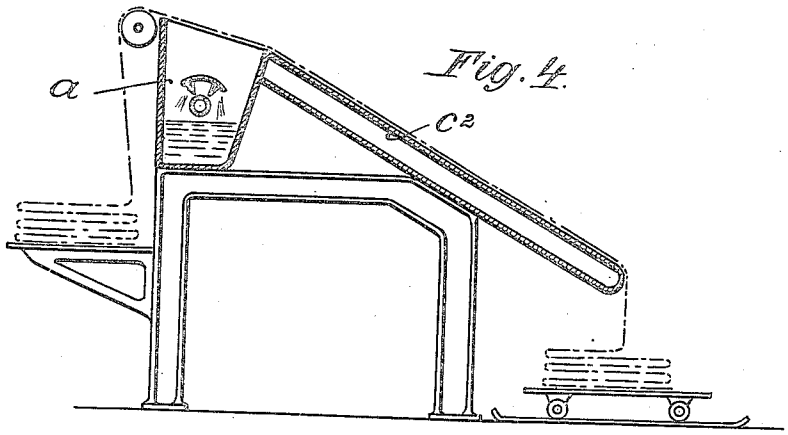
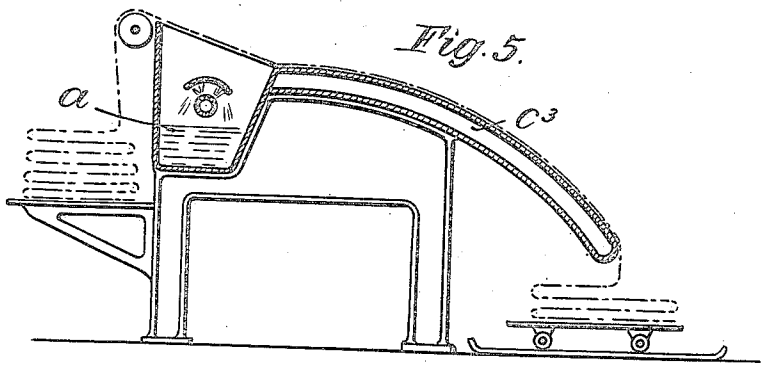


Fig. 5.



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UNITED STATES PATENT OFFICE

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METHOD OF AND APPARATUS FOR SHRINKING CLOTH OR CLOTH GOODS

Application filed September 28, 1929, Serial No. 395,911, and in Germany October 3, 1928.

My invention pertains to an improved method of and apparatus for shrinking cloth or cloth goods in a more efficient and reliable manner than hitherto practised and realized by way of the customary shrinking process.

In the art as hitherto practised the cloth or cloth goods are subjected to the shrinking treatment, properly speaking, immediately after the tentering and drying operations or prior to the finishing treatment. The shrinking procedure is for the purpose of removing all and any tension from the cloth and to render the latter thoroughly shrunk and not liable to shrink during any subsequent ironing and sewing operation or wearing. The tension existing in recently woven cloth is mainly due to or involved by the dressing of the cloth, especially to the running and winding of the web or cloth under tension and particularly to the drying of the cloth while in tensioned condition.

In the shrinking process and machines as hitherto employed the cloth is first caused to pass over a steaming table or box in order to be moistened and loosened and subsequently the cloth is subjected to the action of dry heat without, however, being exposed to any appreciable pressure or tension during such drying treatment, for the purpose of causing the cloth to shrink or contract.

The steaming of the cloth, however, entails the result of stretching the same due to the absorption of moisture and in the subsequent operation of conveying the moist web of cloth over and around conveying and guiding rollers provided adjacent to the two ends of the said table or box the unduly stretched cloth will be further stretched or spread longitudinally or in the direction of the warp.

A cloth thus extended or elongated during the shrinking procedure is objectionable for the reason that in the subsequent treatments the cloth contracts first for the amount of such extension or elongation only, while the tension of the cloth originating from the previous dressing and finishing operations will scarcely or to a moderate degree only be removed in the shrinking procedure.

The chief object of my invention is to provide an improved method of and an apparatus for shrinking cloth and cloth goods wherein the latter will not be unduly stretched or elongated as in the method as hitherto practised.

With the above recited and other objects in view reference is made to the following specification and annexed drawings in which there is exhibited one example or embodiment of the invention which is in no way intended as a limitation upon the scope of the subjoined claims, as it is to be clearly understood that variations and modifications which fairly fall within the true scope of said claims may be resorted to when found expedient.

In the accompanying drawings forming a part of this specification and showing for purposes of exemplification a preferred form and manner in which the invention may be embodied and performed:

Figure 1 is a view in vertical longitudinal section of the apparatus for carrying out and embodying the present invention, and Figure 2 is a view in top plan thereof, Figures 3, 4, 5 show different forms and accommodations of the shrinking plate.

The apparatus shown comprises an open steam box or vessel a with a rear wall extending upwards in front of and adjacent to a conveying roller b, while the front wall thereof is bent and elongated to form a curved guiding and traveling surface or plate c for the web to be shrunk. Mounted in the box a is a steam-pipe a' and the box is partially filled with water a''. The roller b acts to feed or forward the web of cloth W to be shrunk, from a table or the like over to the curved inclined plate c attached to or integral with the box a.

Immediately below and parallel to the sur-

face or plate *c* there is provided a second plate *e* which is spaced a certain distance *d* apart from the plate *c*, suitable electrical heating elements *d'* being mounted in the space between the two plates, as will be clearly seen in Figure 1, in order to heat the plate *c* over which the web of cloth is caused to travel, while the lower plate *e* serves as a means for obviating radiation and loss of heat. Suitable series resistances (not shown) may be provided for controlling the current intensity and the temperature of the plate *c*. Below the lower or delivery end of the curved inclined plate *c* a carriage *f* on rails is provided for the reception of the treated cloth W*k* and the carriage is connected with a crank-disk *h* revolubly mounted on a shaft *i*, by means of a connecting rod *g* so as to be reciprocated on the rails in unison with the revolutions of the crank-disk *h* for the purpose of receiving the cloth in the form of a folded pile, as shown. Motion is imparted to the crank-disk and at the same time to the roller *b* from any appropriate source of power (not shown) through the agency of a shaft *k* and a belt-drive or the like. Steam is supplied to the steam box or vessel *a* by means of a conduit *l* from any suitable source of steam or boiler (not shown), the conduit *l* being provided with a valve *m* for controlling the steam supply as usually. The steam is injected into the water *w''* contained in the box *a*, so that any steam evolved or emerging from the water will be very moist and of low temperature.

The opening or mouth of the steam box *a*, that is to say the slanting rim or edge of the box, alines with the inclined shrinking plate *c* so as to lie in the plane of the latter which is curved according to the arc of a circle struck about a centre point situated outside of the lower delivery edge *x* of the plate. Consequently the web of cloth moving over and down the plate can slide off the edge readily and free of tension. It goes without saying, that, instead of electrical heating means, such as *d*, any other heating agents, such as gas burners pipes heated with steam or hot air, may be employed for the purpose of heating the plate *c*.

The shrinking procedure according to the present invention is, so to say, an imitation of the known ironing operation wherein a moist sheet is placed upon the cloth to be smoothed and the flat-iron heated to a temperature of about 250° C. is moved to and fro on and over the moist sheet. The high temperature of the flat-iron causes the moisture contained in the sheet to abruptly evaporate and the thus produced hot steam will penetrate the underlying cloth. Upon removal of the flat-iron and the sheet which now is dry, the ironed cloth or surface will shrink. Thus the cloth to be ironed or shrunk will not be stretched again.

According to the present invention the web of cloth W to be conveyed in the direction of the arrow over and about the roller *b*, the box *a* and the shrinking plate *c* is in a completely dry condition. When the web passes around the roller *b*, and slides downwards over the open mouth, of the steam box *a* without being subjected to any tension, the cool steam ascending in the box, as indicated by the arrows II, will moisten the web and loosen the same and while subsequently sliding on the inclined curved plate *c* the web will be subjected to a high temperature and caused thereby to shrink.

It is to be noted that the cloth, as above intimated, slides down over the hot plate *c* freely, and devoid of tension in the direction of the arrow I and that the same slides in a perfectly shrunk condition over the edge *x* of the plate *c* downwards onto the carriage *f* to fold and pile up on the latter due to the reciprocatory movement of the carriage indicated by the arrows III and IV, and imparted to the same by the revolving crank-disk *h* and the rod *g*.

Although the curved or concave shape of the inclined shrinking plate *c*, as shown, is a practical form, still very satisfactory results may be realized by using other forms or shapes of the shrinking plate *c*.

Fig. 3 shows a straight flat plate *c'* constituting with the mouth edge of the steam box a straight inclined plane for the web of cloth to slide down thereon. The angle of the plate *c'* towards the horizontal line is beyond 30 degrees.

In the modification of Fig. 4 the shrinking flat plate c^2 forms an angle with the mouth edge of the steam box *a*, the angle of the plate towards the horizontal line being greater than that of the plate *c'* of Fig. 3.

In the modification of Fig. 5 the shrinking plate c^3 is convex in shape for the web of cloth to slide down thereon. Though I have shown and described with great particularity of detail a single embodiment of my invention only, yet it is not to be understood therefrom that the invention is limited to the particular embodiment disclosed.

What I claim is:—

1. Apparatus for shrinking cloth, cloth goods or the like, including a steam box having an inclined opening at one end of the top thereof, a feeding roller at the upper end of the inclined opening of the steam box, an inclined heating and shrinking plate carried with the top at the lower edge of the inclined opening of the steam box, and the edges forming the opening of the steam box aligning with the upper surface of the shrinking plate and being curved so as to form a concave face.

2. An apparatus for shrinking cloth or cloth goods and the like, comprising a steam box open at the top, a feeding roller at the

uppermost end of the inclined opening or mouth of the said steam box, an inclined heating plate attached to or integral with the lowermost end of the inclined opening of the steam box, a reciprocating carriage below the lower or delivery end of the said heating plate, and means for imparting reciprocatory motion to the said carriage, substantially as described.

In testimony whereof I have signed my name to this specification.

MAX SPUHR.