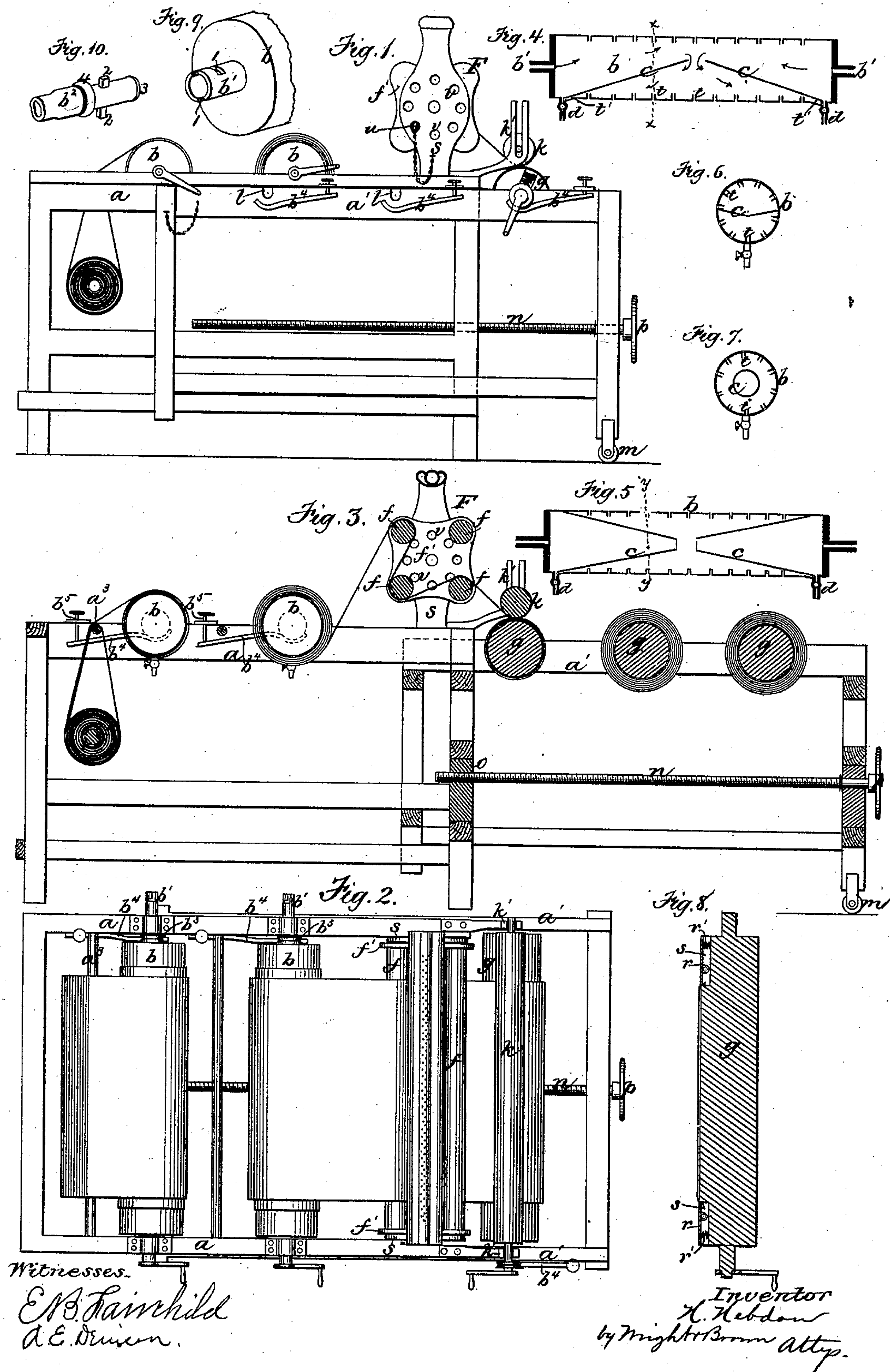


H. HEBDON.
Process and Apparatus for Finishing Cloth.
No. 201,112. Patented March 12, 1878.



UNITED STATES PATENT OFFICE.

HERBERT HEBDON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO LYDIA HEBDON, OF SAME PLACE.

IMPROVEMENT IN PROCESSES AND APPARATUS FOR FINISHING CLOTH.

Specification forming part of Letters Patent No. **201,112**, dated March 12, 1878; application filed October 15, 1877.

To all whom it may concern:

Be it known that I, HERBERT HEBDON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Processes and Apparatus for Finishing Cloth, of which the following is a specification:

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side view of my improved apparatus. Fig. 2 represents a top view of the same. Fig. 3 represents a sectional view, showing the frame extended and the extra winding-rollers in place. Figs. 4 and 5 represent longitudinal sections, showing modifications of the steam-cylinders. Figs. 6 and 7 represent sections on lines *x x* and *y y*, Figs. 4 and 5. Fig. 8 represents a longitudinal section of one of the winding-rollers. Figs. 9 and 10 represent views of the coupling for the steam-cylinders.

Similar letters of reference refer to like parts in all the figures.

This invention relates to the finishing of woolen cloth and preparing it to be made up into garments after it has gone through the usual processes of manufacture.

The object of the invention is to produce a better and more uniform and durable finish than heretofore, and to effect a saving of time and labor in the operation.

In ordinary processes of finishing cloth the web is steamed as it passes from roll to roll, raising and roughening the nap, losing the beneficial effects of continued heat, and destroying the finish. The cloth has also been steamed from the inside while on the roll, and afterward planished, the effect being to bring it to such a condition that the subsequent planishing with the tailor's iron imparts to it a glossy and highly objectionable appearance.

By my process the nap is laid and the fibers set in their laid condition, the planishing is effected before cooling, and the finish imparted is such as will not be affected by subsequent ironing.

In carrying out my invention I employ a frame, *a*, on which are journaled two hollow perforated steam-cylinders, *b b*, these cylinders being parallel with each other, and provided with cranks or other means whereby they

may be rotated. The cylinders *b* are provided with tubular journals *b¹ b¹*, which are adapted to be connected to steam-pipes *b² b²*.

c c represent partitions in the interior of the cylinders, said partitions extending respectively from the lowest portion of the cylinders, at the opposite ends thereof, inwardly and upwardly, their inner ends terminating near the center of the cylinders, spaces being left between said inner ends, and between the inner ends and the upper portions of the cylinders. The partitions *c*, in connection with the portions of the cylinders that inclose them, constitute reservoirs or receptacles for any water of condensation that may be forced into the cylinder from the steam-pipes, or that may accumulate in the cylinders before the latter become heated when steam is first introduced. Steam, in entering the cylinders, passes over and between the inner and upper ends of the partitions *c*, and reaches all portions of the cylinders, as shown by the arrows.

d d represent pipes at the ends of the cylinders, through which the water that is accumulated by the partitions *c* is discharged, the pipes being provided with suitable cocks.

If desired, the partitions *c* may be made in the form of hollow truncated cones, attached at their bases to the ends of the cylinders, as shown in Fig. 5. The perforations in the periphery of the cylinders may be surrounded by short tubes *t*, which project into the cylinders above the level to which water accumulating therein would be liable to rise, as shown in Figs. 4, 5, 6, and 7; and to remove any water of condensation that may accumulate in the cylinders under the partitions *c*, I provide passages *t'* communicating with the pipes *d*.

The operation of the cylinders *b* is as follows: A piece of cloth is wound compactly on one of the cylinders before steam is admitted; then the cylinder is turned so that its outlet-pipes *d* will project downwardly, and steam is turned on, heating the cylinder and passing into the cloth, the water of condensation passing out through the pipes *d*. The cloth remains on this cylinder until the steam has nearly reached the outer portion of the roll or piece; then the steam is shut off, and the piece

is transferred to the second cylinder and wound thereon, with its outer end as wound on the first cylinder next to the periphery of the second. Steam is then admitted to the second cylinder, and the piece is resteamed, the end that received the least steam on the first cylinder receiving the most on the second.

I prefer to wind several thicknesses of cotton cloth on the cylinders *b* before winding the cloth to be finished thereon, for the purpose of preventing discoloration of the latter by contact with the cylinder. The partitions *c*, when made as in Fig. 2, should be concave on their upper surfaces, as shown in Fig. 6, to prevent the water accumulating therein from escaping through the perforations in the sides of the cylinder. I provide the frame *a* with a roller, *a*³, from which to suspend a roll of cloth as it is being wound onto the first cylinder *b*, as shown in Fig. 3. The cylinders are provided on their journals with grooved disks *b*³, with which engage brake-levers *b*⁴, which are pivoted to the frame *a*, and are adapted to be pressed with any desired degree of force against the disks *b*³ by screws *b*⁵, so as to offer sufficient resistance to the rotation of the cylinders *b* to cause the cloth to be tightly wound on each cylinder. The steam-pipes *b*² are detachable from the journals *b*¹ of the cylinders *b*, said journals being provided with angular slots 1 1, and the pipes *b*² with studs 2 2, the two constituting a bayonet-joint. The ends of the pipes *b*² to which the studs are attached are of metal, and are provided with packing-rings 3 of suitable elastic material, and with elastic shoulders 4, which are arranged to be compressed against the ends of the journals *b*¹ when the pipes *b*² are connected therewith. The shoulders 4 are preferably the ends of rubber tubes which compose the main portions of the pipes *b*², and are suitably attached to the metallic ends having the studs 2 to form said shoulders 4.

In carrying out my improved process for finishing cloth, which includes both steaming and shrinking and pressing and cooling, I employ, in addition to the steaming apparatus already described, a series of stationary smoothing-bars, *f f f f*, having smoothly-polished surfaces, and a winding-roller, *g*, which has a metal surface and is used in a cold condition. The bars *f* and roller *g* are located in the same general frame-work that supports the cylinders *b*, and are parallel with the latter, the smoothing-bars being located between the cylinders *b* and the winding-roller *g*. The cloth is taken from the second cylinder *b* while in its highly-heated condition and, full of dry steam, passed over the bars *f* in such direction as to smooth its nap, and wound upon the roller *g*, where it is allowed to remain for about an hour, or until cold. The roller *g* is provided with a brake or brakes, *b*⁴, similar to those of the cylinders *b*, and with a crank, *k*, or other means of rotation. The brake *b*⁴, in connection with the brake on the second cylinder *b*, insures the passage of the

cloth over the bars *f* under as great a degree of tension as may be desired to insure perfect smoothness.

This method of finishing cloth—viz., thoroughly and uniformly steaming the cloth throughout its entire length, passing it while hot under tension over the stationary smoothing-bars, and winding it onto the cold winding-roller, and allowing it to remain until cold—I have found to produce a finish that is far superior to any produced by any other method of which I am aware. It gives the cloth a solid firm finish, with a uniform luster throughout the piece, both ends alike, an even shade, and leaves a luster that I have found to be unaffected by the tailor's hot iron and damp cloth. The cloth, being carried through the entire process in single thickness—that is, without being folded—is free from creases, and, after removal from the winding-roller *g*, is ready for being cut up into garments, no further shrinking or finishing being necessary. By this process I do away with all complicated and inconvenient pressing mechanism, such as hydraulic and other presses, hot-plates, press-papers, &c., and obviate the necessity of a second pressing for changing or removing creases. I have found that the finish put upon cloth is not due to enormous pressure, but to the uniform and regular application of heat to all parts of the cloth, together with a moderate degree of pressure. This I accomplish perfectly in the manner above described.

The smoothing-bars *f* are rigidly attached to two end plates, *f'*, which are pivoted to standards *s* rising from the frame *a*. The bars *f* and end plates *f'* constitute a frame, *F*, that is adapted to be turned on its pivots so as to cause the cloth passing over the bars to take a more or less tortuous course, and thus increase or diminish the friction on the cloth. The frame *F* is adapted to be secured at any desired point, so that it will not turn by means of a pin, *u*, which passes through corresponding holes *v* in the plates *f'* and standards *s*.

k represents a pressure-roll that is located over the winding-roller *g*, and is adapted to rise and fall in slotted guides *k'* attached to the frame *a*. This roll assists in pressing the cloth as it is wound upon the roller *g*, resting upon the cloth, and rising as the latter accumulates on the roller *g*.

The winding-roller *g* is located preferably on an extension, *a*¹, of the frame *a*, that is adapted to be moved in and out, so as to extend the frame *a*, as shown in Fig. 3, or shorten it, as shown in Fig. 1. The extension *a*¹ is provided with bearings *l*, for three or any desired number of winding-rollers *g*, and when drawn out is adapted to hold the number of rollers for which it was designed. The extension is supported at its outer end by rollers *m*, and is moved out and in by a screw-shaft, *n*, which is journaled in the extension *a*¹, and passes through a nut, *o*, rigidly attached to the frame *a*, and is provided on its outer end

with a hand-wheel, *p*. I prefer, in carrying out the processes herein described, to wind about ten pieces of cloth on each roller *g*. After one roller is filled it is covered with sheeting, and the extension *a*¹ is drawn out far enough to enable another roller, *g*, to be put in under the pressure-roll *k*, and so on until the extension is full of rollers. By the time the last roller is filled the cloth on the first will be in condition to be removed, which is accomplished by unwinding it onto the cutting-table or otherwise, as desired. When the extension *a*¹ is moved out the pressure-roll *k* descends gradually until it is supported by the lower ends of its slotted guides, in which position its lower surface is about on a level with the upper surface of the roll *g*. The extension *a*¹ is provided with brakes for each of the rollers *g* that it is adapted to receive, as shown in Fig. 1.

The rollers *g* are preferably provided with clamps *r r*, for securing the end of a piece of cloth, as shown in Fig. 8. These clamps are composed of levers pivoted in slots or recesses *s* in the rollers *g*, and arranged to cooperate with the ends of said recesses in gripping the end of a piece of cloth. The outer ends of the clamps *r* are supported by springs *r*¹.

I claim as my invention—

1. The process of finishing cloth, consisting in first steaming the entire roll by steam passed radially through the roll, then subjecting the cloth, while hot and under tension, to the action of smoothing-bars to smooth the nap, winding, and then cooling the same while in the form of a roll, as specified.

2. The combination of the series of smoothing-bars *ffff*, the steaming-cylinders *b*, and cooling-rollers *g*, as set forth.

3. The cylinder *b*, perforated throughout its whole extent, provided with inclined partitions extending from opposite ends, and with outlets receiving the water at the lower ends of the partitions, as specified.

4. A perforated cylinder, *b*, for steaming cloth, provided on its interior with tubes or guards *t*, to prevent the escape of water through the perforations, and with outlets *t*¹ communicating with the outlets *d*, as set forth.

5. In combination with the frame *a* and locking devices, as described, the smoothing-frame *F*, composed of the bars *f* and plates *f*¹, journaled in suitable standards, substantially as set forth.

6. The combination, with the main frame, its steaming and smoothing appliances, of a vertically-sliding roller, *k*, and an adjustable frame, *a*¹, having bearings for a series of detachable rollers, as set forth.

7. The combination of the stationary frame *a*, the sliding frame *a*¹, having rollers *m*, and the screw-shaft *n*, all arranged and operating substantially as described.

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

HERBERT HEBDON.

Witnesses:

C. F. BROWN,
E. B. FAIRCHILD.