J. MEADE.

COATING APPARATUS.

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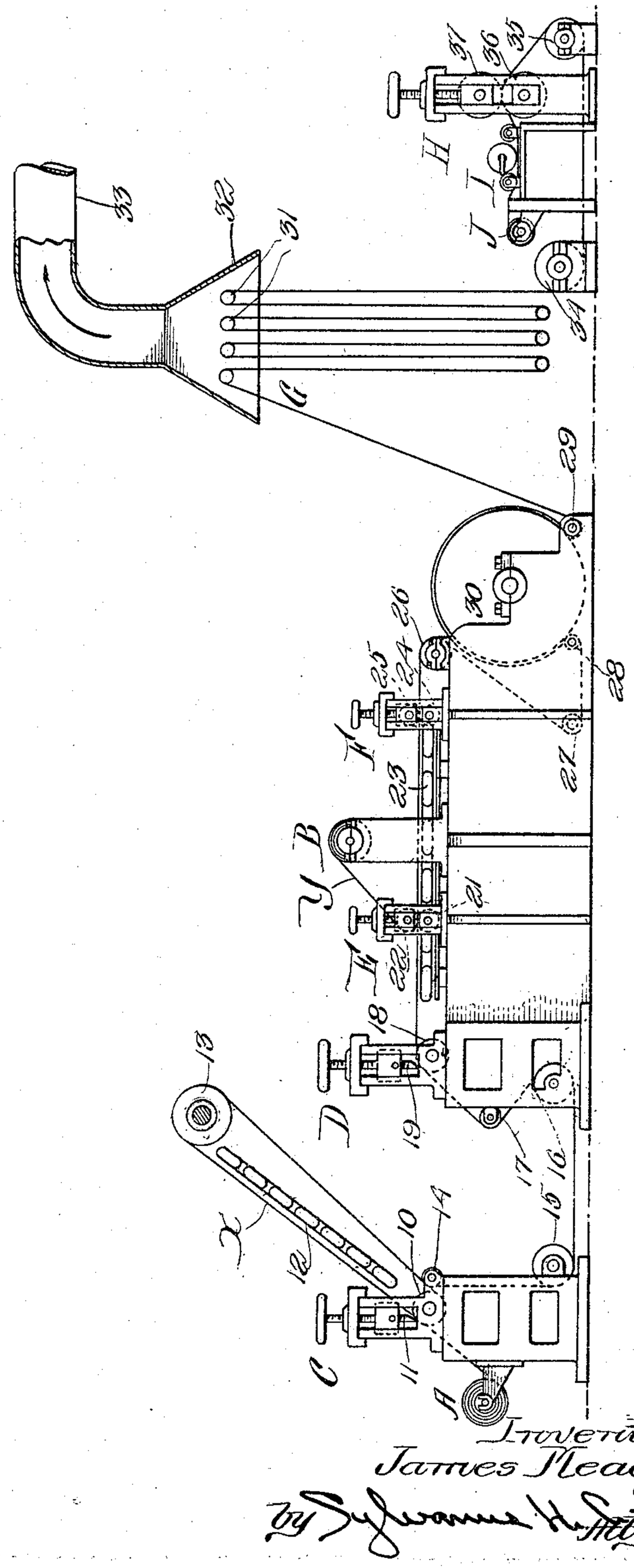
Patented Sept. 28, 1915.



Witnesses:
John A. Martin.
James E. Lynch.

Inventor:
James Meade
by Sylvanus H. Kelly.

UNITED STATES PATENT OFFICE.

JAMES MEADE, OF STOUGHTON, MASSACHUSETTS.

COATING APPARATUS.

1,154,874. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed February 21, 1911. Serial No. 610,022.

To all whom it may concern:

Be it known that I, JAMES MEADE, a citizen of the United States, residing at Stoughton, in the county of Norfolk and State of Massachusetts, have invented new and useful Improvements in Coating Apparatus, of which the following is a specification.

In the coating of fabrics with waterproof substances, as ordinarily carried on, and particularly when there is included the step of doubling the goods to give a coating of the waterproof substance between outer layers of fabric, it is necessary to employ a number of distinct machines, each performing one of a series of operations. Between these the goods are repeatedly rolled and handled, often with resulting injury and always causing their production to be relatively inefficient and costly. In accordance with my invention, a unitary apparatus is provided in which the fabric may be advanced without interruption from its initial supply to the final operation, each element being adapted to perform its functions most efficiently, especially through its relations with coöperating elements.

The accompanying drawing illustrates an embodiment of my invention, the elements which are familiar or non-essential not being shown in detail.

As the apparatus is particularly useful in the manufacture of the double-faced goods previously mentioned, two sources of fabric, A and B, are illustrated. The former is rotatably mounted at one extremity of the apparatus, and from it the fabric X is shown passing upwardly over the bed-roll 10 of a spreader C and beneath its vertically adjustable gage-knife or spreading member 11. The latter is so adjusted as to apply to the fabric a comparatively light coating of a suitable waterproof substance which is placed in a plastic condition upon the fabric over the bed-roll and against the knife. The fabric thus coated then travels on over drying means, conveniently a series of steam coils 12 arranged in an upwardly inclined plane about a roll 13 driven at the proper speed to advance the goods, and then is directed along a path of some length by idle rolls 14, 17, and driven rolls 15, 16 to the bed-roll 18 and knife 19 of a second spreader D. By the time this element is reached, the solvent in the initial coating has sufficiently evaporated. This coating, on account of its light character, so fills the surface of the fabric, without passing through to the other side, that said fabric is in condition to safely receive a comparatively heavy coating, applied at the spreader D and provided for by the proper adjustment of the gage-knife. At this stage the second layer of fabric Y comes from the source of supply B, and is directed into coöperation with the now multiply coated fabric X. This may be effected by the means which first presses the layers together. As illustrated, this consists of a doubling device E having a lower roll 21 upon which the fabric X rests and a vertical adjustable upper roll 22 about and under which the fabric Y runs. The doubler rolls 21 and 22 are of small diameter, and are adapted to exert upon the goods a comparatively light pressure, which effectually smears and distributes the waterproof substance over the opposed faces of fabric without danger of forcing it through and defacing the outer surfaces. As the goods with the second coating leave the spreader D and proceed toward and through the doubler E, they are partially dried by some such means as steam coils 23 situated below their horizontal run, and are in better condition to receive the pressure of a second doubling device F, the light rolls 24 and 25 which may be in all respects similar to and act in the same manner as those of doubler E. By them the distribution of the coating is completed, and the bringing together of the layers of fabric carried as far as is possible without endangering the exposed surfaces.

After traversing the roll 26 which guides the goods through the light doubling devices, they are directed by idlers 27, 28 and 29 over the periphery of a driven heating drum 30, contacting with a considerable portion thereof to attain the necessary evaporation of the solvent in the coating. A further drying effect is given by the action of the succeeding element G, which, as illustrated, is often termed a "festooner." Over a horizontal series of small rolls or other supports 31, the goods travel from the idler 29, falling therefrom in long parallel folds. Above the supports is a hood 32 connected with a conduit 33, through which an upward current of air is maintained by any suitable exhaust means.

Upon leaving the festooner, the coating substance has been reduced to a condition in which the layers of fabric may be safely brought into intimate contact. They are,

therefore, directed by rolls 34, 35 to a doubling device H, provided with a large fixed roll 36 and a corresponding adjustable roll 37, by which a heavy pressure may be applied to the goods to uniformly and smoothly join the layers. Thus completed, they pass through a measuring device I of any convenient design and are finally delivered to the receiving core or spindle J, about which the finished goods are wound for removal and shipment. This winding spindle and the doubler-rolls 36 and 37 produce a tension upon the web of goods which draws it from the festooner.

In describing the passage of the goods through the festooner, only its drying effect was mentioned. It performs, however, an additional function of great importance. Once having started the fabric under the spreading knives, it is necessary that its movement shall continue without interruption, or, if it must be stopped, that the supply of coating substance be removed, otherwise the fabric will be so saturated that the coating will appear at the outer face and injure the goods. To thus remove the coating substance is troublesome and wasteful of time. On the other hand, it is impossible to avoid frequently stopping the doubler H. After the passage of, say, fifty yards of the goods, the receiving roll must be removed and a fresh core substituted, and it is also sometimes requisite that this doubling device be carefully adjusted. Furthermore, differences in tension of the fabric naturally occur in such a long run, operating over many independently rotatable elements. The slack held loosely over the supports 31 permits a considerable difference in the rate of travel of portions of the goods upon opposite sides of the festooner. Consequently, if one is accelerated, retarded or stopped, no evil effects will be produced upon the other, the fold rising or falling to compensate for the variations.

Considering the apparatus as a whole, it will be obvious that the entire coating and doubling processes are performed without handling the goods, that little attendance is required, and that the waterproof substance may be applied evenly and the layers firmly and uniformly combined without staining.

I claim and desire to secure by Letters Patent—

1. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means for applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating-applying means with respect to the fabric, a second source of fabric-supply, and means for pressing the fabric from the second source against the multiply coated surface of the fabric from the first-named source.

2. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means of applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating-applying means with respect to the fabric, a second source of fabric supply, a plurality of independent means for pressing the fabric from the second source against the multiply coated surface of the fabric from the first-named source, and means for adjusting the pressure of each of said pressure means.

3. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means for applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating applying means with respect to the fabric, a second source of fabric-supply, a plurality of independent means for pressing the fabric from the second source against the multiply coated surface of the fabric from the first-named source, means for adjusting the pressure of each of said pressure means, and heating means acting upon the doubled fabric between the pressure means.

4. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means for applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating-applying means with respect to the fabric, a second source of fabric-supply, a plurality of independent means for pressing the fabric from the second source against the multiply coated surface of the fabric

from the first-named source, means for adjusting the pressure of each of said pressure means, and combined heating and tension-compensating means acting upon the doubled fabric between the pressure means.

5. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means for applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating-applying means with respect to the fabric, a second source of fabric-supply, and successive pairs of light and heavy doubler-rolls operating to press the fabric from the second source against the multiply coated fabric from the first-named source.

6. In an apparatus for making doubled waterproof fabric, the combination with a source of fabric-supply, of means for applying a coating to one face of the fabric, means for adjusting the distance of the applying means toward and from the fabric to vary the thickness of the coating, heating means acting upon the fabric after the coöperation of the applying means therewith, a second coating-applying means for coöperation with the previously coated surface of the fabric, means for adjusting the last-named coating-applying means with respect to the fabric, a second source of fabric-supply, a plurality of pairs of light doubler-rolls operating to press the fabric from the second source of supply against the multiply coated fabric from the first-named source, means for heating the doubled fabric, and a pair of heavy pressure rolls thereafter acting upon the doubled fabric.

7. A coating apparatus comprising a material-supply-roll, a spreader to which the supply-roll delivers, a second spreader, means for guiding material from the first spreader to the second, a second material-supply-roll, a pair of small doubler-rolls receiving the material from the spreaders and second supply-roll, a pair of large doubler-rolls thereafter acting upon the material, and a drum presenting an extended heating surface to the material between the small and large doubler-rolls.

8. A coating apparatus comprising a material-supply-roll, a spreader to which the supply roll delivers, a second spreader, means for guiding material from the first spreader to the second, a second material-supply-roll, pairs of small doubler-rolls receiving the material from the spreaders and second supply-roll, a pair of large doubler-rolls thereafter acting upon the material, heating coils over which the material passes between the small doubler-rolls, and a heating drum coöperating with the material between the small and large doubler-rolls.

9. In an apparatus for coating material, means for applying the coating to the material, tension means for acting upon the coated material, said coating and tension means advancing the material at varying rates of speed, and means for supporting the material in folds between the applying means and tension means whereby the variations in the travel of the material are compensated for.

10. A doubling apparatus comprising successive pressure means, means for moving the doubled material from one pressure means to another, means for supporting the material in loose folds or festoons between the pressure means, and means for passing an air-current over said folds or festoons.

11. The combination with material-coating means, of means for winding the coated material, separated supports over which the material travels in festoons between the coating and winding means, and a suction-conduit adjacent to the supports and acting upon the festooned material.

12. The combination with sources from which fabric is drawn, of means for applying plural coatings to the fabric from one source, plural means for pressing the fabric from another source against the multiply coated surface, means for advancing the fabric, and means for supporting the material in loose folds between the pressure means.

13. A doubling apparatus comprising successive pressure means, means for moving the doubled material from one pressure means to another, means for supporting the material in successive parallel folds between the pressure means, and means extending above all the folds for passing an air-current over said folds.

Signed at Stoughton, in the county of Norfolk and State of Massachusetts, this 16th day of February, 1911.

JAMES MEADE.

Witnesses:
PATRICK H. MAHONEY,
SADIE H. COLCORD.