J. P. DEVINE.

APPARATUS FOR COATING FABRICS.

APPLICATION FILED MAR. 2, 1914.

1,164,174.

Patented Dec. 14, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

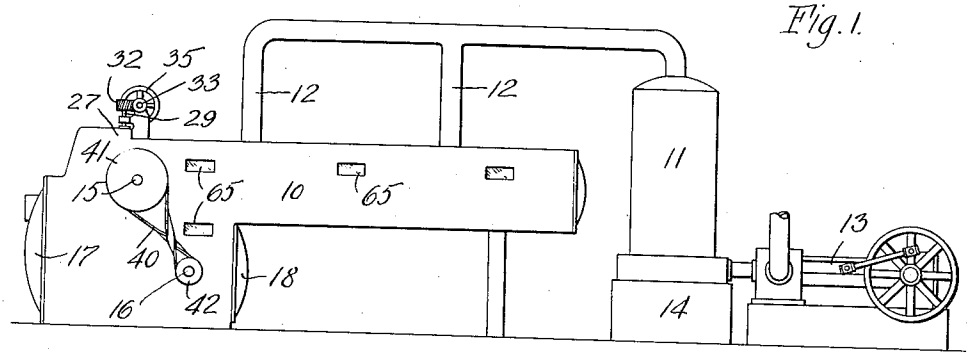


Fig. 2.

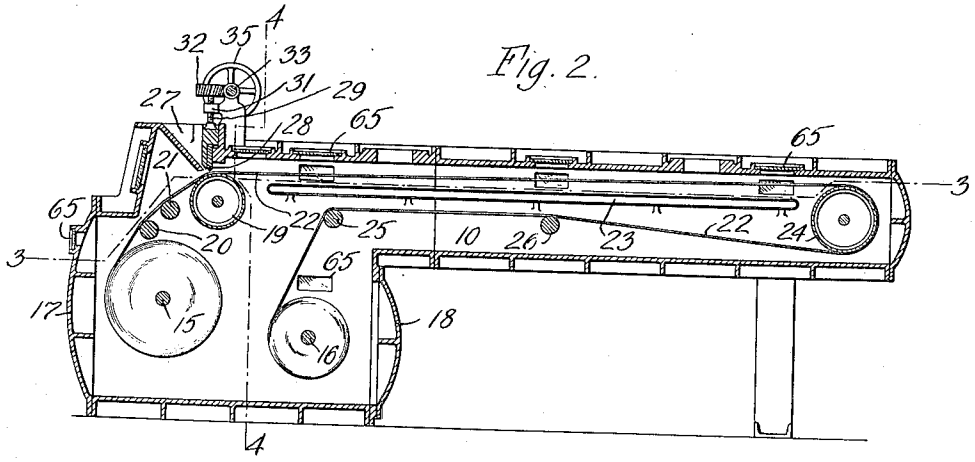
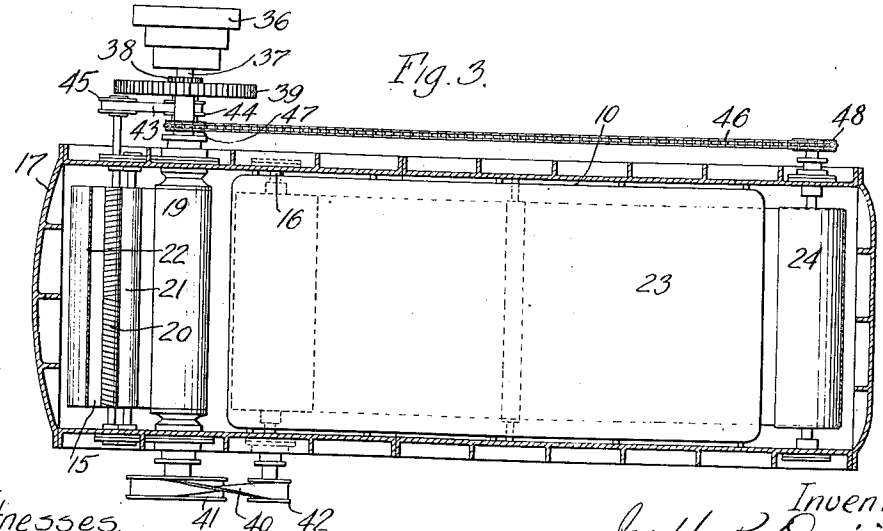


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

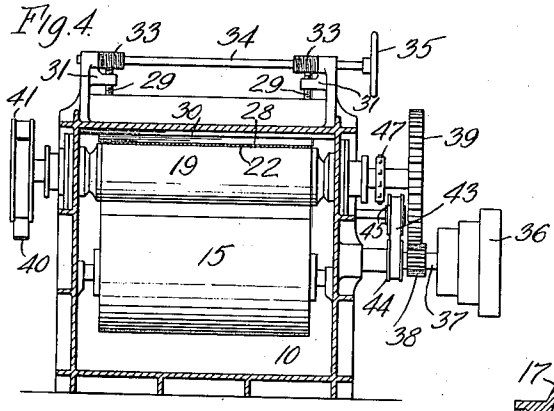


Fig. 5.

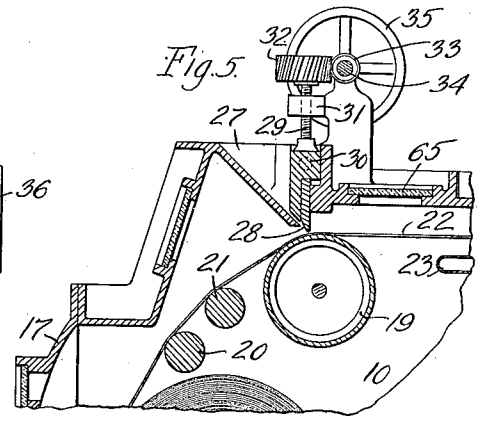


Fig. 6.

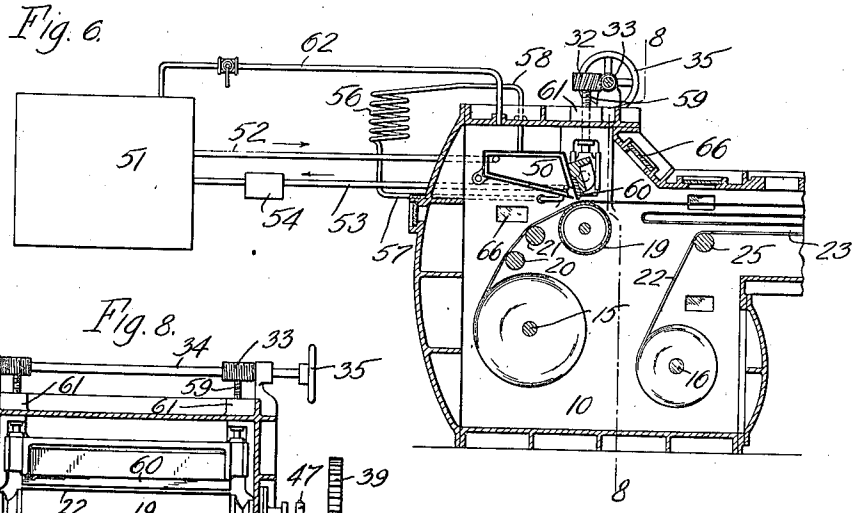


Fig. 8.

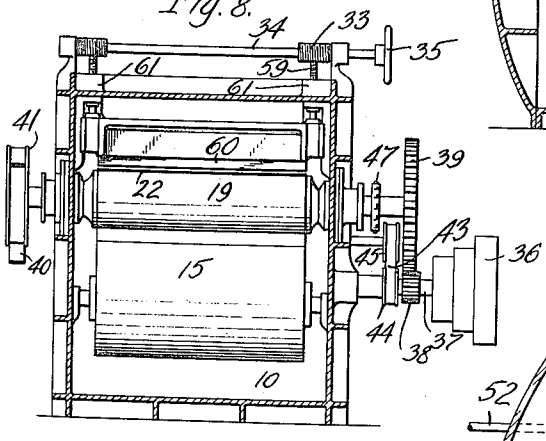
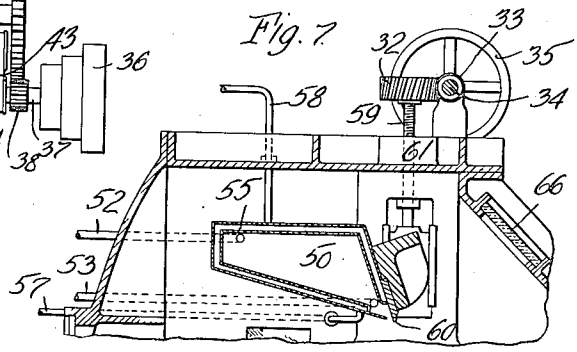


Fig. 7.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COATING FABRICS.

1,164,174. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed March 2, 1914. Serial No. 822,093.

To all whom it may concern:

Be it known that I, JOSEPH P. DEVINE, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Apparatus for Coating Fabrics, of which the following is a specification.

This invention relates to apparatus for coating or impregnating fabric with a liquid or semi-liquid material which contains a volatile solvent, an operation which is often called frictioning. This class of apparatus comprises usually means for applying the coating material, a chamber for drying the same, and means for recovering by condensation the volatile solvent which is driven off.

The object of this invention is to construct the apparatus in such manner that the operations of drying the coated fabric and recovering the volatile solvent are conducted in a closed chamber under a partial vacuum, thereby conducting these operations in a very efficient and economical manner.

In the accompanying drawings: Figure 1 is a diagrammatic elevation of the complete apparatus. Fig. 2 is a longitudinal sectional elevation of the drying chamber, on an enlarged scale. Fig. 3 is a horizontal section on line 3—3, Fig. 2. Fig. 4 is a transverse section on line 4—4, Fig. 2. Fig. 5 is a fragmentary elevation of the front portion of the apparatus, on an enlarged scale. Fig. 6 is a fragmentary longitudinal section of the front portion of a modified apparatus. Fig. 7 is a similar view, on an enlarged scale. Fig. 8 is a transverse section on line 8—8, Fig. 6.

Referring to Figs. 1–5, 10 represents the vacuum drying chamber, 11 a condenser, 12 pipes leading from the top of the drying chamber to the condenser, 13 an air pump, and 14 a receptacle for the condensed solvent. The condenser and pump may be of any suitable construction and arrangement.

The front portion of the vacuum drying chamber is provided with an enlarged base portion which contains a delivery shaft or drum 15 for the fabric to be coated, and a receiving shaft or drum 16 for the coated fabric. This base portion is provided with a removable front plate 17 for introducing the roll of fabric to be coated and with a removable rear plate 18 for removing the roll of coated fabric.

The front portion of the drying chamber is further provided with a roller or drum 19 over which the fabric to be coated passes as it is unwound from the shaft 15, and with intermediate smaller rollers 20, 21, over which the fabric passes between the delivery shaft 15 and the drum 19. From the latter the web 22 of fabric passes rearwardly through the drying chamber over a heating table 23 or other suitable heating apparatus, then downwardly around a drum 24 arranged in the rear portion of the chamber, and then forwardly underneath the heating apparatus to the receiving shaft 16. Supporting rollers 25, 26, are preferably arranged in the chamber between the rear drum 24 and the receiving shaft 16 for supporting and guiding the coated fabric.

The front portion of the chamber is provided with a feed hopper or receptacle 27 for the coating material. This hopper is open at the top to the atmosphere and has its narrow discharge opening or throat arranged over the fabric, preferably directly over the front drum 19. The discharge of the coating material from the feed hopper and the spreading of the material over the fabric are controlled by any suitable means, for instance, as shown, by a knife or scraper 28 which is arranged in the throat of the hopper and which is vertically adjustable by means of upright screw rods 29 having swiveling connections at their lower ends with the knife head 30 and working in screw-threaded lugs 31 on the chamber. These rods carry at their upper ends gear wheels 32 which are engaged by pinions 33 on a horizontal shaft 34 provided with a hand wheel 35 for rotating the adjusting shaft, thereby raising or lowering the knife or scraper.

The several drums or rollers may be driven in any suitable manner, for instance, as shown, the power may be applied to a cone pulley 36 on a shaft 37 and transmitted from this driving shaft by a pinion 38 to a gear wheel 39 on the front roller 19 and from the shaft of the latter by a crossed belt 40 and pulleys 41, 42, to the receiving

shaft 16. The intermediate roller 20 is driven from the shaft 37 by a chain or belt 43 and pulleys 44, 45, and the rear drum 24 is driven from the shaft 19 by a chain or belt 46 and pulleys 47, 48. A suitable brake is preferably applied to the delivery shaft 15.

In the operation of the apparatus the coating material flows from the feed hopper upon the web of fabric and is spread over the same as it passes underneath the knife or scraper. As the feed hopper is open to atmospheric pressure a coating material which does not flow readily can be delivered from the hopper upon the web of fabric without difficulty. The coating material is dried as the coated fabric passes through the drying chamber and the vapors of volatile solvent generated in this drying operation are drawn off by the pump and recovered in the condenser. As this operation is carried on in a vacuum the solvent is evaporated at a comparatively low temperature and the operation of drying is effected quickly and thoroughly and the escape of vaporized solvent is prevented.

In the modified construction of the apparatus represented in Figs. 6, 7 and 8, the feed receptacle 50 for the coating material is arranged within the drying chamber and is not exposed to atmospheric pressure. The liquid coating material is circulated through this feed hopper from a reservoir 51 by a flow pipe 52 and a return pipe 53 in which a pump 54 of any suitable kind is arranged. The feed hopper is preferably provided with a water jacket 55 through which water is circulated by means of a cooler 56 and flow and return pipes 57, 58. The upright adjusting screws 59 of the knife or scraper 60 pass through stuffing boxes 61 in the top plate of the drying chamber. The reservoir 51 is placed in communication with the vacuum drying chamber by a pipe 62.

Either form of the apparatus is provided with suitable observation glasses 65, Figs. 1, 2 and 5, and 66, Figs. 6 and 7.

I claim as my invention:

1. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of means to create and to maintain a partial vacuum in said chamber, a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, and means for moving said web in the vacuum chamber past said aperture.

2. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of means to create and to maintain a partial vacuum in said chamber, a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, means for moving said web in the vacuum chamber past said aperture, and a spreader arranged in rear of said aperture.

3. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, means for moving said web in the vacuum chamber past said aperture, means for removing the vapor from said chamber and creating a partial vacuum therein, and means for condensing the vapors which are removed from said chamber.

4. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, means for moving said web in the vacuum chamber past said aperture, a pump and connections for removing the vapor from said chamber and creating a partial vacuum therein, and a condenser connected to said connections for condensing the vapors which are removed from said chamber.

5. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of means to create and maintain a partial vacuum in said chamber, a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, means for moving said web in the vacuum chamber past said aperture, a scraper arranged in rear of said aperture, and means for adjusting said scraper toward and from the fabric.

6. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of means to create and maintain a partial vacuum in said chamber, a feed receptacle for the coating material, which receptacle is exposed to atmospheric pressure and has its discharge aperture communicating with said vacuum chamber and means for moving the web in the vacuum chamber past said aperture.

7. In an apparatus for coating a web of fabric, the combination with a vacuum drying chamber, of means to create and maintain a partial vacuum in said chamber, a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, a spreader arranged in rear of said aperture, and a drum over which said web passes and which is arranged underneath said receptacle and spreader.

8. In an apparatus for coating a web of fabric, the combination with a vacuum dry-

ing chamber, of a feed receptacle for the coating material having its discharge aperture arranged in said chamber to deliver the coating material upon said web, delivery and receiving shafts for said web arranged in the front portion of said chamber, a heater over which the web passes rearwardly from said delivery shaft, and a roller arranged in rear of said heater around which said web passes downwardly and then underneath said heater to said receiving shaft.

Witness my hand in the presence of two subscribing witnesses.

JOSEPH P. DEVINE.

Witnesses:
W. STROHN,
W. SUSEMIHL.