

Oct. 20, 1925.

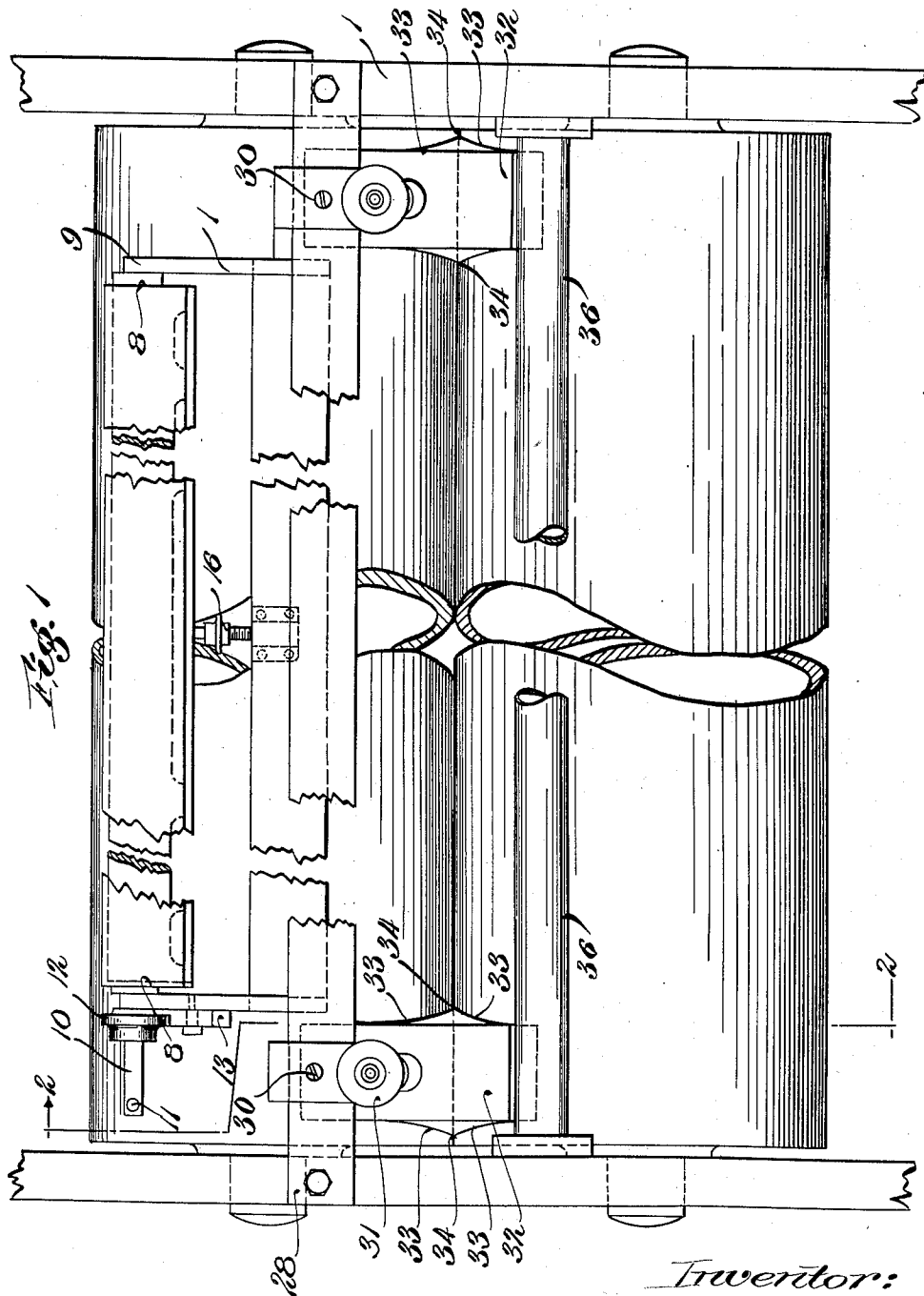
L. S. NEWELL

1,558,271

PROCESS AND MECHANISM FOR IMPREGNATING FIBROUS MATERIAL

Filed May 2, 1924

2 Sheets-Sheet 1



Inventor:
Luther S. Newell,
by Robert, Robert & Cushman,
attys.

Oct. 20, 1925.

L. S. NEWELL

1,558,271

PROCESS AND MECHANISM FOR IMPREGNATING FIBROUS MATERIAL

Filed May 2, 1924

2 Sheets-Sheet 2

Fig. 4

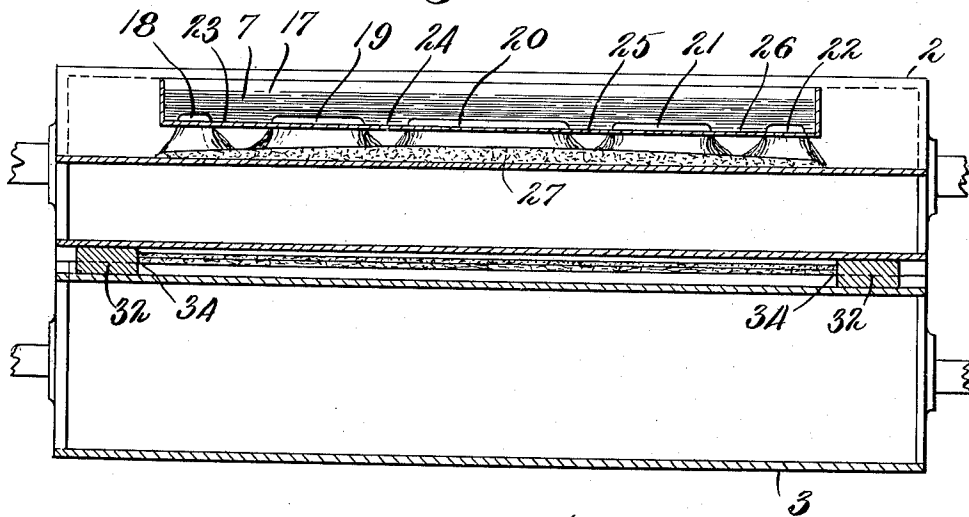


Fig. 2

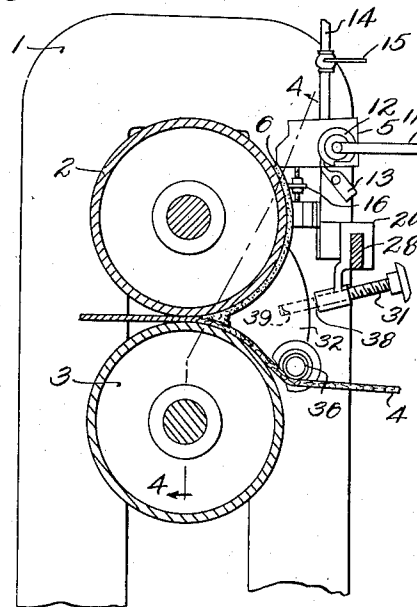
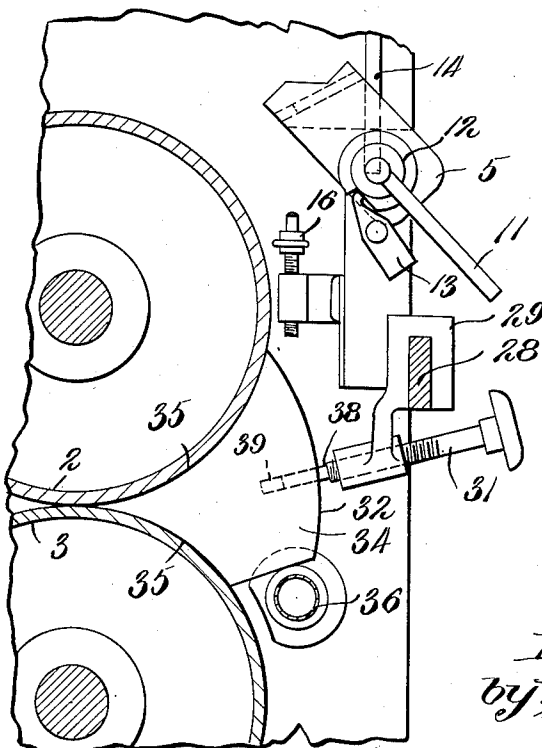


Fig. 3



Inventor:
Luther S. Newell,
by Roberts, Roberts & Cushman,
Attys.

UNITED STATES PATENT OFFICE.

LUTHER S. NEWELL, OF CRANSTON, RHODE ISLAND, ASSIGNOR TO RESPRO INC., OF CRANSTON, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

PROCESS AND MECHANISM FOR IMPREGNATING FIBROUS MATERIAL.

Application filed May 2, 1924. Serial No. 710,698.

To all whom it may concern:

Be it known that I, LUTHER S. NEWELL, a citizen of the United States of America, and resident of Cranston, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Processes and Mechanism for Impregnating Fibrous Material, of which the following is a specification.

10 This invention relates to impregnation of felted or fabric strips of material and has particular reference to an improved method or process of impregnating and to a machine for carrying out said process.

15 Previous to the present invention impregnated strips of fabric, felted fibrous materials or the like have been produced by application thereto of a viscous fluid such as a rubber solution. If the solution be thin enough to flow freely, the material will be impregnated chiefly with the solvent, so that when dry there will be but little rubber incorporated therewith. If a thick pasty rubber solution be employed, it is difficult to secure even distribution of the fluid without excessive wastage, due to the fact that such solutions are highly cohesive and tend to form a skin or film tension surface holding the masses together, retarding spreading, and causing them to flow quite sluggishly.

20 The chief objects of the present invention are to obviate the difficulties previously experienced; to provide all portions of the material with an adequate initial supply of the fluid, to obtain proper distribution of the impregnating fluid over the surface of the material, to insure even impregnation, to eliminate waste and utilize the fluid flowing out toward the edges, and to facilitate the control of the application of the fluid and the discontinuance of flow thereof.

25 In the attainment of these objects the invention in its broad aspect comprises a novel method or process of preparing impregnated fabric or fibrous material characterized by applying to the material a supply of impregnating fluid in unequal amounts transversely thereof, an excess being preferably supplied to the central portion of the strip and diminishingly graded amounts of the fluid being supplied to the lateral portions of the strip. Further steps in the process include spreading the applied fluid into a substantially even layer on the material, and

the application of pressure either during or immediately subsequent to the spreading step to force a uniform quantity of the fluid into the material while reserving for reutilization any excess over the quantity required to coat the fibers of the material.

30 In a more specific aspect, the invention includes a machine for carrying out the process, said machine having a suitable fluid-supply, such as a trough with a plurality of discharge apertures laterally decreasing in either size or number, means for supplying fluid to the trough and for moving the trough into and out of discharging position, and cooperating pressure rolls between which the coated material passes. One of these rolls serves to feed the fluid to the material; the bite of the rolls spreading out the fluid and forcing it into the material. Laterally adjustable guide members cooperate with the rolls to prevent undue lateral spreading of the fluid, these members being formed to direct inwardly for reutilization any excess fluid which flows laterally on the rolls toward or beyond the edges of the material during the spreading operation.

35 To facilitate an understanding of the invention, one embodiment of the machine for carrying out the improved process is illustrated in the accompanying drawings, in which:—

Fig. 1 is a front view of the essential portions of the machine with middle portions broken out;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a similar section with the trough tipped into non-discharging position; and

Fig. 4 is a section on the line 4—4 of Fig. 2.

40 The machine includes a frame 1 supporting a pair of suitably driven pressure rolls 2 and 3 between which the fabric or strip of material 4 is fed to be impregnated. This material may be either a loose felted material such as cotton batting or a suitably woven or otherwise produced fabric and is fed from a suitable source of supply (not shown). The frame also supports a trough member 5 having a discharge portion or spout 6 directing the viscous fluid 7 onto the top saturator roll 2. The fluid spreads over the roll to the extent of its natural flowing tendency, and is carried down onto the material.

The pressure of the rolls against the combined material and coating spreads the coating into a uniform layer and forces it into the material 4 as the coated material passes through the rolls, impregnating all the strands or fibers of the material and binding or matting it together under pressure.

As a result of the impregnation and pressure the thickness of the emergent material if of loosely felted form is less than its thickness before treatment. Each individual fiber has a gummy coating, the mass being flattened together but the spring of the fibers separating them slightly. The resultant product is aerated to produce evaporation of the solvent. The coating is formed around the individual fibers rather than around or upon masses of fibers; the material may be subsequently compressively treated to consolidate the individually impregnated fibers.

The trough 5 includes end wall portions 8 having trunnions 9, 10 journaled in the frame 1, one of the trunnions having the handle 11 by which the trough may be rocked upward into non-discharging position as shown in Fig. 3, the trunnion in addition having a latch 12 for engagement by the weighted pawl 13 on the frame to automatically lock the trough in raised position as it is swung upward.

A feed pipe 14 delivers the viscous fluid into the trough, the fluid spreading out in the trough and issuing along the side 6. Tipping up the trough stops discharge of the fluid and forms a pool lengthwise of the trough ready to properly resume the impregnating operation. Pipe 14 has a control valve 15 either independently operated to regulate the discharge of the fluid or connected with the trough or its handle 11 for automatic operation to shut off the flow when the trough is tipped upward.

An adjustable stop screw 16 carried by the frame 1 engages the trough to limit its downward swinging movement.

One of the essential features of the present invention is the regulation of the quantity of fluid initially supplied to different portions transversely of the material to be impregnated. In the specific manner of accomplishment of this result illustrated, the trough is supplied with a retardant dam or gate member 17 having discharge openings 18, 19, 20, 21 and 22 separated by partitions 23, 24, 25 and 26. As shown in Fig. 4, the central aperture 20 is of greatest width and the size of the other discharge apertures progressively diminishes outwardly while the width of the partitions progressively increases outwardly. As a result, a greater amount of fluid is discharged at 20 than at 19 or 21 and a greater amount at these points than at 18 and 22, the fluid from the several discharge apertures spreading out on the

carrying roll to substantially the configuration indicated in section at 27, being thick in the middle and tapering or diminishing toward the edges.

The saturator or pressure roll 2 in cooperation with the roll 3 applies substantially uniform transverse pressure to the material 4 and fluid layer 27, evening out the fluid and forcing it into the material. The frame has a transverse bar 28 supporting brackets 29 secured in adjusted position by the screws 30. These brackets carry the adjusting screws 31 having reduced ends 38 loosely engaged in sockets 39 of the end dams 32. These dam members 32 have concave edge faces 35 to fit rolls 2 and 3, being forced into tight engagement with the rolls by the screw 31. The dams are adjusted just outside the edges of the material and prevent lateral spread of the fluid and keep the end portions of the rollers clean and free of the fluid, forcing it inward for reutilization. The guide roller 36 for the material also forms a support for the dam members.

I claim:

1. The process of impregnating material characterized by applying a viscous fluid to the entire width of the material in quantity gradually diminishing from center to edge, and applying pressure to the coated strip in a manner to force a transversely uniform amount of the fluid thereinto.

2. The process of impregnating material characterized by applying a viscous fluid to the material in quantity diminishing transversely from center toward the sides, and applying uniform transverse pressure to the fluid and material to spread the fluid and subsequently force it into the material.

3. The process of impregnating material characterized by applying a viscous fluid to the material in quantity diminishing transversely from center toward edge, laterally spreading the fluid, and turning back onto the material fluid forced beyond the edges thereof in spreading.

4. The process of impregnating material characterized by longitudinally moving the material, applying to the material during movement a viscous fluid transversely covering the material with a non-uniform layer diminishing in quantity from the center to the edges and applying pressure to initially uniformly distribute the fluid and subsequently force it into the material.

5. A machine for impregnation comprising pressure rolls and means for applying impregnating material to one of the rolls in quantity gradually diminishing from center toward ends of the roll.

6. An impregnating machine including a material engaging roll, a trough pivoted adjacent the roll having a spout portion adapted to discharge onto the roll and a dam member for the spout having discharge

portions diminishing in capacity from the center toward ends of the trough.

7. An impregnating machine including a material engaging roll, a trough pivoted adjacent the roll having a spout portion adapted to discharge onto the roll, a dam for the spout having discharge portions diminishing in capacity from the center toward ends of the trough, and means for swinging the trough into and out of operative relation to the roll.

8. A machine for impregnating material including pressure mechanism, means for supplying impregnating fluid to material to be impregnated prior to the engagement of such material by the pressure mechanism, said supply means having portions for discharging a greater quantity of material at the center than at the ends thereof, and means adjacent the pressure mechanism for inwardly returning excess impregnating fluid laterally displaced by the pressure mechanism.

9. An impregnation machine including a fluid discharge trough, trunnions laterally projecting from the trough, a frame member on the machine having portions in which the trunnions are journaled, a handle on the trough for tilting the same, a latch member adjacent the handle, and a weighted pawl on the frame adapted to automatically en-

gage the latch member to lock the trough in one tilted position.

10. An impregnation machine including a frame, a fluid discharge trough, laterally projecting trunnions on the trough journaled in the frame, a handle on the trough for tilting the same, a latch member adjacent the handle, means on the frame for engagement with the latch to lock the trough in one tilted position, and an adjustable stop on the frame for limiting tilting movement of the trough in the opposite direction.

11. An impregnation machine including a frame, a fluid discharge trough, laterally projecting trunnions on the trough journaled in the frame, a handle on the trough for tilting the same, a latch member adjacent the handle, means on the frame for engagement with the latch, an adjustable stop on the frame for limiting tilting movement of the trough when the latch is disengaged, said trough having a discharge portion brought into operative position as the trough engages the stop, and a discharge member on the trough having discharge apertures laterally decreasing in area.

Signed by me at Boston, Massachusetts, this 17th day of April, 1924.

LUTHER S. NEWELL.