Feb. 25, 1936. L. DU B. REES 2,032,028

IMPREGNATING APPARATUS

Filed Oct. 12, 1931

Fig. 1.

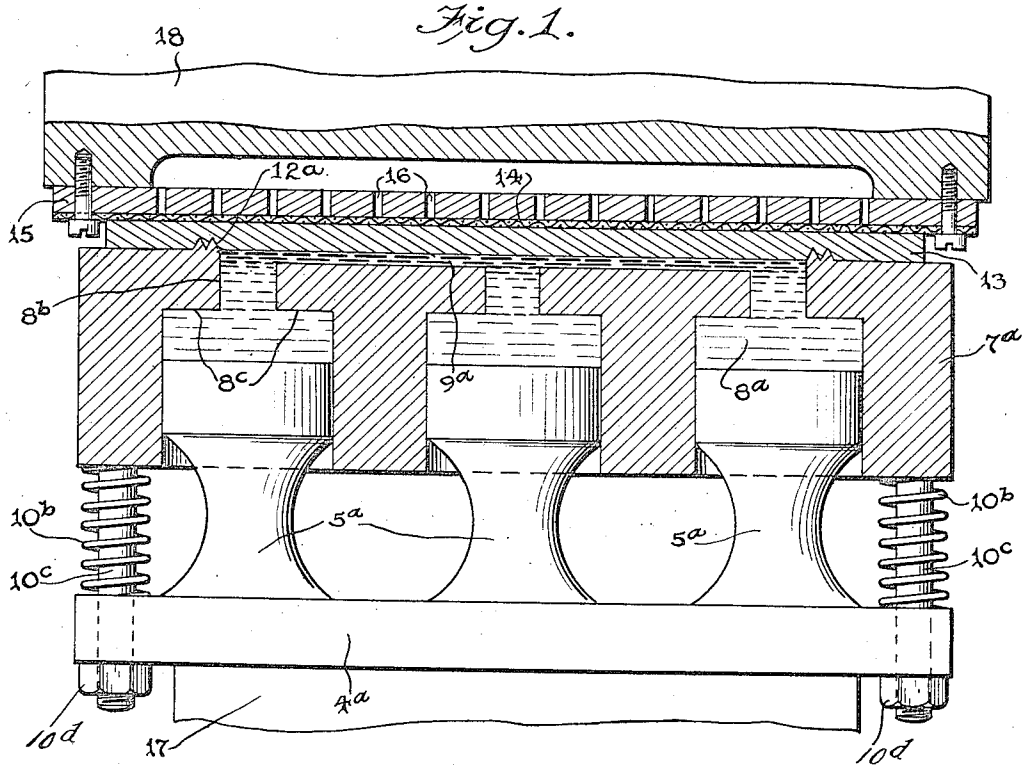
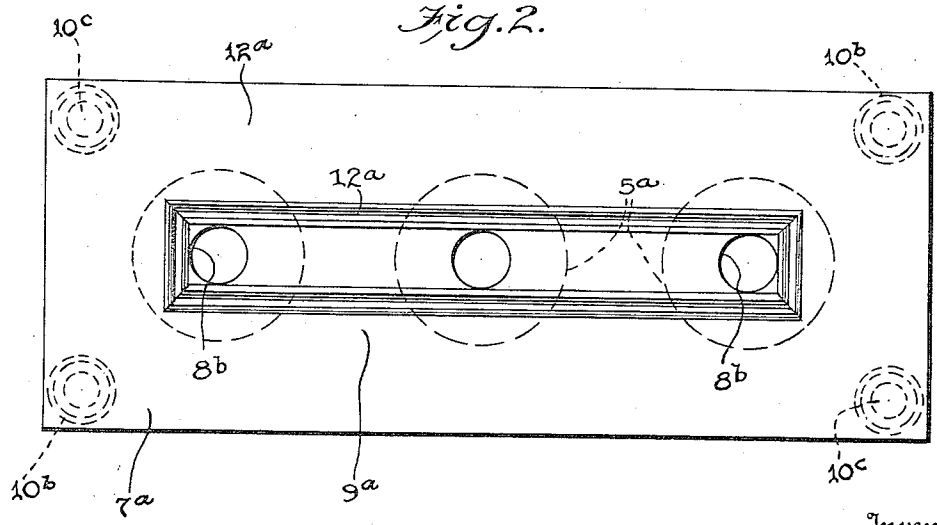


Fig. 2.



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2,032,028

IMPREGNATING APPARATUS

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Application October 12, 1931, Serial No. 568,461

5 Claims. (Cl. 91—18)

This invention relates to the impregnation of fibrous or porous materials such as leather, textile fabrics, wood, asbestos, non-vitrified porcelain, etc., and more particularly to a novel apparatus for impregnating such materials.

The primary purpose of the invention is to provide an apparatus for the impregnation of porous or fibrous materials, and the invention is especially useful for the impregnation of leather with any suitable impregnating agent such as oils or rubbery compounds.

By impregnation is meant the filling in of the pores or the spaces between the fibres of such materials with any suitable impregnating agent which may flow under pressure.

Another object of the invention is to provide an apparatus including a variable sized basin across the mouth of which may be placed the article to be impregnated, and the construction of the apparatus is such that just before an impregnating fluid is forced from the basin into the article, a tight seal is made between the article and the mouth of the basin.

In my application Serial No. 539,888, filed May 25, 1931, I have disclosed a process and apparatus for the impregnation of various articles with fluid impregnating agents, and in that apparatus, a spring supported cylinder cooperates with a piston to form a variable sized basin to contain the impregnating agent. When the article to be impregnated is placed across the mouth of this basin and pressure is exerted to force either the piston toward the cylinder, vice versa, or both; the springs function to first cause an annular lip at the mouth of the basin to penetrate the article to provide an effective seal to prevent the escape of the impregnating fluid between the lip and the article, and afterwards, as the pressure on the piston and cylinder is increased, the impregnating fluid is forced into the article.

Another object of the present invention is to improve the apparatus disclosed in said application.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawing, and more particularly pointed out in the appended claims.

In the drawing,

Fig. 1 is a vertical sectional view partly in elevation of one form of the improved apparatus shown in place in a suitable type of press.

Fig. 2 is a top plan view of the cylinder block portion of the apparatus.

In the embodiment of the invention illustrated in the drawing, 4^a designates any suitable type of base from which rises a plurality of pistons 5^a.

Arranged above the base is a main cylinder 7^a having a plurality of piston bores 8^a which form part of and communicate with a variable sized basin 9^a arranged in the top of the block 7^a.

The upper ends of the bores are reduced in diameter, as shown at 8^b, and these reduced portions communicate at their upper ends with the basin proper 9^a. This construction provides shoulders 8^c within the bores for a purpose hereinafter described.

The block 7^a is provided with depending bolts 10^c which slide in holes in the base 4^a. Coil springs 10^b surround the bolts and yieldingly support the block above the base. Nuts 10^d on the lower ends of the bolts cooperate with the base to limit the upward movement of the cylinder block.

At the mouth of the basin, I arrange sealing means preferably consisting of one or more annular lips 12^a having relatively sharp edges adapted to penetrate the porous or fibrous sheet or article 13 which is placed over the basin 9^a. After the sheet or article has been so placed, I prefer to superpose on the same, a sheet of wire mesh fabric or the like 14, and over this I place a rigid plate 15 provided with perforations 16. The reticulated fabric prevents the article to be impregnated from entering the perforations 16 when pressure is exerted.

In operation, such apparatus is placed in any suitable press, for example, in one having an anvil member 17 and a platen 18, the latter being constructed to permit the perforations 16 to communicate with a chamber or the like, where the pressure will be less than that exerted on the fluid impregnating agent contained in the basin 9^a. If desired, the perforations 16 may communicate either with the atmosphere or with a source of sub-atmospheric pressure.

At the start of the operation, block 7^a is supported at a suitable elevation by the springs, and at such time, the impregnating fluid is placed in the basin 9^a. Then the article or sheet 13 is placed over the basin and the members 14 and 15 are superposed on the article 13. Then the platen 18 is lowered until it contacts with the perforated plate. As the platen 18 moves downwardly, the impregnating fluid confined in 8^a, 8^b and 9^a will be compressed as the block 7^a moves toward the base 4^a. Consequently, this pressure will also be exerted on the shoulders 8^c, and this

will act to push the block 7a toward the descending platen, whereby the lip 12a will act to bite into or penetrate the sheet or article to be impregnated. Thus an effective seal will be created between the lip and the article as pressure is built up on the impregnating fluid. The impregnating fluid contained in the vessel is thus subjected to constantly increasing pressure and must flow into the article 13, or upwardly through such article.

Of course, when the article has been impregnated to the desired extent, and the platen is raised, and pressure is released in the basin, the springs 10b will function to lift the block 7a to normal position, and then the members 14 and 15, as well as the article 13, may be removed, and the operation may be repeated with another article.

If desired, the perforated plate 15 and reticulated sheet 14 may be connected with the platen 18 as illustrated so as to move with the platen.

The shape of the basin 9a may be rectangular as illustrated in Fig. 2, or it may be of any suitable shape to accommodate the article to be impregnated. Furthermore, in such an apparatus, I may employ either one or more pistons 5a. Moreover, while I prefer to use oil or rubbery compounds as an impregnating agent, I am aware that the invention may be used in connection with any suitable impregnating agent, and with any article which may be impregnated by such a machine.

It will also be evident that the sealing means disclosed herein may be used in any environment where it is desired to effect a tight seal between the mouth of a basin or the like, and an article which may be penetrated by an annular lip.

In actual practice it will be understood that the areas of the upper surfaces of the pistons must be greater than the area bounded by the innermost annular lip 12a, the difference in area being the combined area of the shoulders 8c and the latter area times the pressure in pounds per square inch exerted by pistons 5a is the total pressure which acts upwardly to force the annular lip 12a into the article to be impregnated, thus causing the seal to be made. It is evident that this total pressure can be controlled by varying the area of the shoulders 8c.

From the foregoing it is believed that the construction, operation and advantages of the invention may be readily understood by those skilled in the art, and I am aware that changes may be made in the details disclosed, without departing from the spirit of the invention, as expressed in the claims.

Having fully described my invention what I claim as new and desire to secure by Letters-Patent, is:—

1. A leather impregnating apparatus comprising a piston member, a cylinder member, said members forming a variable sized basin and one member being movable relatively to the other, sealing means surrounding the mouth of said basin, means for holding a sheet to be impregnated across the mouth of said basin and in contact with said sealing means, and pressure exerting means for causing one of said members to move relatively to the other for forcing an impregnating substance from the basin through a sheet stretched across the mouth of the same.

2. An apparatus for impregnating sheet material with impregnating substances, comprising a piston member, a cylinder member having a bore into which the piston member extends, said members forming a basin in the upper end of the bore, one of said members being movable relatively to the other, a lip surrounding the upper end of the bore and forming a mouth for the basin on which the sheet to be impregnated can rest, an air receiving element adapted to rest on said sheet and to extend entirely over said mouth, and means for exerting pressure in one direction on said element and in the opposite direction on one of said members for causing an impregnating substance deposited in the basin to penetrate the pores of said sheet.

3. An apparatus for impregnating sheet material with impregnating substances, comprising a piston member, a cylinder member having a bore into which the piston member extends, said members forming a basin in the upper end of the bore, one of said members being movable relatively to the other, a lip surrounding the upper end of the bore and forming a mouth for the basin on which the sheet to be impregnated can rest, a pad of porous material adapted to rest on said sheet and to extend entirely over said mouth, means for exerting pressure in one direction on the pad and in the opposite direction on one of said members for causing an impregnating substance deposited in the basin to penetrate the pores of said sheet, and a rigid perforated plate resting on said pad to allow the escape of air from the latter.

4. An impregnating apparatus comprising a base, a stationary piston mounted on the base, a cylinder movable relatively to the base and having a bore into which the piston extends, resilient means normally holding the cylinder at such a height relatively to the base that a basin is formed by the top of the piston and an upper portion of said bore, an annular tapered lip on the cylinder surrounding the upper end of the bore and adapted to support a sheet to be impregnated, a porous pad adapted to rest on said sheet, a perforated rigid plate superposed on the pad, and means for forcing said plate and base toward one another for causing an impregnating substance deposited in the basin to penetrate the pores of said sheet.

5. An impregnating apparatus comprising a base member, a stationary piston mounted on the base member, a cylinder member movable relatively to the base member and having a bore into which the piston extends, resilient means normally holding the cylinder member at such a height relatively to the base member that a basin is formed by the top of the piston and an upper portion of said bore, an annular tapered lip on the cylinder member surrounding the upper end of the bore and adapted to support a sheet to be impregnated, a porous pad adapted to rest on said sheet, a perforated rigid plate superposed on the pad, means for forcing said plate and base member toward one another for causing an impregnating substance deposited in the basin to penetrate the pores of said sheet, guide elements for the cylinder member secured to one of said members and slidably engaging the other member, and abutments on the guide elements cooperating with one of the members for limiting the upward movement of the cylinder member.

LOUIS DU BOIS REES.