

July 10, 1928.

W. G. O'BRIEN

1,676,798

METHOD OF MAKING ARTICLES FROM A FIBROUS COMPOSITION

Filed Sept. 16, 1922

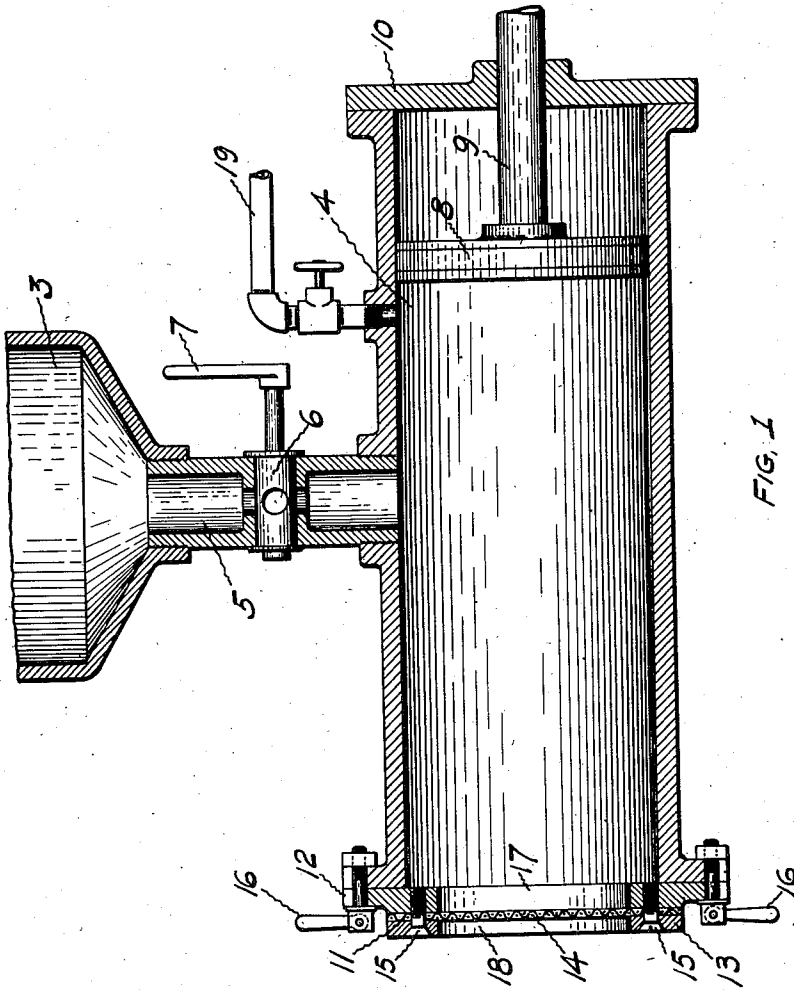


FIG. 1

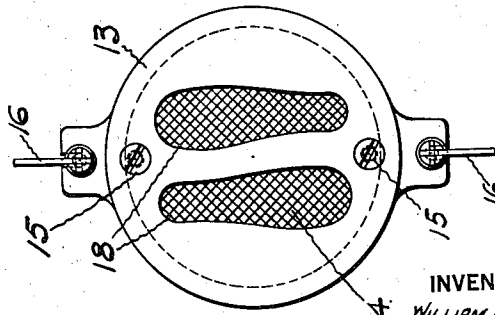


FIG. 2

INVENTOR
WILLIAM G. O'BRIEN
BY
R. P. O'Brien
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM G. O'BRIEN, OF AKRON, OHIO, ASSIGNOR TO THE GOODYEAR TIRE & RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

METHOD OF MAKING ARTICLES FROM A FIBROUS COMPOSITION.

Application filed September 18, 1922. Serial No. 538,668.

My invention pertains to a method of and apparatus for making articles from a fibrous composition, and it has particular relation to a method of and a machine for molding such articles.

One object of my invention is to provide a novel method of making articles composed of a fibrous composition, in which the article may be molded into the finally desired form, and in which the fibers are deposited normally to the wearing surface thereof.

Another object of my invention is to provide a machine whereby articles of any desired contour may be molded from fibrous material and in which the fibers are so arranged by the machine as to cause them to be perpendicular to the external surface of the article.

In the accompanying drawing:

Fig. 1 is a cross-sectional view of a machine adapted for the formation of articles in accordance with my invention, parts being broken away for the sake of clarity; and

Fig. 2 is an end elevational view of the portion of the machine illustrated in Fig. 1.

The machine is provided with a tank 3, connected to a cylinder 4 by means of a conduit 5. The conduit 5 is provided with a valve 6, which may be opened and closed at will by means of a handle 7. The tank 3 is normally employed as a container for a liquid in which is suspended a quantity of fibers.

The cylinder 4 is provided with a piston or plunger member 8, mounted upon a piston rod 9, which extends through a piston head 10, and is connected to a suitable source of power, not shown. The cylinder 4 is provided at the opposite end with a removable end member 11, which consists of a main supporting ring 12, an auxiliary supporting ring 13, and a screen member 14, of comparatively fine mesh, which is disposed between, and clamped in position by, the two annular members 12 and 13, by means of screws 15 or other suitable connecting devices. The rings 12 and 13 are connected rigidly to the cylinder 4 by means of latching members 16, or other suitable fastening devices. The rings 12 and 13 are provided with correspondingly shaped openings 17

and 18, respectively, which conform in contour to the article which it is desired to make. In the apparatus illustrated, the openings conform to soles for shoes, as best indicated in Fig. 2.

In operating the machine, the valve handle 7 is rotated through an angle of 90°, thus opening the valve 6 and establishing communication between the container 3 and the cylinder 4, through the conduit 5. A relatively large quantity of fibers suspended in the liquid in the container 3 is permitted to enter the cylinder 4. When a sufficient quantity of fibers has been admitted to the cylinder 4, the valve 6 is closed, and the piston 8 is moved forward by means of the piston rod 9. As the piston moves toward the end 11 of the cylinder, the liquid in which the fibers are suspended is forced through the screen which covers the openings in members 17 and 18 respectively. The mesh of the screen 14 is sufficiently fine to prevent the passage of the fibers therethrough. As the liquid passes through the screen 14, the fibers are deposited thereon, and as the piston 8 is moved into engagement with the end 11 of the cylinder, all of the fibers are forced into the opening 17 in the ring 12.

It is believed to be essential that the liquid be passed through the screen 14 at a relatively high rate of speed because, when the liquid moves rapidly, the fibers arrange themselves in the direction in which the liquid is moving and engage the screen in a position perpendicular thereto. As the liquid is moving rapidly, through the screen, large numbers of the fibers are similarly disposed in a very brief interval of time. The fibers are therefore assisted in retaining their perpendicular position by other fibers similarly disposed upon all sides thereof.

It is believed that if the liquid were caused to pass thru the screen 14 at a relatively low rate of speed, the fibers would be originally disposed perpendicular to the screen, but would subsequently be forced or would tend to arrange themselves parallel thereto by the pressure of oncoming liquid and fibers. By passing the liquid through the screen rapidly there is more tendency for the fibers to retain their original position. Also, they are assisted by other fibers

deposited in engagement therewith either simultaneously or immediately thereafter.

It is essential that the end member 11 be readily removable from the cylinder 4 so that the articles formed may be quickly and easily removed therefrom, or if desired, they may be dried while in the mold.

While I have referred to the solids used merely as fibers, it will be understood that manila, hemp, cotton, wool, asbestos, jute, leather, or any other suitable fibrous material may be employed.

In practising my invention I prefer to employ rubber coated fibers, which may be prepared by mixing a quantity of the fibers with a solution of rubber in the container 3, and precipitating the rubber thereon by the addition of a rubber precipitating agent, or by any other desired method. The rubber coated fibers, together with the liquid in which they are suspended, are then admitted to the cylinder 4 and the fibers are deposited upon the screen 14 as the liquid passes therethrough as already described. A quantity of alcohol or other suitable rubber precipitant is then admitted to the cylinder 3 through a conduit 19, and is forced through the fibers deposited upon the screen 14. This liquid is also caused to move at a relatively high rate of speed through the screen. The treatment with the alcohol serves to remove from the rubber on the fibers, any rubber solvent or other undesirable liquid ingredient which may remain therein. This operation is known as the washing or displacing operation.

From the foregoing description, it will be apparent that I have provided a novel method of molding articles from a fibrous composition. Also that by this method the fibers are so arranged as to be perpendicular

to the wearing surface of the material, thus improving the wearing qualities of the article. It will also be apparent that I have provided a novel type of machine for forming and subsequently washing articles of any desired contour without wasting any of the material of which the article is formed.

While I have illustrated only one form which my invention may assume and have described in detail but a single application thereof, it will be apparent to those skilled in the art that it is not so limited, but that various minor changes and modifications may be made therein without departing from the spirit of my invention, or from the scope of the appended claims.

What I claim is:

1. A continuous one-piece shoe sole composed of a synthetic fibrous material, the fibers thereof being disposed substantially normal to the wearing surface thereof.

2. The method of making articles from a fibrous composition which consists in precipitating rubber upon a quantity of fibers, forcing the liquid in which the coated fibers are suspended through a screen of sufficiently small mesh to prevent the passage therethrough of the particles, and subsequently causing a rubber precipitant to be moved through said screen.

3. The method of forming an article from a suspension of fibers in a liquid that comprises forcing the liquids through a fiber retaining mesh at a velocity sufficiently great to cause the fibers to be caught and held on the screen with their axes perpendicular thereto.

In witness whereof, I have hereunto signed my name.

WILLIAM G. O'BRIEN.