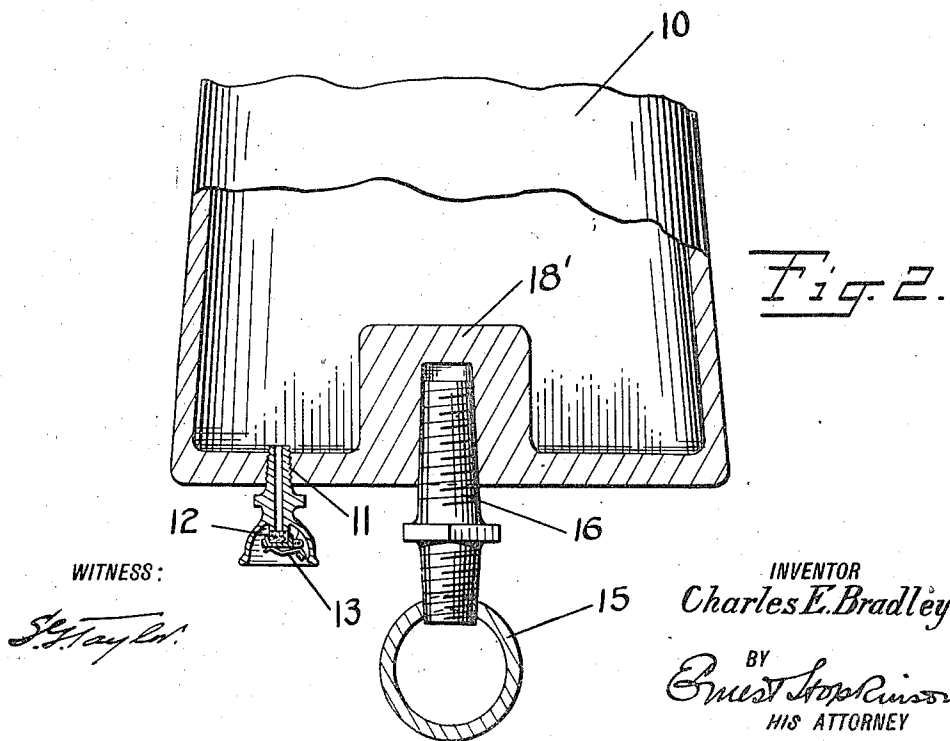
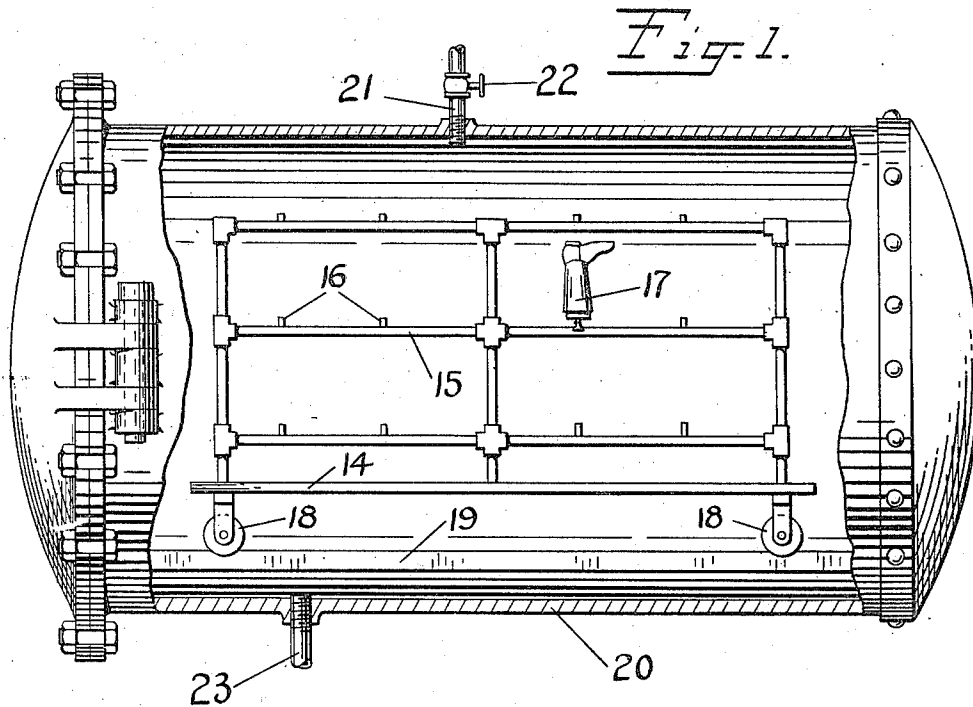


C. E. BRADLEY.
FORM FOR RUBBER ARTICLES.
APPLICATION FILED MAY 15, 1915.

1,240,931.

Patented Sept. 25, 1917.



UNITED STATES PATENT OFFICE.

CHARLES E. BRADLEY, OF MISHAWAKA, INDIANA, ASSIGNOR TO MISHAWAKA WOOLEN MANUFACTURING COMPANY, A CORPORATION OF INDIANA.

FORM FOR RUBBER ARTICLES.

1,240,931.

Specification of Letters Patent.

Patented Sept. 25, 1917.

Application filed May 15, 1915. Serial No. 28,301.

To all whom it may concern:

Be it known that I, CHARLES E. BRADLEY, a citizen of the United States, residing at Mishawaka, in the county of St. Joseph, State of Indiana, have invented certain new and useful Improvements in Forms for Rubber Articles, of which the following is a full, clear, and exact description.

This invention relates to apparatus used in controlling the internal and external pressure exerted upon articles embodying rubber, rubberlike, or similar materials, during or prior to the process of vulcanization.

An object of the present invention is to provide a novel form whereby a controllable differential of pressure may be exerted upon the article supported thereupon.

The invention can be readily understood from the following description taken in connection with the accompanying drawing, in which—

Figure 1 is a sectional view with parts in elevation showing an apparatus suitable for carrying out the invention;

Fig. 2 is a fragmentary view with portions in section showing a form embodying my improvements.

Ordinarily, in vulcanizing under the controllable differential of pressure process, the articles, such as for instance boots or shoes, are built in the usual manner upon hollow perforated trees or forms. These forms are mounted upon a car, the frame of which is formed of tubing, there being branch pipes of this tubing connected with the interior of the hollow forms. The car carrying the forms with the articles to be vulcanized thereon, is run into a vulcanizer wherein the outside of the articles is subjected to heat and controllable high pressure. The car tubing is connected to a controllable low pressure or even a vacuum pipe, whereby the inside of the articles is subjected to a lesser pressure than the outside, this differential of pressure serving to exhaust entrapped air, gases, fluids, and the like from the articles.

From the above it is obvious that an airtight frame or tubing for the car is necessary to prevent equalization of the pressures within and without the forms. My present invention obviates the low pressure or vacuum-conducting function of the tubular frame, and on the other hand renders the forms separate independent units, which,

after being evacuated, will have no common low pressure or vacuum-conducting pipes at all, the advantage of this being that should one form leak, this will have no detrimental effect upon its neighbors, as hitherto has been the case, and the forms taken as a whole, are entirely unaffected by any loose connections in the tubing or frame of the car.

In carrying out my invention I provide a hollow form 10 of the usual and well known type, used in carrying out the controllable differential pressure process of vulcanization, such a form, as is well known, having perforations at places generally in the foot portion thereof so that the article supported upon the form will be exposed to the lesser pressure or vacuum upon the inside of the form as well as the greater pressure upon the outside of the form. This form is equipped with an opening 11 through which the interior of the form may be exhausted, evacuated, or even subjected to a low pressure, and preferably I seal this opening with a check valve 12 adapted to be held closed by a differential of pressure within and without the last, quick closing of the valve being promoted by a spring 13.

In connection with the use of a form of the above described type, I may employ a car 14 having a frame 15 which may be formed of tubing or not, as desired, there being upstanding lugs 16 at intervals on the frame to support a plurality of the forms 10 with the articles 17 to be vulcanized supported thereon, said forms being provided each with a suitable socket 18 to receive a corresponding lug 16. The car is mounted upon wheels 18 which facilitate the car being run upon a track 19 into a vulcanizer 20 of the usual and well known type. Heat and pressure are supplied to the articles in the vulcanizer through a suitable medium, such as steam for instance, which enters the vulcanizer through a pipe 21 that is controlled by a valve 22. A low pressure or exhaust pipe 23 enters the vulcanizer and is controlled by a valve not shown.

In operation, should it be desired to subject the articles 17 internally to atmospheric and externally to a higher pressure, it is simply necessary to admit the desired high pressure into the vulcanizer through the pipe 21, it being understood that the forms

are sealed against equalization of the atmospheric pressure within them and said higher pressure without them, by the closed check valves 12. Should it be desired to subject
5 the articles 17 to a vacuum internally and a high pressure externally, the interior of the vulcanizer 20 may be exhausted to the desired degree by the suction through the pipe 23 which may be connected to a suitable
10 pump or other device for this purpose, it being understood that the valves 12 open under such suction and establish communication between the interiors of the forms and the interior of the vulcanizer. When
15 the desired degree of vacuum has been established, the vacuum in the vulcanizer may be broken by the admission of the high pressure medium through the pipe 21, whereupon the valves 12 are instantly closed
20 as the external pressure upon the forms rises, such closing being assisted by the controlling springs 13.

The above examples are given merely for the purpose of illustration, it being obvious
25 that there are many modifications in both the use and the manner of constructing the apparatus. As for instance, the forms may all be exhausted either independently of each other or simultaneously before being
30 disposed in the vulcanizer, and it is not essential that the sealing of the lasts be automatic under a differential of external and internal pressures, since I may employ in lieu
35 of the check valve, a manually operable valve, it being simply necessary to the practice of the invention that a form upon which a rubber article may be supported during
40 a differential of pressure process cure, be controllable as an independent unit as to its internal and external pressure conditions.

Having described my invention, what I

claim and desire to protect by Letters Patent is:

1. An apparatus of the class described, comprising an air-tight chamber, means for
45 exhausting the same, a support in said chamber, and a perforated hollow boot or shoe last on said support having a check valve opening outwardly to afford communication between the interior of the last 50 and the interior of the chamber.

2. An apparatus of the class described, comprising a vulcanizer, means for exhausting the same, means for applying fluid pressure in the vulcanizer, a support in the vul- 55 canizer, and a perforated hollow boot or shoe last on said support having a check valve opening outwardly to afford communication between the interior of the last and the interior of the chamber. 60

3. The process of treating vulcanizable rubber boots and shoes consisting of building the same to substantially final form upon a hollow last provided with perforations that expose the interior of the article 65 to the interior of the last, said last having a check valve, transferring the lasted article to a vulcanizer, exhausting the interior of the vulcanizer by a vacuum whereby the interior of the last is simultaneously ex- 70 hausted, breaking said vacuum in said vulcanizer by admitting a pressure medium, said check valve being closed by said pressure medium with a resultant entrapping of the vacuum in said last, and finally vulcan- 75 izing the lasted rubber article while exposed exteriorly to pressure and interiorly to said entrapped vacuum.

Signed at Mishawaka county of St. Joseph, State of Indiana, this 12 day of May, 80 1915.

CHARLES E. BRADLEY