R. D. PIKE.

METHOD FOR MOLDING MAGNESIA ASBESTOS INSULATING COVERINGS.

APPLICATION FILED SEPT. 2, 1919.

1,356,309. **Patented Oct. 19, 1920.**

2 SHEETS—SHEET 1.

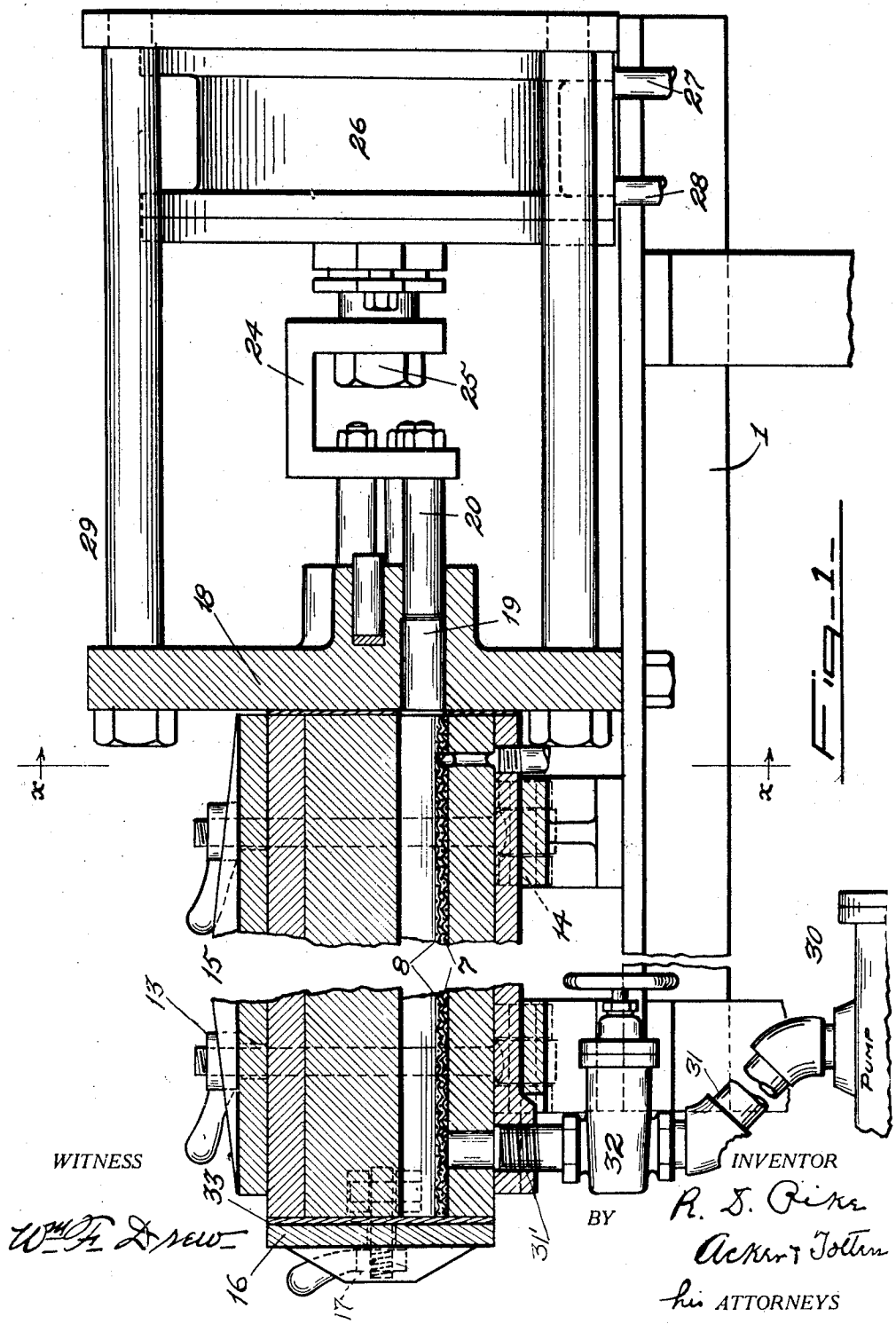

Fig. 1.

WITNESS

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Fig. 3.

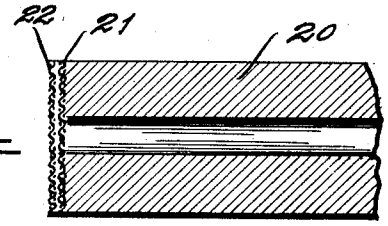
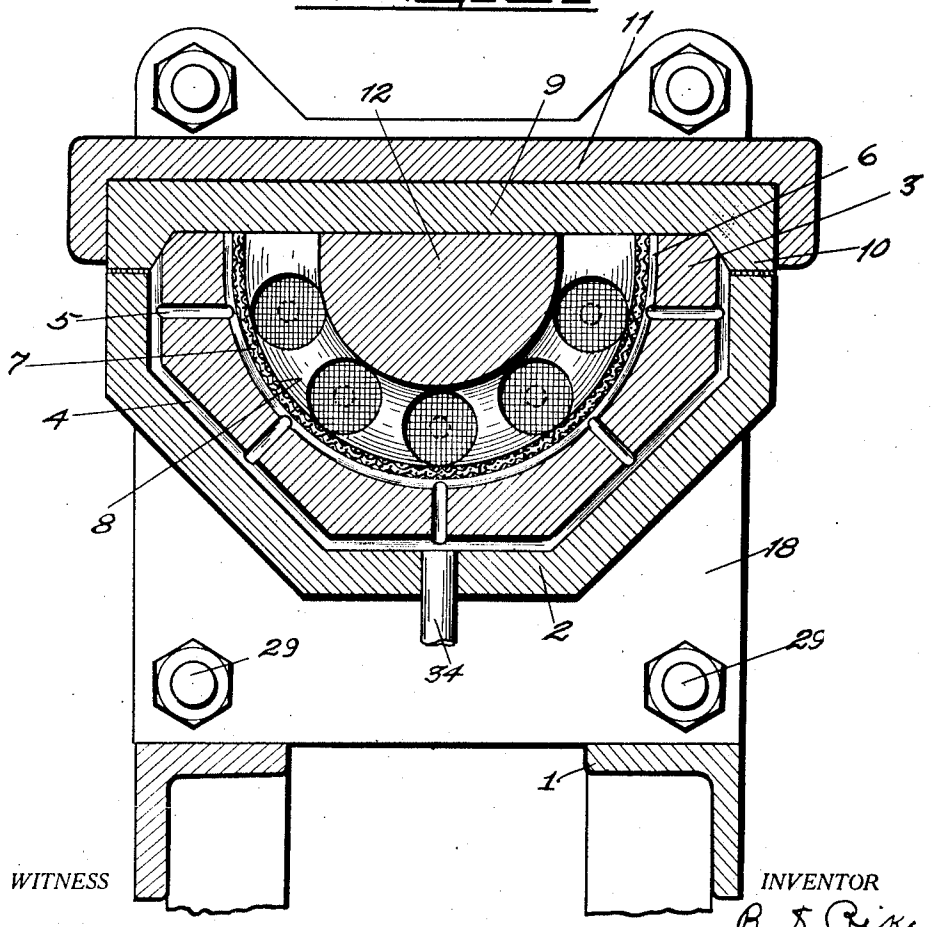


Fig. 2.



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UNITED STATES PATENT OFFICE.

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METHOD FOR MOLDING MAGNESIA-ASBESTOS INSULATING-COVERINGS.

1,356,309. Specification of Letters Patent. Patented Oct. 19, 1920.

Application filed September 2, 1919. Serial No. 321,082.

To all whom it may concern:

Be it known that I, ROBERT D. PIKE, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Methods for Molding Magnesia-Asbestos Insulating-Coverings, of which the following is a specification.

The present invention relates to an improved method for the molding, shaping or forming coverings, preferably of the heat insulating type, and more particularly what are commonly termed, magnesia asbestos heat insulating coverings, the ingredients or composition of which consists of approximately 85% basic carbonate of magnesia forming the body and 15% of asbestos fiber which forms the binding medium.

The principal object of the present invention is to obtain by my improved method a finished article wherein the adhesion of the body and the binder to each other is greatly increased resulting in the increasing of the strength of the insulating covering, and at the same time reducing the amount of asbestos or binder required in proportion to the magnesia.

It is the present practice to mix the body and binder together in the approximate proportions as above set forth, the mixture forming a thin water suspension or magma which is admitted under pressure in the molds having porous sides, the continued pumping of the magma into the molds forces much of the water through the porous sides retaining the magnesia and asbestos therein which is of such consistency as not to be forced through the porous sides of the mold. The draining of the remaining water from the formed body permits the mixture to remain in a semi-solid form of the required shape and of sufficient rigidity to be transferred to supports for drying, and during the drying operation the last trace of moisture is expelled from the mass leaving the mass in a solid porous-like form, having sufficient mechanical strength to permit of the same being machined to finished size and to be shipped and installed without undue breakage.

The basic carbonate of magnesia in the mass is the ingredient which imparts to the magnesia asbestos heat insulating coverings, very high insulating value, and the asbestos is added to furnish a binder and to add mechanical strength, a high degree of which is necessary from the practical standpoint of handling and shipping without loss from breakage. The binder is more expensive than the heat insulator and the greater proportion thereof employed in the mixture correspondingly reduces the heat insulating value of the resulting product, and for this reason, it is desirable to use as little binder as possible consistent with mechanical strength.

Owing to the evaporating of the remaining moisture in the present product during the drying thereof, the pockets or spaces containing the water become porous vents or cells when the water is expelled therefrom during the drying operation, and thus honey-combing the finished product, materially weakening the strength thereof.

In carrying out my improved method the magna in the proportions now commonly used is pumped under pressure into a mold having porous side walls, and when the mold is filled to its capacity the plastic mass is compressed under pressure which drives out or expels all the remaining water therein which has not passed under the filling pressure through the porous sides of the mold, thus increasing the adhesion of the magnesia particles to each other and to the asbestos fibers and consequently increasing the strength of the covering and correspondingly reducing the amount of asbestos required in proportion to the magnesia. The reducing of the proportion of asbestos resulting in the lowering in the cost of manufacture and increasing the heat insulating value and the increase in adhesion of the particles, developing a much larger proportion of the ultimate tensile strength of the separate binder fibers during rupture over the strength of corresponding fibers molded by the present methods.

In carrying out my present method any suitable apparatus may be employed, but for purposes of illustration and simplicity of description, I prefer to use the following, wherein,

Figure 1 illustrates a view in longitudinal section of one form of apparatus.

Fig. 2 is a transverse section taken on line *x*—*x* of Fig. 1.

Fig. 3 is a view in detail section of one of the fluid expelling plungers.

In the drawings, 1 indicates a supporting bottom or base of a press frame and at one

end of which is suitably supported an open topped mold chamber or base 2, illustrated as being trough-shaped. Within the same is adapted to be received a mold 3, open at its top and of any desired configuration, the form illustrated with its core being designed for the molding of heat insulating coverings of the well known type. The mold 3 is provided on one surface with one or more grooves 4 which communicate with the inner side thereof through branch channels 5, which in turn connect at their inner ends with the channel 6, extending preferably transversely of the interior surface of the mold 3. On the interior surface of the mold 3, in contact with said surface are preferably positioned superimposed layers of thin wire fabric 7 and canvas or other fabric 8, which serve as a straining means for separating the water from the magnesia forming body and the binding medium during the formation of the article, as hereinafter described. The upper open top of the mold 3 is closed by covering 9, preferably of wood and the flanged edges 10 of which rest on the upper edges of the chamber or base 2. This cover is carried by a suitable top member 11 and mounts on its under surface the core 12. The cover 9, carrying the core 12 is retained in position as illustrated in Fig. 2 by any suitable mechanism or clamping means, particularly illustrated in Fig. 1, and the same consisting of the pivoted threaded members 13, fulcrumed as at 14 to the base 1, and their free ends received within slotted openings 15 in the member 9, and held in place by the clamp screws 13. One end of the chamber or base 2 and the mold 3 is adapted to be closed by a removable end plate 16, clamped in position by a suitable clamping means 17 of the same structure as those employed for clamping the cover in position.

The opposite or rear end of the base 2 and mold 3 is closed by a rear end plate 18, carried by the base 1 and which is provided in line with the portion of the mold within which the article is formed with one or more bores 19, opening at one end thereinto and within each of which is mounted a tubular plunger 20, the inner end of which is covered with one or more layers of thin wire mesh screening 21 and canvas 22, arranged preferably in laminated form, as illustrated in Fig. 3. The rear ends of said plungers 20 are carried by a yoke 24 mounted on a piston 25 which is adapted for reciprocation within a cylinder 26, provided with compression inlet and outlet pipes 27 and 28, the cylinder being in turn connected through bolts 29 to the end of the plate 18.

The material to be admitted into the mold chamber, and which is preferably in the form of a magma in the approximate proportions above set forth, is forced into a mold chamber by a pump illustrated in a conventional form as at 30, and from which leads the supply pipe 31, communicating through a passage 31′ in the mold 3 with the mold chamber, and interposed in said pipe 31 is a controlling valve 32. To prevent the escape of the magma from the joints of the mold, packings 33 are employed, and to conduct the fluid expressed from the base 2 an outlet or drain pipe 34 is provided.

In carrying out my method and utilizing the apparatus described with the parts positioned as in the drawings the valve 32 is opened and the magma is pumped under pressure into the mold chamber, completely filling the chamber and the pump pressure forces the water contained in the magma from the mold chamber through the channels 4 and 5 and drain 34 up to the point of the pump compression, and said magma also fills the bores 19. When in this condition the material contained within the mold chamber has a majority or greater portion of the water expelled therefrom by the pump pressure, but considerable water remains therein, and the binder and base are not compressed to a greater degree other than that occasioned by the pump pressure. To express the water in the material contained within the mold chamber the valve 32 is closed and pressure is admitted into the chamber 26 to reciprocate the pistons 20 in the bores 19 in a direction toward the mold chamber, which forces the material contained within the bore into the mold chamber, and tightly compresses the material within the chamber to express the remaining water therefrom, the expressed water passing through the members 21 and 22, over the ends of the plungers 20 and passing longitudinally through said tubular plungers to the point of discharge. The molded article is thence removed from the mold chamber by removing the end 16 and cover 9 which permits of the molded article to be lifted from the mold and transported to a place where the same is further operated on.

The finished article by having the moisture remaining therein over that expelled by the pump pressure expressed therefrom and the body and binder tightly compressed, provides an article of increased strength over those manufactured under the present method, and permits, due to the compressing of the material within the mold of the employment of a lesser amount of asbestos or binding medium than that employed at the present time.

Having thus described my invention what I claim is:

1. The method of molding plastic articles from material in a flowing condition which consists in filling to its full capacity a substantially closed mold provided with a drain outlet with the flowing material to be molded by forcing the same thereinto under a

sufficient pressure to expel a portion of the fluid of said material through the drain outlet by the filling pressure, and thence compressing the material received within the mold to express the remaining fluid therefrom and tightly compress the material within the mold to mold the article therein.

2. The method of molding plastic articles from material in a flowing condition which consists in filling a substantially closed mold provided with a drain outlet with the material to be molded by forcing the same thereinto under a sufficient pressure to force a portion of the fluid in said material from within the mold through the drain opening and thence compressing the material remaining within the mold to express the remaining fluid therefrom and tightly compress the material within the mold to mold the article therein.

3. The method of molding plastic articles from material in flowing condition, which consists in pumping under pressure into a substantially closed mold provided with a drain outlet the material to be molded, the pumping pressure forcing a portion of the fluid in said material within the mold through the drain opening, thence closing the filling opening, and thence compressing the material remaining within the mold to express the fluid remaining therein and tightly compressing the material within the mold to mold the article therein.

4. The method of molding plastic articles from material in a flowing condition, which consists in filling to its full capacity a substantially closed molding chamber provided with a drain opening with the flowing material to be molded by forcing the same thereinto under a sufficient pressure to expel a portion of the fluid of said material through the drain opening by the filling pressure, and thence compressing the molded article within the molding chamber to express the remaining fluid therefrom and compress the material within the molding chamber to form the article therein.

5. The method of forming pipe coverings from material in a flowing condition, which consists in filling to its full capacity a substantially closed molding chamber of a size larger than the finished article and provided with a drain opening with the flowing material to be molded by forcing the same thereinto under a sufficient pressure to expel a portion of the fluid of said material through the drain opening by the filling pressure, and thence compressing the molded article to its normal size within said molding chamber to express the remaining fluid therefrom and compress the material within the molding chamber to form the article therein.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT D. PIKE.

Witnesses:
N. A. ACKER,
D. B. RICHARDS.