

June 19, 1923.

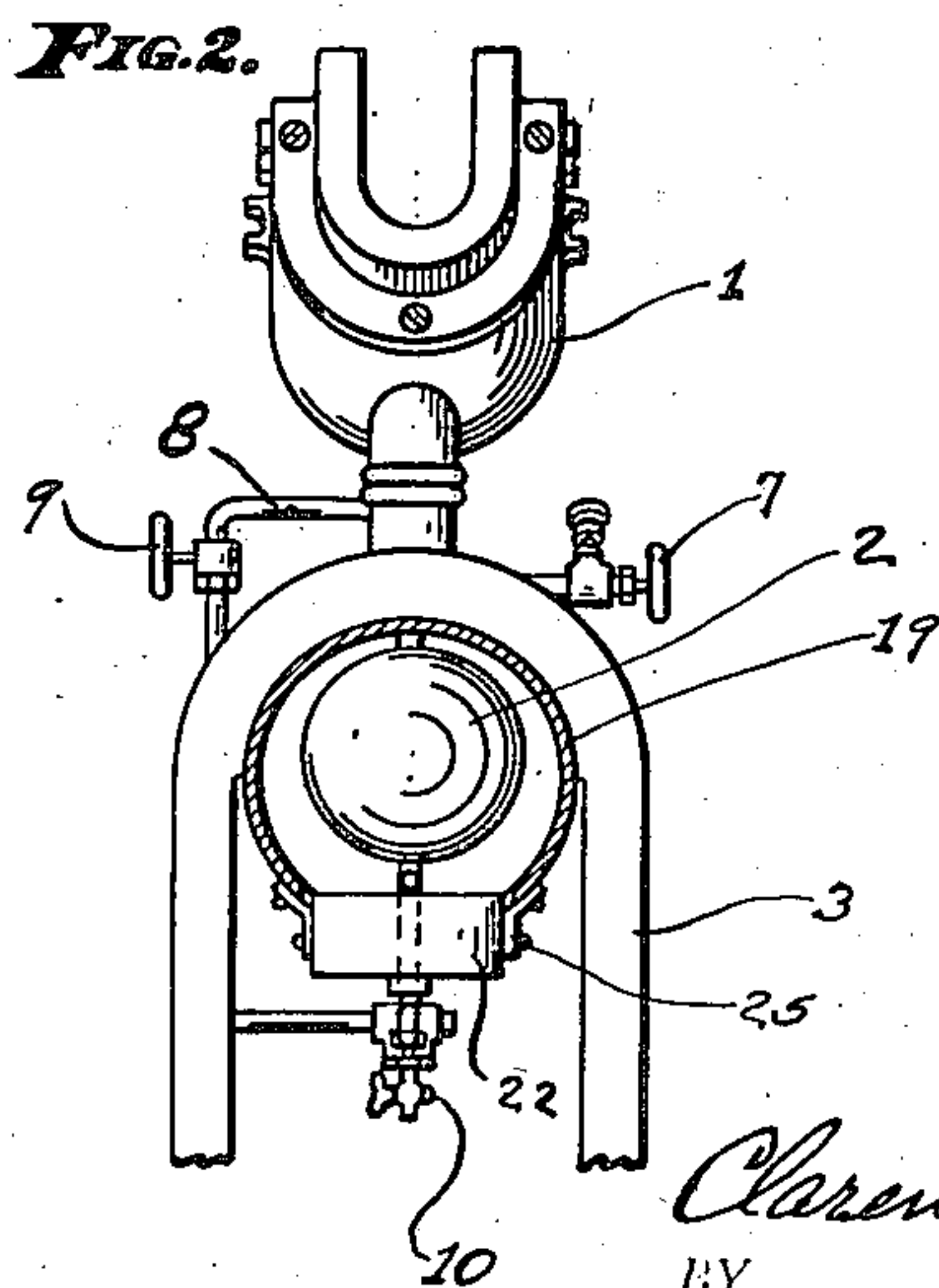
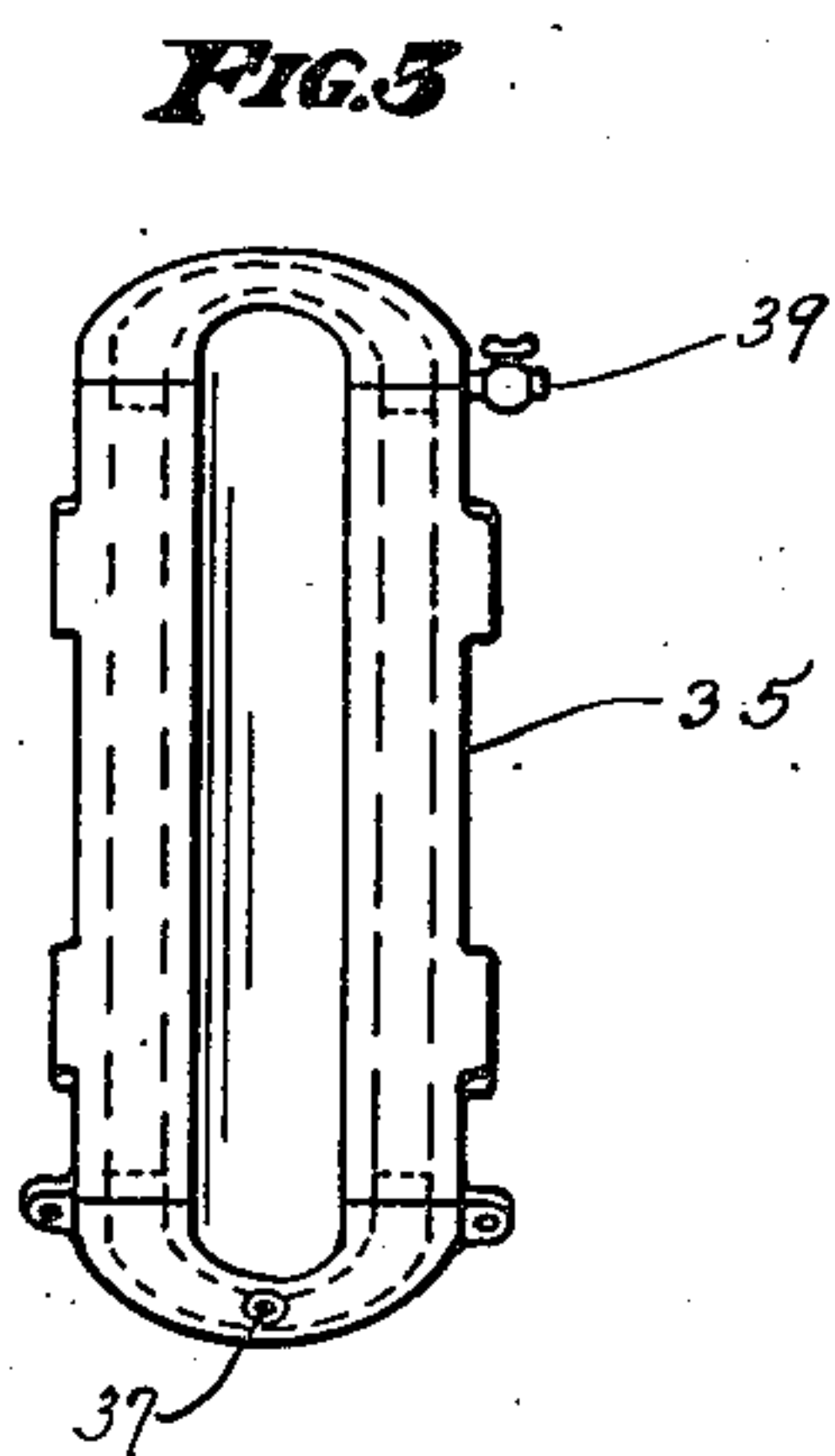
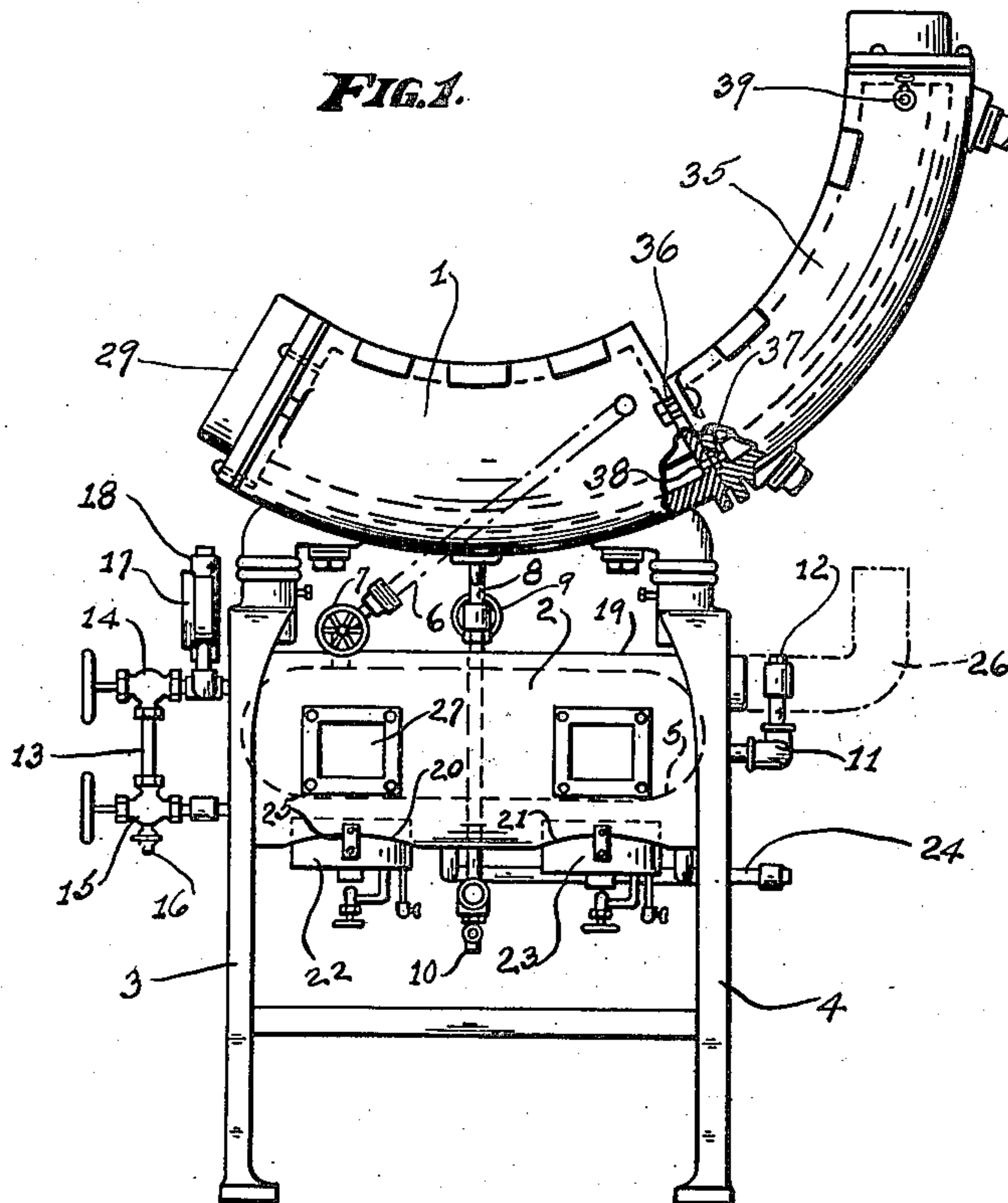
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C. A. SHALER

VULCANIZER

Filed Oct. 26, 1921

2 Sheets-Sheet 1



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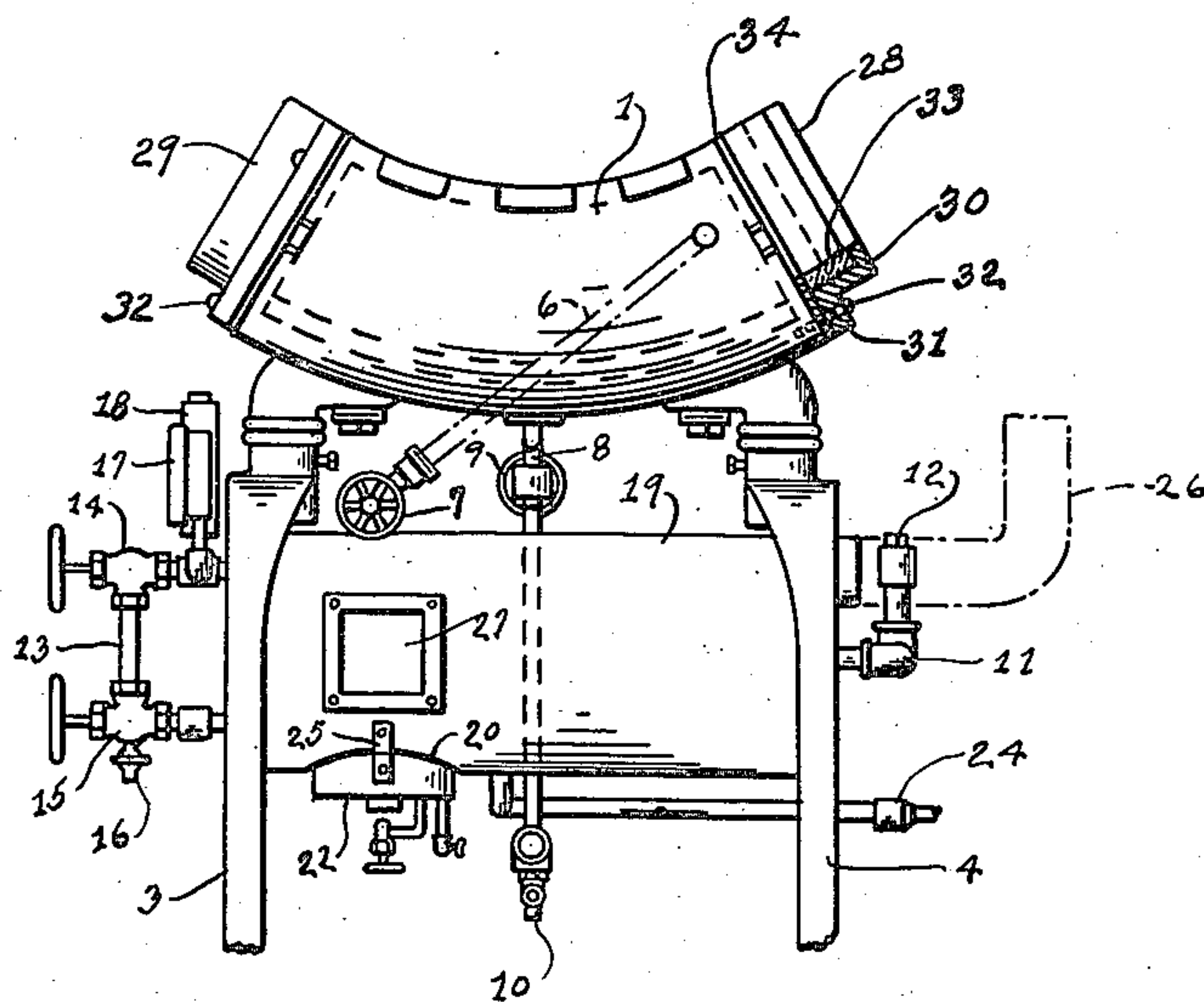
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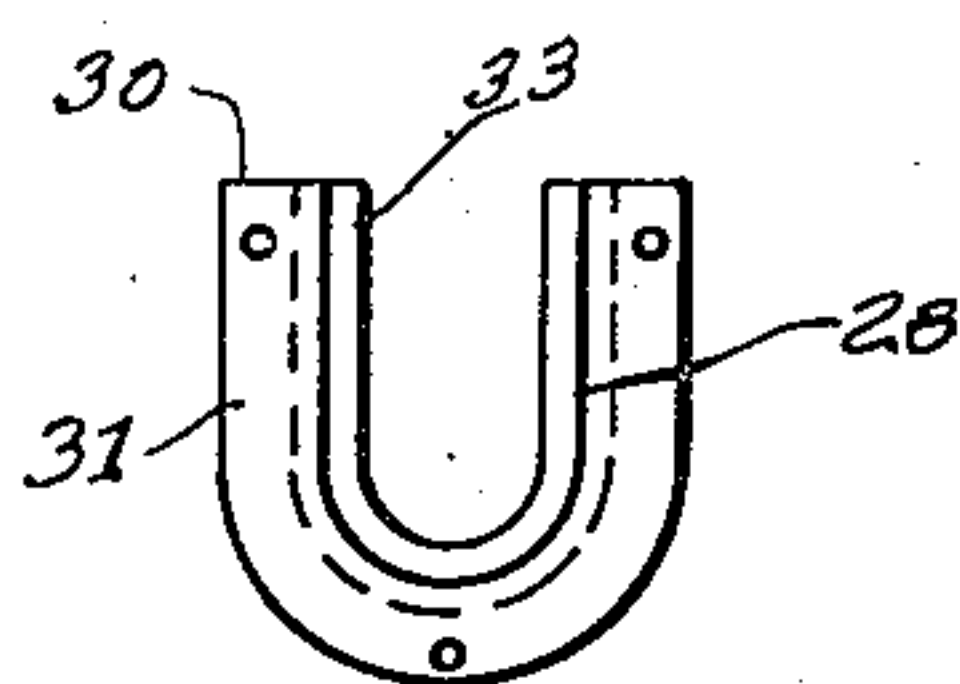
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2 Sheets-Sheet 2

FIG. 4.



**FIG. 5.**



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# UNITED STATES PATENT OFFICE.

CLARENCE A. SHALER, OF WAUPUN, WISCONSIN.

## VULCANIZER.

Application filed October 26, 1921. Serial No. 510,554.

*To all whom it may concern:*

Be it known that I, CLARENCE A. SHALER, a citizen of the United States, residing at Waupun, county of Dodge and State of Wisconsin, have invented new and useful Improvements in Vulcanizers, of which the following is a specification.

This invention relates to vulcanizers, and is particularly directed to a vulcanizer for re-treading tires.

Objects of this invention are to provide a vulcanizer that may be used for either making the ordinary repairs of relatively short lengths of tires as are occasioned by blow-outs, or for making repairs for the entire tire, as for example, re-treading such tire; to provide a vulcanizer with detachable portions whereby it may be varied in length or capacity to accommodate the particular section that it is desired to treat; to provide a vulcanizer which is provided at its ends with means for preventing the formation of humps on the finished tire, or the double curing or over-curing of any portion of the tire.

Further objects are to provide a vulcanizer which may be used at places not supplied with steam or other facilities for heating, which is of unitary and compact design, which may be operated efficiently either intermittently or continuously, and which may be operated with precision to insure the same result for any number of cures.

Further objects are to provide a vulcanizer of compact and simple design, which may be readily and cheaply manufactured, and which may be operated by unskilled labor.

Embodiments of the invention are shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of a vulcanizer with the extension attached.

Figure 2 is an end view of the structure shown in Figure 1 with the extension removed.

Figure 3 is a plan view of the upper portion of the structure shown in Figure 2.

Figure 4 is a side elevation of the device shown in Figure 1 with the extension removed and with the end shoes applied at both ends of the permanently attached section of the vulcanizing shell.

Figure 5 is an elevation of one of the end shoes.

The vulcanizer comprises a permanently attached casing or vulcanizing shell 1 and a boiler 2 for supplying steam to such shell. The shell is preferably carried upon the upper ends of supports 3 and 4, and the boiler, intermediate the upper and lower ends of such supports and beneath the vulcanizer shell. The boiler 2 is substantially cylindrical thruout the major portion of its extent and is provided with spherical ends 5. The boiler is preferably formed of sheet steel and is devoid of riveted joints. It is, in effect, a cylindrical shell provided with spherical ends and formed thruout of a single, integral substantially homogeneous material. It will be seen that the boiler is admirably adapted to withstand very high pressures and consequently, although such pressures are not normally used, contributes to the safety of the device. The shell 1 is connected adjacent its upper portion with the upper portion of the boiler 2 by means of a pipe 6 which is provided with a control hand valve 7. The lower portion of the casing 1 is provided with a drain or return pipe 8 which is controlled by a hand valve 9, such pipe passing downwardly and upwardly into the lower portions of the boiler, as shown in the drawings. The lower portion of this return or drain pipe is provided with a drain cock 10 which, it will be seen from reference to the drawing, is placed at the lowest point in the system and may, therefore, be used to drain the entire system when it is desired. A filling attachment 11 is provided at one end of the boiler and is equipped with a removable plug 12, so that a funnel may replace the plug 12 and the boiler may be filled with water to the desired point. The other end of the boiler is provided with a sight glass or water glass 13 and the usual valves 14 and 15, together with a drain cock 16. Attached to the upper portion of the fittings for the water glass is a pressure gauge 17 and a safety valve 18. The boiler is completely housed within a cylindrical sheet metal casing 19 and is eccentrically positioned with respect to such casing, as may be seen from Figure 2, such boiler having its axis above the axis of the casing and in the same vertical plane therewith. The lower portion of the casing is provided with a pair of openings 20 and 21 within which are positioned a pair of burners 22 and 23 respectively. These burners



are preferably hydrocarbon burners and are adapted to be supplied with fuel under pressure as, for example, by means of the pipe 24. Burners substantially fill the openings and are supported from the casing 19 by means of straps 25. They are placed at the lower portion of the casing and utilize a portion of the additional clearance provided by the eccentric mounting of the boiler. The casing is preferably provided with a flue pipe 26 adapted to carry away the products of combustion, such pipe communicating with the upper portion of the casing preferably adjacent one end thereof. It will be seen that when it is desired to rapidly start the apparatus, both burners are lighted and adjusted until they are properly burning, as may be determined by looking thru the mica windows 27. After the desired temperature has been reached, one burner is cut off and the other burner easily maintains the temperature. It is to be noted that by the peculiar positioning of the burners, casing and boiler, that adequate space is left for the combustion of the fuel and that the flame or heated gases are wrapped about the boiler by the casing 19, thereby insuring the extraction of the maximum amount of heat by the boiler from the heated gases.

The casing 1 is a double walled shell of substantially horseshoe shape, as may be seen from Figures 2 and 3. Its inner portion is contoured to fit the desired tire and the ends of the casing are furnished with removable shoes 28 and 29. These shoes comprise a metallic member 30 of substantially horseshoe shape and are provided with outwardly extending flanges 31 adapted to be secured by means of bolts 32 to the body of the casing 1 or to the casing extension. Upon their inner sides these shoes are provided with a lining composed of a partial heat insulating material 33 which allows the slow passage of heat therethru to prevent the temperature from rising to an excessive value, and thereby assures a gradual change in the temperature from the body portion of the mold 1 outwardly along the shoes. Each shoe is preferably separated from the body portion 1 by means of a relatively thin gasket 34 of asbestos or similar material. In this manner the metallic parts of the shoe are prevented from directly contacting with the metallic parts of the mold, thereby preventing too rapid conduction of heat and correspondingly preventing excessive temperature values for the metallic parts of the shoes.

If it is desired to effect a vulcanizing of a limited portion of the tire, the mold as just described is used. However, if it is desired to vulcanize the complete tire or an extended portion thereof, an extension 35 of substantially the same relative cross sectional contour is bolted, as indicated at 36, to one end

of the casing 1. Both the casing 1 and the extension casing 35 are provided with closed ends and the abutting ends of such members are provided with aligned or registering orifices 37 and 38, so that when the extension and casing 1 are bolted together at a plurality of points, their interiors are placed in direct communication. The end of the extension 35 and the free end of the member 1 are each provided with an end cap shoe as previously described. The shoe on the upper end of the casing extension 35 shown in Fig. 1 is adapted for interchangeable use on the end of the extension or on the end of the portion 1, as illustrated in Fig. 4, whereby when the vulcanizer is in the condition in which it is shown in Fig. 4 and it is desired to apply the extension member 35 for a more extended vulcanizing operation it is merely necessary to remove the cap shoe 28, attach the extension 35, and reapply the cap shoe 28 to the free end of the extension member. In order to allow the removal of the trapped air within the casing extension 35, a pet cock 39 is provided adjacent the upper end of the extension and it is designed to be opened when the mold is put into its initial use to insure the complete filling of the casing 35 with steam. If it is found that considerable air is contained in the water and given up continuously as steam is generated, the pet cock 39 may be left slightly open to thereby allow the continuous discharge of air therefrom.

It will be seen that a vulcanizer has been provided which is well adapted for vulcanizing widely differing lengths of tires without over-curing any portion of the tire and without forming ridges therein. It will also be seen that a vulcanizer has been provided which may be rapidly brought up to the desired temperature and which may be economically maintained at such temperature.

I claim:

1. A vulcanizer for vehicle tires comprising a chambered casing having an apertured end affording communication with the interior of the casing, a detachable cap for said end conforming in cross sectional contour to that of the casing, a steam generator connected to supply steam to the interior of the chambered casing, and a detachable casing extension adapted to be substituted for the cap to form a continuation of said casing and having an aperture adapted to register with said casing aperture.

2. A vulcanizer for vehicle tires comprising a casing formed of two separable portions having registering end apertures, a steam generator having a steam chamber connected to one of the portions, and an end cap shoe adapted to fit one end of either portion.

3. A vulcanizer for vehicle tires comprising a casing formed of two separable por-



tions having registering end apertures, a steam generator having a steam chamber connected to one of the portions, and an end cap shoe adapted to fit one end of either portion, and having an open recess in its inner face filled with non-heat conducting material, the remainder of the cap shoe including its outer end portion being formed of metal.

4. A vulcanizer for vehicle tires comprising a chambered casing having an inner surface conforming to the portion of the tire to be received therein, a heater upon which said casing is centrally superposed, an upwardly curving casing extension adapted to be connected end to end with the first mentioned casing, said ends having registering apertures, means for allowing steam to pass from the heater to the chamber of the first mentioned casing, and means for allowing an escape of air from the upper end of the second casing, whereby steam may pass through said registering apertures to fill the extension casing.

5. In a vulcanizer having a segmental vulcanizer casing, a metallic end cap for said casing provided with an open recess in its inner surface, and a non-heat conducting filling in said recess adapted to fit the portion of a rubber tire to be vulcanized, the metallic portion of said cap having side and

end surfaces constituting continuations of the surface of said filling.

6. A vulcanizer comprising a portable boiler, an eccentrically mounted casing surrounding said boiler and spaced its greatest distance from said boiler adjacent its lower portion, a burner mounted in the lower portion of said casing, and a vulcanizing shell operatively connected with said boiler and mounted externally of said casing.

7. A vulcanizer comprising a steam generator, a hollow casing permanently connected thereto and having a detachable portion, and end shoes adapted for detachable connection interchangeable with the ends of said stationary portion, or with one end of said stationary portion and with one end of the detachable portion, such shoes having means for insuring gradual variation of heat applied to the work adjacent the outer portion of said casing.

8. A steam generator for a vulcanizer, comprising a cylindrical boiler having spherical ends, a cylindrical casing surrounding said boiler and eccentrically positioned relatively thereto with the greatest clearance between the casing and the bottom of the boiler, and a burner projecting into said casing beneath said boiler.

CLARENCE A. SHALER.