Oct. 25, 1927. 1,647,040

R. D. FRITZ

VULCANIZING APPARATUS

Filed Aug. 7, 1926

Fig-1

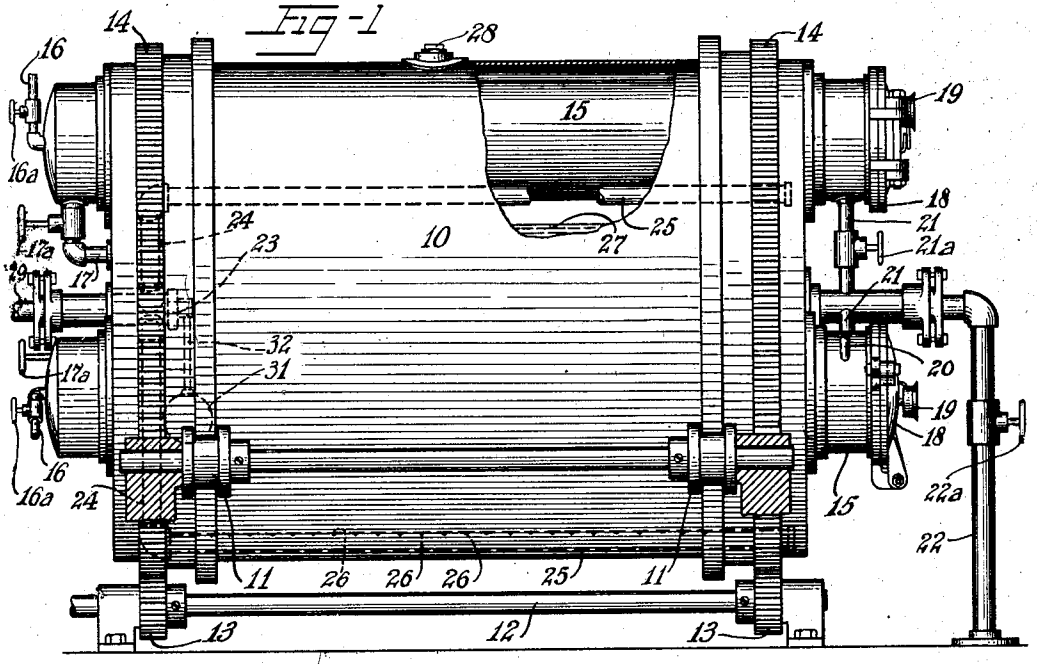


Fig-3

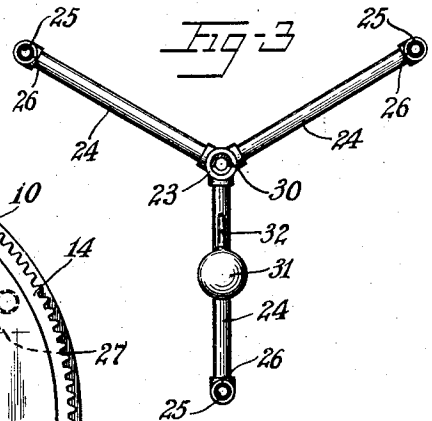
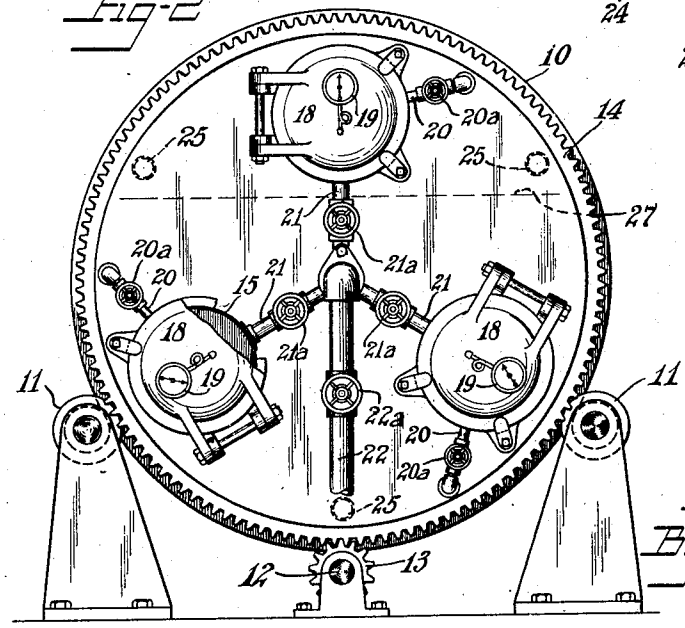


Fig-2



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UNITED STATES PATENT OFFICE.

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VULCANIZING APPARATUS.

Application filed August 7, 1926. Serial No. 127,837.

This invention relates to methods and apparatus for vulcanizing articles wherein the heat is transmitted from a liquid to the articles to be vulcanized.

Its chief objects are to provide improved procedure and apparatus wherein successive batches of articles to be vulcanized may be submerged in a body of vulcanizing liquid while the latter remains in the same container, for conservation of heat; to provide in an improved manner for overlapping vulcanizing periods for successive batches of the articles in the same apparatus, so that removal and substitution of the articles may be effected with but little equipment demurrage. Another object is economy of floor space.

Of the accompanying drawings:

Fig. 1 is a side elevation of a vulcanizer embodying and adapted to carry out my invention in its preferred form, parts being sectioned and broken away.

Fig. 2 is a front end elevation of the same with a part broken away.

Fig. 3 is a vertical section of a steam-pipe spider for heating the body of liquid.

Referring to the drawings, the apparatus comprises a horizontal, cylindrical tank 10 rotatably mounted upon a set of cradle rolls 11, 11 and adapted to be driven through a shaft 12 having thereon pinions 13, 13 meshed with respective gear rings 14, 14 mounted upon the tank.

Mounted in and projecting through the end walls of the tank are a plurality of tubes 15, 15, three such tubes, equally spaced apart circumferentially of the tank, being here shown. At the rear end of the tank each tube has a permanently closed end but is provided with a vent pipe 16 controlled by a valve 16^a and with a drain pipe 17 leading into the tank 10 and controlled by a valve 17^a, the drain pipe being so positioned circumferentially of the tube as to drain from the lowest part thereof when the tube is at the top of its orbit.

At the front end of the vulcanizer each of the tubes 15 is provided with a hinged door 18 having a pressure gauge 19 mounted therein and with a pressure-equalizing inlet pipe 20 controlled by a valve 20^a and leading from the general interior of the tank 10.

At the front end of the vulcanizer each of the tubes 15 is also provided with a pressure pipe 21 controlled by a valve 21^a, all of the pipes 21 leading from a stationary water or air-supply pipe 22 controlled by a valve 22^a, with which they have revoluble connection at the extended axis of the tank 10.

Mounted in the center of the rear end wall of the tank 10 and adapted to rotate therewith is the hub 23 of a steam-pipe spider having three equally spaced radial arms 24, 24 adjacent the rear end of the tank and respective pipes 25, 25 extending horizontally forward from the outer ends of the radial pipes, each of the pipes 25 having its forward end closed and being formed with perforations 26, 26 for the bubbling of steam into a body of water 27 contained in the tank 10 to heat the said water. The tank 10 is provided with a filling and draining hole closed by a plug 28.

The steam-pipe spider has revoluble connection at the extended axis of the tank 10 with a stationary steam-supply pipe 29.

In order that the perforated pipes 25 may discharge steam only when they are submerged in the body of water 27, the hub 23 of the spider is provided with a valve plug 30 adapted to be held against rotation by a weight 31 mounted upon an arm 32 projecting radially from the plug, the weight being adapted to hold the arm in a downwardly projecting position, and the plug and its socket in the hub 23 being so formed as to maintain communication between the steam-supply pipe 29 and each of the radial pipes 24 only while the radial pipe is in such part of its orbit that its perforated pipe 25 is submerged.

In the operation of the apparatus the tank 10 is filled with water, which may be previously heated, to about the level shown, and the water is maintained at vulcanizing temperature by steam passed thereinto through the perforated pipes 25, the weight 31 holding the valve plug 30 stationary and so causing it to admit steam to each of the pipes 25 only when the said pipe is submerged in the water.

The tank 10 is periodically rotated through one-third of a revolution, by driving of the shaft 12, the stopping positions being such that one after another of the tubes 15 is held above the level of the water while the other two are submerged, as shown.

Assuming all valves to have been closed

when the tank is initially charged with water, articles to be vulcanized are placed in the uppermost tube, through its door 18, and the latter is closed. Its valve 20^a is then opened, which permits steam from the water 27 to enter the tube and the pressure therein to equalize with that of the general interior of the tank.

The valve 17^a of the said uppermost tube is then opened and the tank is given one-third of a revolution, which submerges the said tube and brings the next one above the level of the water.

As the operation is the same for each of the tubes, the description of operation with respect to the tube which has just been referred to as being submerged will suffice for all.

As the tube 15 is submerged, with its valves 20^a and 17^a open, the water flows into the tube through the valve 17^a and fills the tube, the air escaping from the tube through the valve 20^a and rising to the surface of the water. The valves 20^a and 17^a are then closed and the valves 21^a and 22^a are opened and the pressure within the tube is thus raised by high pressure water or permissibly air from the supply pipe 22. The valves are thus left, the articles undergoing vulcanization under pressure and being supplied with heat by gravity currents in the water, until the end of the period during which the tube remains in its second underwater position, at which time, but either just before or just after the tube rises to the top position, the valve 21^a is closed to shut off the high pressure water or air. The valves 20^a and 17^a are then opened, which permits the water to flow from the tube into the body of water 27, through the valve 17^a, after which the valves 20^a and 17^a are closed and the vent pipe valve 16^a is opened to reduce the pressure in the tube to that of the atmosphere. The door 18 is then opened and the vulcanized articles are removed, the vent pipe valve 16^a is closed, the tube is recharged with articles to be vulcanized, and the operation as described is continued.

The apparatus, being adapted to rotate substantially in its entirety, readily may be made of strong construction and provides simplicity of operation. Other advantages, including those set out in the above statement of objects, will be manifest.

Modifications may be resorted to without departure from the scope of my invention as defined in the appended claims.

I claim:

1. Vulcanizing apparatus comprising a container for the articles to be vulcanized, a container for a body of liquid, means for lowering the first container into and lifting it from the liquid in the second container, and means for opening and closing communication between the interiors of the two containers, the first said container being mounted for planetary rotation to lower it into and lift it from the liquid.

2. Apparatus as defined in claim 1 in which the first container is fixed within the second container and the latter is mounted for rotation to submerge the first container in the liquid and raise it therefrom.

3. Vulcanizing apparatus comprising a rotatable tank, a plurality of containers having fixed relative positions in the tank, and means for opening and closing communication between the general interior of the tank and the interiors of the containers selectively.

4. Apparatus as defined in claim 3 including stationary means coaxial with the tank for conducting pressure fluid into the containers selectively while permitting rotation of the tank.

5. Vulcanizing apparatus comprising a rotary tank, means entering the tank at the axis thereof for conducting steam into the tank and releasing it therein at a low part thereof, a body of water in the tank, and means within the tank for so supporting therein articles to be vulcanized as to cause them to be lowered into and lifted from the water in the rotation of the tank.

6. Apparatus as defined in claim 5 in which the steam-conducting means comprises a spider of piping mounted to rotate with the tank and a weight-controlled valve for opening and closing off each arm of the spider with respect to the steam-supply pipe.

In witness whereof I have hereunto set my hand this 5th day of August, 1926.

ROY D. FRITZ.