

Dec. 11, 1934.

C. F. BALL

1,983,891

PRESSURE RELIEF APPARATUS FOR CONCRETE MIXERS

Filed Oct. 16, 1931

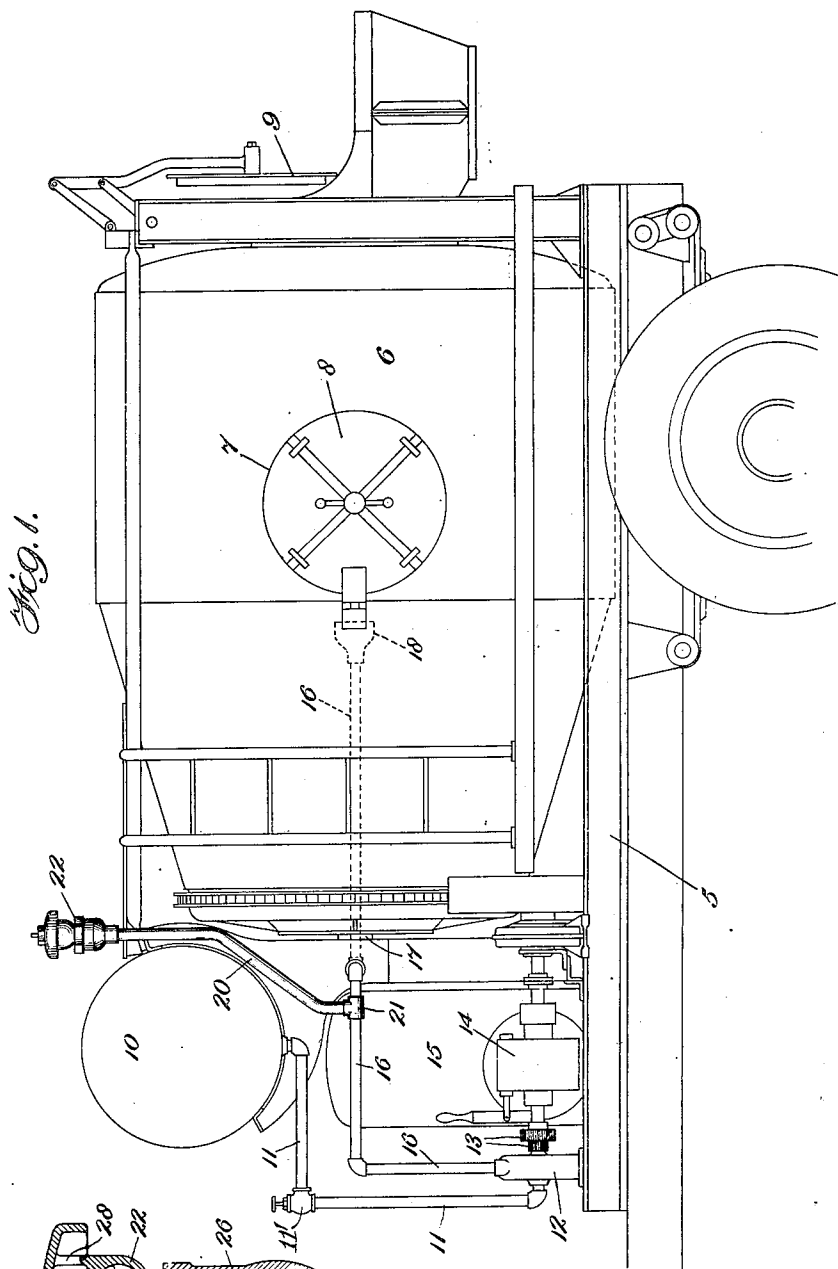
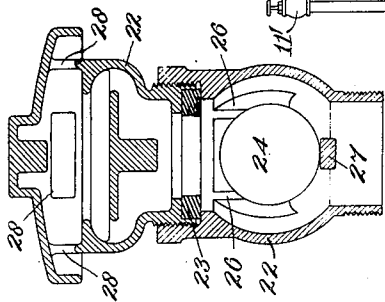


Fig. 2.



304

Inventor
Chas. F. Ball,
Barker & Collings
attorneys

UNITED STATES PATENT OFFICE

1,983,891

PRESSURE RELIEF APPARATUS FOR
CONCRETE MIXERS

Charles F. Ball, Milwaukee, Wis., assignor to
Chain Belt Company, Milwaukee, Wis., a cor-
poration of Wisconsin

Application October 16, 1931, Serial No. 569,322

1 Claim. (Cl. 83—73)

This invention relates to concrete mixing apparatus and has for its principal object the provision of means in such apparatus for relieving the gaseous pressures which may be built up within the mixing receptacles during the mixing operation.

In the development of truck or transit mixers within the last few years it has been found that during the mixing operation the chemical reactions between the constituents of the mix, particularly between the water and cement, generate certain gases which, owing to the peculiarities of truck mixer construction and practice are apt to build up dangerous pressures within the mixing receptacles. That is to say, whereas in ordinary construction and paving mixers the interior of the mixing drums or receptacles are open to the atmosphere through their charging and discharging openings, which are not ordinarily closed, in truck mixer practice it is usual to provide the charging and/or discharging openings with hatch plates or covers whereby the receptacles are completely closed during the mixing operation. This is primarily for the purpose of securing larger capacities since by introducing more raw materials into the receptacles and closing the said openings during the mixing operation batches of 2, 3 and 4 cubic yards may be mixed and transported in receptacles of substantially the same size as those employed for mixing one cubic yard in a paving mixer.

When the receptacles are thus closed however, the gases resulting from the chemical reactions above mentioned, build up pressures within the closed receptacles which experience has shown may reach dangerous points, since instances are of record wherein the operator, upon releasing the locking means of the closure for the discharge opening, has had the said closure blown violently outward with resultant injury to himself.

It is therefore the primary object of the present invention to provide means in mixers of this type for relieving such pressures by venting the receptacles to the outer atmosphere so that the gases may escape as they are formed.

A further object of the invention is to employ a portion of the water supply system of a mixer of this type as a portion of the venting means.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter described and particularly pointed out in the appended claim.

Referring to the accompanying drawing forming a part of this specification in which like reference characters designate like parts in all the views:—

Figure 1 is a side elevational view of a portion of a truck mixer of well known form with venting means constructed in accordance with the present invention illustrated thereon; and

Figure 2 is a central vertical sectional view of one type of valve suitable for controlling the gas vent.

Referring more particularly to the said drawing, 5 indicates generally the truck mixer having the rotatable mixing receptacle 6 which is provided with a charging opening 7 normally closed during the mixing operation by a hatch cover 8. The said receptacle 6 is also provided with a discharge opening at its rear end which is normally closed during the mixing operation by hatch cover 9.

Such truck mixers are ordinarily provided with a water supply system which lends itself readily to use in connection with the gas venting means of the present invention and such a construction has been herein illustrated. That is to say, the said mixers are provided with a water tank or receptacle 10 from which leads a pipe 11 to a centrifugal or other pump 12 driven through suitable gearing 13 from the transmission 14 of the motor enclosed within the housing 15, which motor is employed primarily for rotating the mixing receptacle 6. The pipe 11 is provided with a control valve 11' which normally is closed at all times except when water is being admitted to the mixing receptacle. The pump 12 discharges into a pipe 16 which enters the mixing receptacle 6 along its rotative axis through the forward bearing 17, and the said pipe 16 is preferably provided at its inner end with a suitable protector 18 which is or may be constructed substantially in accordance with the disclosure in my prior co-pending application filed September 18, 1931, Serial No. 563,661, entitled Protectors for the fluid supply pipes of agitating apparatus. As fully disclosed in the said prior application the function of this protector is to permit flow of water into the drum from a pipe such as 16 and at the same time prevent the entry into the said pipe of concrete materials, more especially the heavier aggregates, such as gravel or crushed stone. However, the said protectors do not provide a fluid tight seal so as to prevent any gases which may be generated within the receptacle 6 from entering into the pipe 16 and therefore it is

quite practical to vent the interior of the receptacle 6 from the said pipe.

For this purpose a pipe or conduit 20 may be connected as at 21 to the pipe 16 intermediate the valve 11' and receptacle 6 and extend upwardly as shown in Figure 1. Where the water system of the truck mixer is provided with a pump such as 12 to facilitate the entry of the water into the drum the upper end of the vent pipe 20 is preferably provided with any suitable type of valve structure which will permit of the escape of gases from the pipe 20 but which will prevent the escape of water therefrom when being forced by the pump 12 through the pipe 16 and into the receptacle 6. One form of valve structure suitable for use in this connection is illustrated in Figure 2 and comprises a valve body 22 enclosing a yielding seat 23 against which valve ball 24 may contact. The said ball is preferably mounted in suitable guides 26 of the valve body and a stop 27 is provided to limit the downward or outward movement of the ball. In the normal position of the valve, which is its open position, the weight of the ball 24 is sufficient to cause it to drop onto the stop 27 thereby permitting free passage of gases through the valve and out through the discharge passages 28. However, when water under pressure from the pump 12 passes through the pipe 16 and rises in the pipe 20 its impact against the ball 24 will raise the same until it seats on the packing 23, thereby preventing the water from being forced out through the openings 28. On the other hand, when the admission of the water into the receptacle 6 has been completed, the valve ball 24 will fall under the influence of gravity, thereby again opening the pipe 20 to the atmosphere. This is the condition of the parts in the mixing operation and obviously any gases which may be generated within the receptacle 6 through the chemical reactions may find their way through the protector 18, pipe 16, pipe 20 and past the valve ball 24 to the atmosphere. Dangerous building up of the gas pressure within the receptacle 6 is thus avoided.

In some truck mixers water pumps such as 12 are not employed, the hydrostatic head resulting from the elevation of the water tank 10 being depended upon to supply the water to the receptacle 6 by gravity. In this event the pipe 11, and pump 12 are omitted and the pipe 16 is connected directly to the water tank 10. Should the discharge end of the vent pipe 20 be lower than the tank 10 it would of course still be necessary to employ a valve structure such as 22 to prevent water from being forced out through the vent pipe. However, if the said vent pipe be extended upwardly so that its discharge end is higher than the tank 10, then such valve structure may be omitted, since obviously the water would never rise higher in the vent pipe 20 than it is in the tank 10.

The valve structure illustrated in Figure 2 is one which is in wide use and no claim is made to the specific details thereof which have been shown merely as a typical example of the type of valve which may be employed. Obviously a float valve or an impact valve of different construction from that shown in Figure 2 may be used if desired.

It is obvious that those skilled in the art may vary the details of construction as well as the precise arrangement of parts without departing from the spirit of the invention, and therefore it is not wished to be limited to the above disclosure except as may be required by the claim.

What I claim is:

In a concrete mixer, the combination of a closed mixing receptacle; a pressure water supply system including a conduit communicating with the interior of said receptacle, and a control valve for said conduit exterior of said receptacle; a gas vent pipe communicating with the atmosphere and with said water conduit intermediate said control valve and receptacle; and a valve controlling said vent pipe, arranged to permit the escape of gas and prevent the escape of water there-through, whereby the gaseous pressure within the receptacle is maintained equalized with that of the external atmosphere.

CHARLES F. BALL.