W. F. WEBB.

CONCRETE GUN.

APPLICATION FILED DEC. 11, 1919.

1,362,767.

Patented Dec. 21, 1920.

2 SHEETS—SHEET 1.

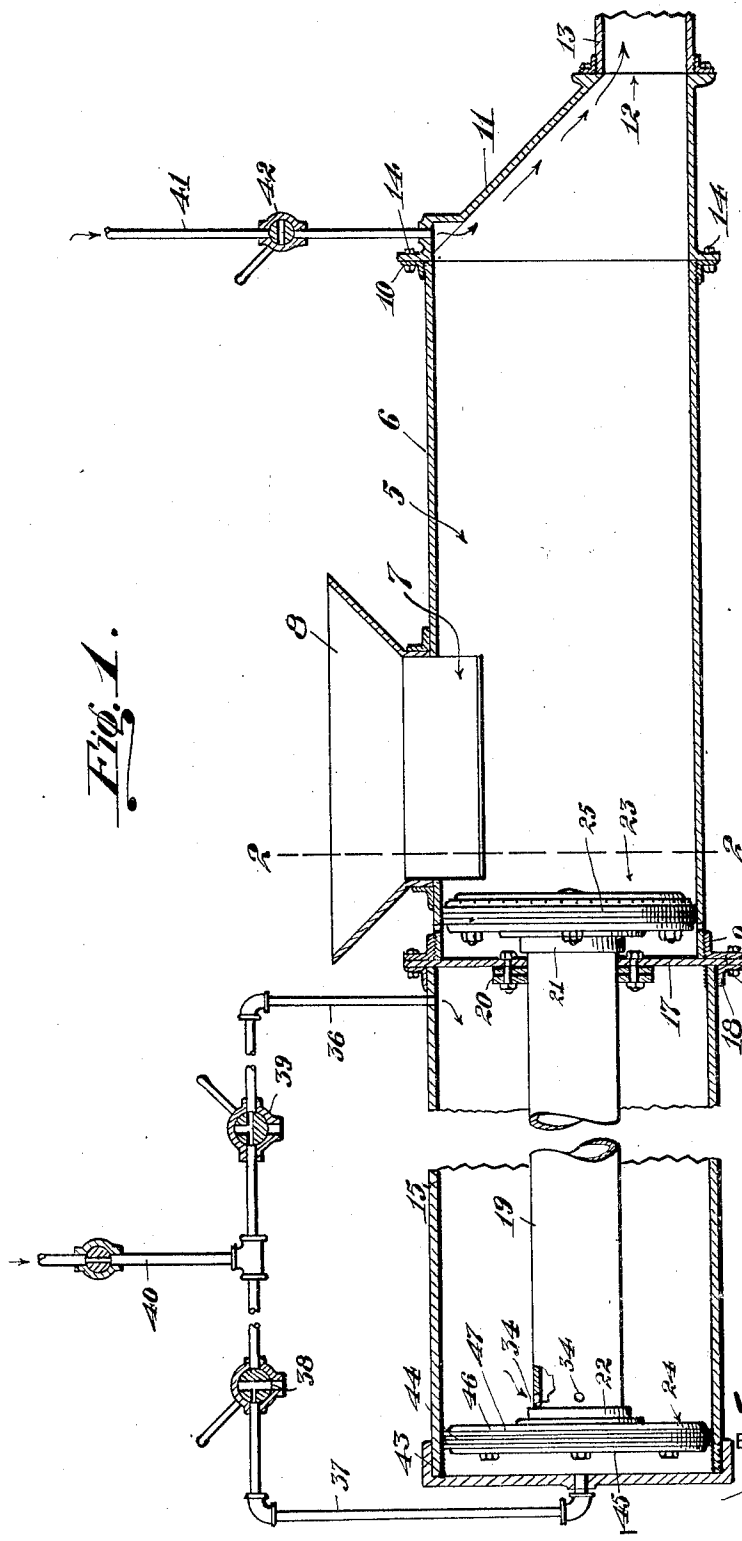

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

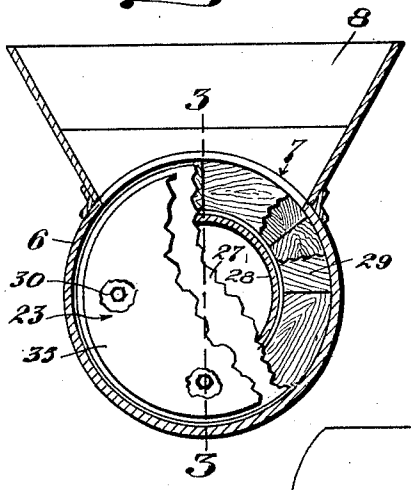


Fig. 3.

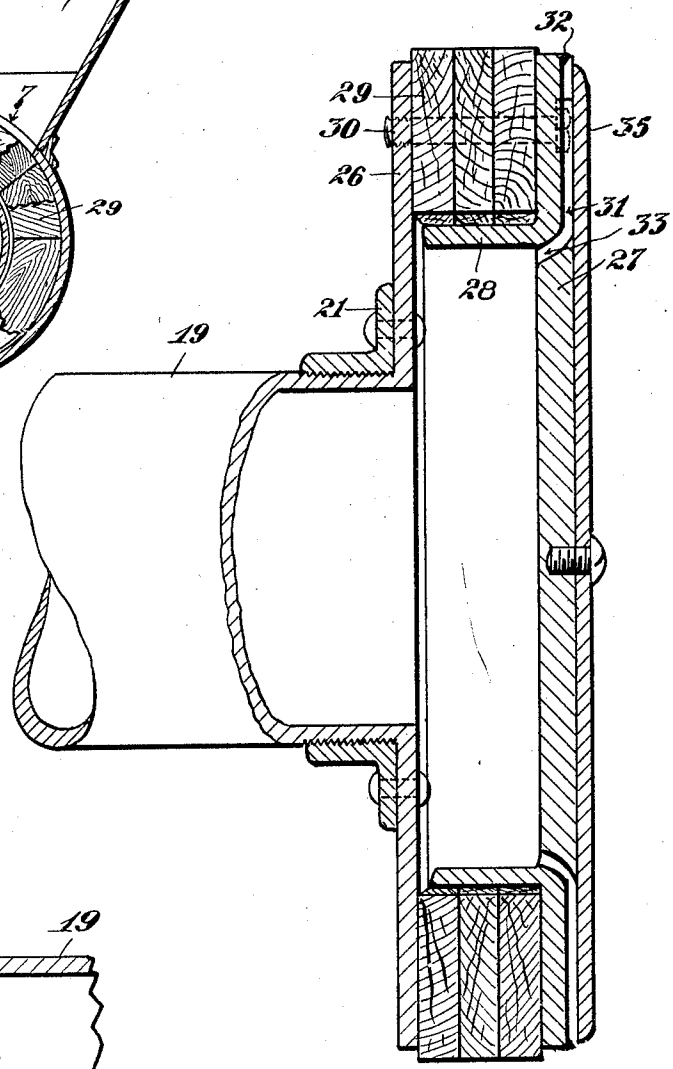
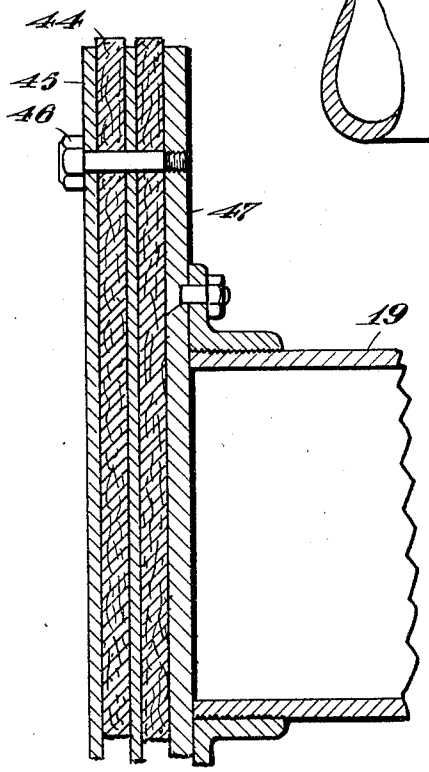


Fig. 4.



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UNITED STATES PATENT OFFICE.

WADE F. WEBB, OF KERNVILLE, CALIFORNIA.

CONCRETE-GUN.

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To all whom it may concern:

Be it known that I, WADE F. WEBB, citizen of the United States, residing at Kernville, in the county of Kern and State of California, have invented new and useful Improvements in Concrete-Guns, of which the following is a specification.

This invention relates to a concrete gun and particularly pertains to an air operated mechanism for conveying concrete through a conduit.

It is the object of this invention to provide effective means whereby concrete may be forced through a conduit by the direct action of air thereon, and embodying a mechanism for feeding a charge of concrete to the conduit while it is being subjected to the conveying action of air under pressure.

Another object is to provide a concrete gun embodying a receiving chamber having a piston therein adapted to advance the concrete delivered to the chamber toward a discharge nozzle, and also to provide a means for reciprocating said piston by air under pressure.

Another object is to provide a novel piston construction which will permit of the ready adjustment or removal and replacement of packing elements on the piston to compensate for the unusual wear to which packing rings in pistons employed for this purpose would be subjected.

Another object is to provide a construction and arrangement of parts in a concrete gun whereby it may be readily assembled and dismantled.

A further object is to provide means for removing concrete from the inner walls of the receiving chamber so as to reduce wear of the piston and chamber walls.

Other objects will appear hereinafter.

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a view of the concrete gun in vertical section, partly in elevation;

Fig. 2 is a transverse section as seen on the line 2—2 of Fig. 1, with parts broken away;

Fig. 3 is an enlarged vertical section on the line 3—3 of Fig. 2, showing the construction of the concrete advancing piston and illustrating the construction of the piston rings;

Fig. 4 is an enlarged detail section illustrating the construction of the air piston;

More specifically, 5 indicates a concrete receiving chamber which is formed of a cylinder 6 preferably comprising an ordinary iron pipe of suitable dimensions, preferably about 2 feet in diameter. This cylinder is formed with an inlet opening 7 in the upper portion and adjacent to one end thereof, fitted with a feed hopper 8, and the cylinder is also fitted with end flanges 9 and 10 here shown as screwed thereon. The end of the cylinder remote from the opening 7 connects with an eccentric reducer 11, the bottom wall of which is continued flush with that of the chamber 5 and the side and top walls of which taper to an outlet 12 connecting with a conduit 13 leading to any suitable point of discharge.

The reducer 11 is preferably detachably connected to the cylinder by means of bolts 14 or other suitable fastenings engaging the flange 10.

The end of the cylinder adjacent to the opening 7 is connected to a cylinder 15, which is fitted with an end flange 16, and interposed between the cylinders 6 and 15 is a plate 17 forming a partition between the interiors of the cylinders, and which plate is here shown as secured between the flanges 9 and 16 by bolts 18 by which the cylinders are connected together. The partition plate 17 is formed with a central opening through which a tubular piston stem 19 extends; packing rings 20 encircling the margin of the opening in the partition plate to form a practically air tight joint.

The piston stem 19 is preferably formed of pipe externally threaded at its ends to receive flange rings 21 and 22; the flange ring 21 carrying a piston 23 positioned in the cylinder 6, and the flange ring 22 carrying a piston 24 disposed in the cylinder 15. An important feature of the present invention resides in the construction of the forward piston 23 whereby packing rings 25 thereon may be readily adjusted, removed and replaced; the preferred construction of the piston ring being shown in Fig. 3, in which the piston is illustrated as embodying a back plate 26 secured to the flange ring 21 and a demountable front plate 27 formed with an inwardly projecting annular flange 28 spaced from its outer edge. A series of packing members are mounted on the front plate and are here shown as comprising wooden segments 29 arranged in layers of any suitable number and disposed with the joints

between the segments of adjacent layers staggered or offset relative to each other to form broken joints.

The front plate, carrying the packing member, is demountably attached to the back plate 26 by means of bolts 30, which are here shown as passing through the front plate 27 and through the packing member and screwed into engagement with the back plate 26, which construction permits of the front plate and packing members being removed from the piston and replaced through the opening 7 so as not to necessitate disconnection of the cylinders 6 and 15 when it is necessary to renew the packing member on the piston.

The outer face of the front plate 27 is formed with a series of channels 31 terminating in an inclined wall 32 at the outer edge of the plate and communicating at their inner ends with openings 33 leading to the inner side of the plate in communication with the space interiorly of the flange 28 which opens through the plate 26 to the tubular piston stem 19, which is here shown as formed with an air inlet opening 34 adjacent to the piston 24 so as to admit air from the chamber within the cylinder 15 and effect a discharge of a series of air jets from the forward end of the piston 23 adjacent its periphery and against the walls of the chamber 5.

The channels 31 are covered by a face plate 35, which is placed over the front plate 27 and secured thereto by any suitable fastenings; the face plate 35 affording a removable wearing surface and serving as a protection to the front plate 27.

The pistons 23 and 24 are designed to be reciprocated by air under pressure, which is delivered alternately to the opposite sides of the piston 24 through air inlet pipes 36 and 37 communicating through control valves 38 and 39, with a conduit 40 leading from any suitable source of air under pressure.

The valve 38 is here shown as consisting of an ordinary three-way valve adapted to be positioned to either admit air under pressure to the outer end of the piston or to exhaust the air therefrom. The valve 39 is here shown as comprising an ordinary straight way cut-off valve for admitting air under pressure to the inner side of the piston 24.

The air for conveying concrete through the conduit 13 is admitted to the chamber 5 through a conduit 41 leading into the upper portion of the reducer 11 through a regulating cut-off valve 42.

The outer end of the cylinder 15 is closed by an end cap 43, which is screwed thereon and with which the pipe 37 connects, and the piston 24 is formed with packing rings 44 held in place by an end plate 45 adapted to be removed and replaced through the open outer end of the cylinder 15 when the end cap 43 is removed; the end plate 45 being secured by bolts 46 to a back plate 47 carried on the end flange 22 of the piston stem.

In the operation of the invention, the piston 23 is retracted by admitting air into the chamber within the cylinder 15 through the valve 39, the air being admitted in such volume and pressure as to act on the piston 24 to move the connected pistons rearwardly and at the same time supply sufficient air to maintain a flow of air through the piston 23 during the retraction thereof and clean the walls of the chamber 5. The valve 38 is opened to permit rearward movement of the pistons.

When the piston 23 is in its retracted position, a charge of concrete is delivered to the chamber 5 through the hopper 8 and opening 7, whereupon the valve 39 is closed and the valve 38 opened to direct air under pressure rearward of the piston 24, so as to impel the latter in a forward direction, together with the piston 23.

The air in the chamber within the cylinder 15 will be discharged through the openings 34 and through the piston 23 against the walls of the chamber 5, as the pistons advance. The charge of concrete delivered to the chamber 5 is shoved forward by the piston 23 toward the conduit 13, and when the piston 23 has reached a point beyond the opening 7, the valve 42 is opened to admit air into the space within the chamber 5 between the outer end of the piston 23 and the reducer, which air under pressure will operate to advance the concrete through the conduit and to convey it to any suitable point of discharge remote from the receiving chamber.

The piston 23 is advanced such distance as to position the major portion of the charge into the reducer, whereupon the valve 38 is closed to the air supply and opened to exhaust and the valve 39 opened to the air supply to retract the pistons. The valve 42 may be left open until the piston 23 reaches the opening 7, whereupon it will be closed during the time the succeeding charge is delivered to the receiving chamber and the piston 23 again advanced.

The abrasive character of the material being handled causes rapid wear of the packing member of the forward piston and necessitating occasional adjustment or replacement of the packing members. By the construction of the piston as before described, this may be readily effected by removing the front plate 27 through the intake opening 7.

While I have shown and described a specific embodiment of my invention, it is manifest that various changes may be made in the details of construction thereof, without

departing from the spirit and scope of the invention as set forth in the appended claims.

As a means for preventing backward movement of the pistons in event the conduit should become choked, the piston 24 is formed of an area exceeding that of the piston 23 so that the pressure exerted by the air on the piston 24 would be greater than that exerted by back pressure on the piston 23, thereby overcoming such back pressure. Any other suitable means may be employed for preventing accidental retraction of the pistons.

I claim:

1. In a concrete gun, a concrete receiving chamber, a discharge conduit connected thereto, means for admitting air under pressure to said chamber to convey concrete through said conduit, a piston in said chamber for advancing a charge of concrete into position to be operated on by air under pressure, and means for directing jets of air from adjacent the periphery of said piston against the walls of the receiving chamber.

2. A concrete gun comprising a pair of cylinders, a partition plate interposed between said cylinders, a piston in each of said cylinders, a piston stem connecting said pistons through said partition plate, means for directing air under pressure to the opposite sides of the piston in one of said cylinders for advancing and retracting said pistons, an intake opening being provided in the other cylinder through which a charge of concrete may be admitted to the latter forward of the piston therein, a discharge conduit connected to said last named cylinder, and means for directing air under pressure in front of the piston in said last named cylinder to convey the charge of concrete through said conduit.

3. A concrete gun comprising a pair of cylinders, a partition plate interposed between said cylinders, a piston in each of said cylinders, a piston stem connecting said pistons through said partition plate, means for directing air under pressure to the opposite sides of the piston in one of said cylinders for advancing and retracting said pistons, an intake opening being provided in the other cylinder through which a charge of concrete may be admitted to the latter forward of the piston therein, a discharge conduit connected to said last named cylinder, means for directing air under pressure in front of the piston in said last named cylinder to convey the charge of concrete through said conduit, and means for directing air through the piston in the last named cylinder to direct air jets against the walls of the cylinder.

WADE F. WEBB.