ST. JOHN CLARKE.

APPARATUS FOR HANDLING CONCRETE AND LIKE MATERIALS.

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1,050,427. Patented Jan. 14, 1913.

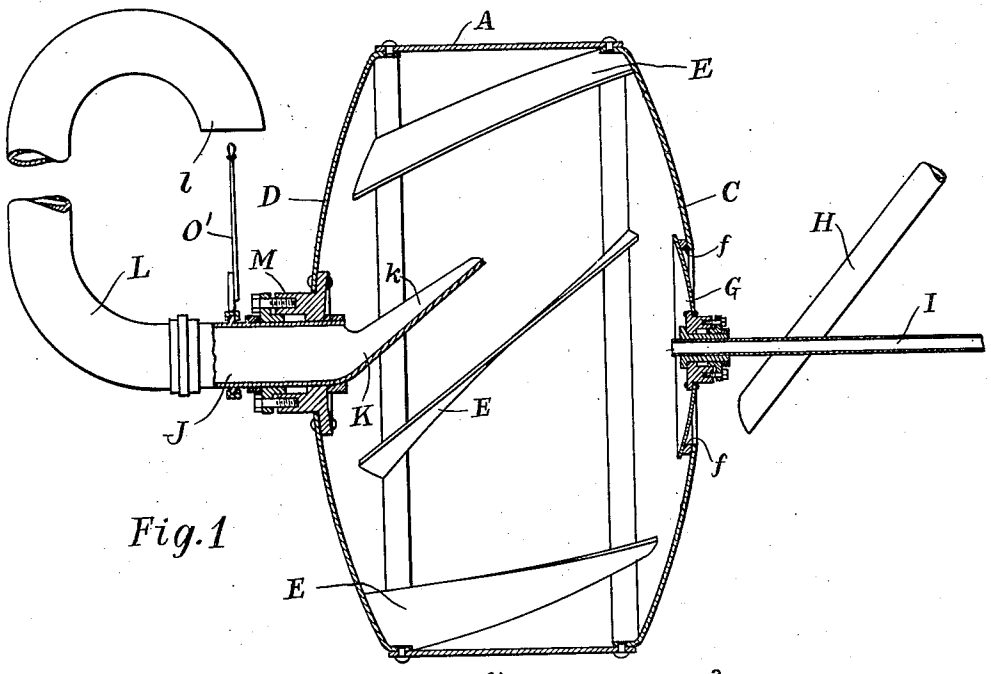

Fig. 1

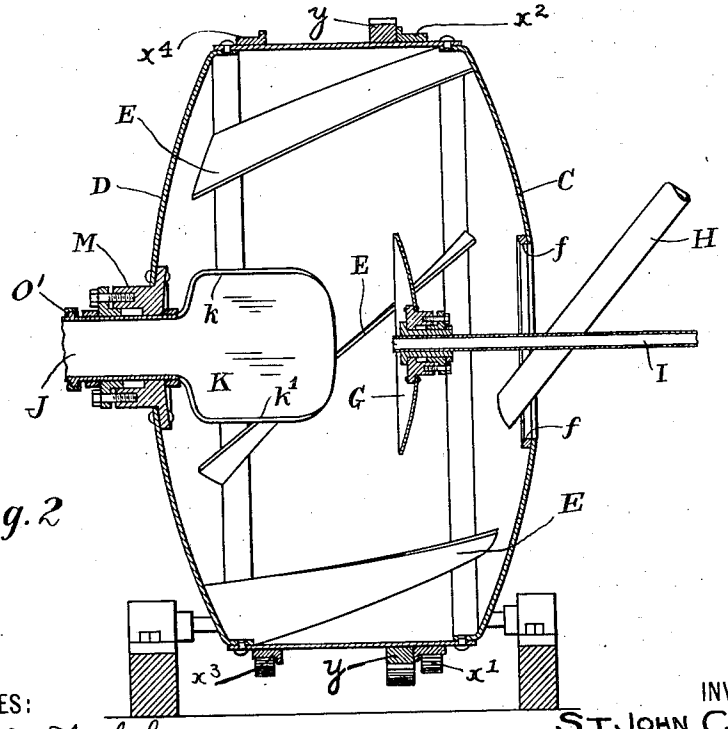

Fig. 2

WITNESSES:

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APPARATUS FOR HANDLING CONCRETE AND LIKE MATERIALS.

1,050,427. Specification of Letters Patent. Patented Jan. 14, 1913.

Application filed August 10, 1910, Serial No. 576,574. Renewed November 14, 1912. Serial No. 731,432.

To all whom it may concern:

Be it known that I, ST. JOHN CLARKE, a citizen of the United States of America, residing at Bogota, in the county of Bergen, State of New Jersey, United States of America, have invented a new and useful Apparatus for Handling Concrete and the Like Materials; and I do hereby declare the following to be a full, clear, and exact description of the same.

The present invention relates to apparatus for handling concrete materials, mortar or like semi-solids, and comprises (1) improvements in means for mixing said materials, and (2) improvements in means for delivering mixed concrete to a desired point of use, for instance, in the lining of tunnels or subways, or in the building of walls.

In a pending application, Serial No. 514,081, filed August 21st, 1909, for Letters Patent of the United States, I have described and claimed a means whereby air under pressure is caused to exercise an injector-like action on a mass of concrete to cause the delivery thereof into and through a pipe.

Hereinafter, I describe and show a different utilization of compressed air, and a different apparatus for effecting the delivery of mixed concrete to a desired point of use.

Prior to my several inventions, it was usual, in the handling of concrete (in tunnel construction, especially) to mix the concrete upon the ground at a point more or less near to the work to be constructed, or to dump the mixed concrete upon the ground at the latter point, and thereafter the workmen shoveled the concrete into buckets and the latter were lifted and the contents dumped between the frame and the wall of the tunnel. This practice has required several handlings of the concrete, and large quantities of the latter are wasted, both causes increasing the cost. In addition, the work has consumed considerable time. By the employment of my improvements, however, the mixture and the delivery of the mixed concrete to any desired point are assured, in one single handling, and it is not necessary to dump the same upon the ground, or to shovel the concrete into buckets, or to lift or carry the material to be dumped into the frame.

According to the invention now under consideration, I provide a casing or other body having an outlet for compressed air and means for delivering mixed concrete toward said outlet to be carried off with the outrushing air.

The means for delivering the concrete into the outlet may be blades or other suitable devices for raising more or less uniform quantities of mixed concrete to fall, by gravity into or toward the outlet. In fact, I use a modified form of the well-known rotary concrete mixer, the changes including the addition of means for making the mixer air-tight, and a construction of the discharge means so as to utilize the compressed air for leading the discharged concrete through a hose or pipe to a more or less distant point of use at any plane with relation to said point of discharge.

Referring to the accompanying drawings, Figure 1 shows, in vertical section, my new apparatus when used for delivering semi-solids—such as mortar or concrete—to a point of use, as between the wall of a tunnel and a frame; and Fig. 2 is a like view of the machine in use for mixing the concrete materials.

While I may employ any means for turning the casing about its axis, I have shown (in Fig. 2) a gear ring, y, secured to the casing, and also two tracks (x^2, x^4) running upon rollers (x' and x^3) when the casing is rotated. The apparatus may be stationary, or it may be mounted on a car or truck to be returned, as often as desired, to a supply chute, and to readily keep pace with the completed work.

A indicates a casing, constituting a concrete mixer, rotatable about a horizontal axis, and having, preferably of any of the usual forms, ends C and D, and diagonally-arranged mixing and lifting blades, E, upon the interior of the casing. One end (C) has a filling opening or port F, and a movable supply chute H, or other suitable device, may be employed for filling mixed concrete, or the ingredients to be mixed, into the casing.

In the usual and well-understood manner, the material in the casing is tumbled over and over, and quantities thereof are lifted by the blades E to be dropped again and, according to the position of a deflecting device having one end within the casing, to fall into the mass at the lower part of the mixer, or to be led from the casing.

The device shown by me is a modification of the well-known mixer, one of the prin-

cipal changes being in providing the outlet for the concrete of a form suitable also for a controlled outrush of air under pressure, so as to direct the concrete into a pipe, the length whereof may be any desired according to the point at which the concrete is to be used, and the exit end of which pipe may be at any desired level (higher, lower or in the same plane) with respect of the casing A. A second principal change is the provision of means for making the casing air-tight, when desired, and also of means for supplying air under pressure to the interior of the same.

As shown in Fig. 2, the lower end of the supply device, H, may be thrust forward into the port F and the concrete materials—in a more or less mixed form—may be poured into the casing. When desired, the port F may be closed by a suitable door, and I have shown the use of a concave-convex metallic disk, G, for this purpose, said disk being disposed so as to be movable horizontally, to open the port, for filling purposes, when slid toward the end D, and to close said port and render the casing air-tight, when drawn (as shown in Fig. 1) against the end C. In the instance illustrated, end C is provided with a metallic or other packing ring *f*, which causes a tight fit, all around near to its edge, of the door or disk, G, near to the edge of the filling port F. In order to slide the disk or door, it may be rotatably mounted as shown, upon a tube or pipe I and near the end *i* which opens into the casing. The disk or door is fixed against sliding on said pipe, so that the moving of the latter causes the door to open and close the filling port F. The outlet means devised by me consists of a tube or pipe, J, passing through the end D and connected by a collar M (or other suitable construction), so as to permit the casing to rotate around the pipe, and also to permit the pipe, when desired as hereinafter stated, to be rocked about the axis of said pipe.

The pipe, J, referred to, has one end extending, for a considerable distance, into the casing, and such end is cut away to provide, or is otherwise formed so as to have, an end bent at an angle relatively to the pipe and also much broadened, thus forming a shovel-like part or hopper K, having edges *k* and *k*^{1}, preferably upstanding, as shown in Fig 1. In order to rock the pipe J about its longitudinal axis—the horizontal axis of the casing—any suitable means, such as the lever O^1, may be provided.

The outer end of the discharge chute or pipe J is connected with another pipe, L, which may be of any number of sections and flexible throughout or at parts. The discharge end *l* of the last-mentioned pipe may lead into any suitable mold or form, at any desired level relatively to the position of the casing.

As heretofore stated, the inner end of pipe J is bent at an angle with respect of the body of the pipe, and when said pipe is turned as shown in Fig. 1, the concrete will fall upon the broadened inner end K, and slide into the pipe, to be passed through the latter.

In the use of my new apparatus for mixing only, the door G is opened as in Fig. 2 (to permit the supply from chute H), and during mixing thereafter—no matter whether the door remains open or is closed—the discharge pipe or chute is held in the position shown, that is so as to present only an edge to material lifted by the blades E, in order not to catch or retain the falling material, which is turned over and over and agitated as long as desired.

When the apparatus is to be used for delivering the concrete to the point of use (that adjacent the discharge end of pipe L), the door G is closed, if not already so, air under pressure—that intended for operating drills or from any source—is supplied through pipe I, and the air rushes from the casing through the pipes J and L. As soon as it is desired to remove concrete from the casing—which may be in constant rotation—the pipe J is rocked so as to have the broadened end K take the position shown in Fig. 1, presenting an extensive surface to concrete falling from the blades E; this surface being inclined, the concrete is directed into the pipe J, and into the column of air outrushing from that pipe. The concrete being in quantities, more or less small, and in motion, when entering the pipe, is easily carried (in a practically-continuous stream) along with the rushing air, the speed of which will depend upon the quantity supplied through pipe I.

What I claim is:

1. In an apparatus for handling concrete and like material, the combination of an air-tight casing adapted to hold material in a certain part thereof; a pipe communicating with said casing, in an air-tight manner, and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and remote from said certain part; and means adapted to intermittently remove small masses of material from said certain part and deposit them in said port.

2. In an apparatus for handling concrete and like material, the combination of an air-tight casing; a pipe communicating with the casing in an air-tight manner for conducting air under pressure into the casing, said casing being provided with a discharge port leading from the casing and provided with a hopper remote from the bottom of the casing; and means for intermittently lift-

ing small masses of the material from the lower part of the casing and depositing it in said port.

3. In an apparatus for handling concrete and like material, the combination of an air-tight casing adapted to hold wet concrete in a certain part thereof; a pipe communicating with the casing in an air-tight manner and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and separate from said certain part; and revolving blades adapted to remove small masses of wet concrete from said certain part and deposit the masses in said discharge port.

4. In an apparatus for handling concrete and like material, the combination of a rotatable air-tight casing adapted to hold wet concrete in its lower part; a pipe communicating with the casing in an air-tight manner and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and separate from said lower part; and means adapted to revolve with the casing and to remove small masses of concrete from said lower part and deposit them in said discharge port.

5. In an apparatus for handling concrete and like material, the combination of a rotatable air-tight casing adapted to hold wet concrete in its lower part; a pipe communicating with the casing in an air-tight manner and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and separate from said lower part; and blades secured to the sides of the casing and revoluble with the casing and adapted to intermittently lift small masses of concrete from the said lower part and deposit them in the discharge port.

6. In an apparatus for handling concrete and like material, the combination of a horizontally disposed rotatable air-tight cylinder casing adapted to hold wet concrete in the lower part thereof; a pipe communicating with said casing in an air-tight manner and adapted to conduct compressed air thereinto; said casing being provided with a discharge port communicating with the center of one end of the casing; a hopper at the inner end of said port; and helically disposed blade fixed on the inner face of the sides of the casing and adapted as the casing rotates, to intermittently lift small masses of concrete from said lower part and to drop them partly back into said lower part and partly into the hopper.

7. In an apparatus for handling concrete and like material, the combination of an air-tight casing adapted to hold material in a certain part thereof; a pipe communicating with casing, in an air-tight manner, and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and remote from said certain part; means adapted to remove small masses of material from said certain part and discharging them toward the discharge port; and means for directing the charged material into or away from the receiving end of the discharge port.

8. In an apparatus for handling concrete and like material, the combination of a rotatable air-tight casing adapted to hold wet concrete in its lower part; a pipe communicating with the casing in an air-tight manner and adapted to conduct air under pressure into the casing; said casing being provided with a discharge port leading from the casing and separate from said lower part; blades secured to the sides of the casing and rotatable therewith for lifting masses of concrete from the lower part of the casing and discharging them toward the discharge port and means for directing the discharged concrete away from or into the discharge port.

9. In an apparatus for handling concrete and like material, the combination of a horizontally disposed rotatable air-tight cylinder casing adapted to hold wet concrete in the lower part thereof; a pipe communicating with said casing in an air-tight manner and adapted to conduct compressed air thereinto; said casing being provided with a discharge port communicating with the center of one end of the casing; a partially rotatable hopper at the inner end of the port and blades on the inner face of the sides of the casing and adapted to intermittently lift small masses of concrete from said bottom part and drop them into said hopper; and means for partially rotating said hopper out of position for receiving said masses.

10. In an apparatus for handling concrete and the like materials, a casing having a supply port, a door for said port provided with an air-supply pipe, a discharge chute leading from said casing, and means for moving material within the casing and toward the chute.

11. In an apparatus for handling concrete and the like materials, a rotatable casing, having lifting blades upon its interior, a door for said casing and means for making said door air-tight, an air-supply pipe passing through said door and having a non-rotatable relation to said casing, and means for directing material lifted by said blades into or away from said chute as desired.

12. In an apparatus for handling concrete and the like materials, a rotatable casing having internally-disposed lifting blades, an outlet chute for the casing rotatable independently thereof and arranged to receive concrete discharged from said lifting blades, a supply door for the casing and mounted to

slide with reference to the latter, and a port in said door for admitting air under pressure into the casing.

13. In an apparatus for handling concrete and the like materials, a rotatable closed casing having a discharge port, a pipe adapted to continuously discharge air under pressure into the casing for discharge through said port, and means for feeding the concrete, in a more or less continuous stream, into the stream of air under pressure.

14. In an apparatus for handling concrete and the like materials, a rotatable air-tight mixer casing having a supply-port, a door for closing said supply-port and for making the casing air-tight except at the discharge-port hereinafter mentioned, said casing being provided with a discharge-port for said casing for the discharge of concrete and of air under pressure, and, means within the casing, for supplying concrete, in a more or less continuous stream, to said discharge-port.

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

ST. JOHN CLARKE.

Witnesses:
W. H. BERRIGAN,
JOHN H. HOVING.