

R. WELCKER.
 APPARATUS FOR HANDLING CONCRETE.
 APPLICATION FILED MAY 26, 1910.

1,038,806.

Patented Sept. 17, 1912.

2 SHEETS—SHEET 1.

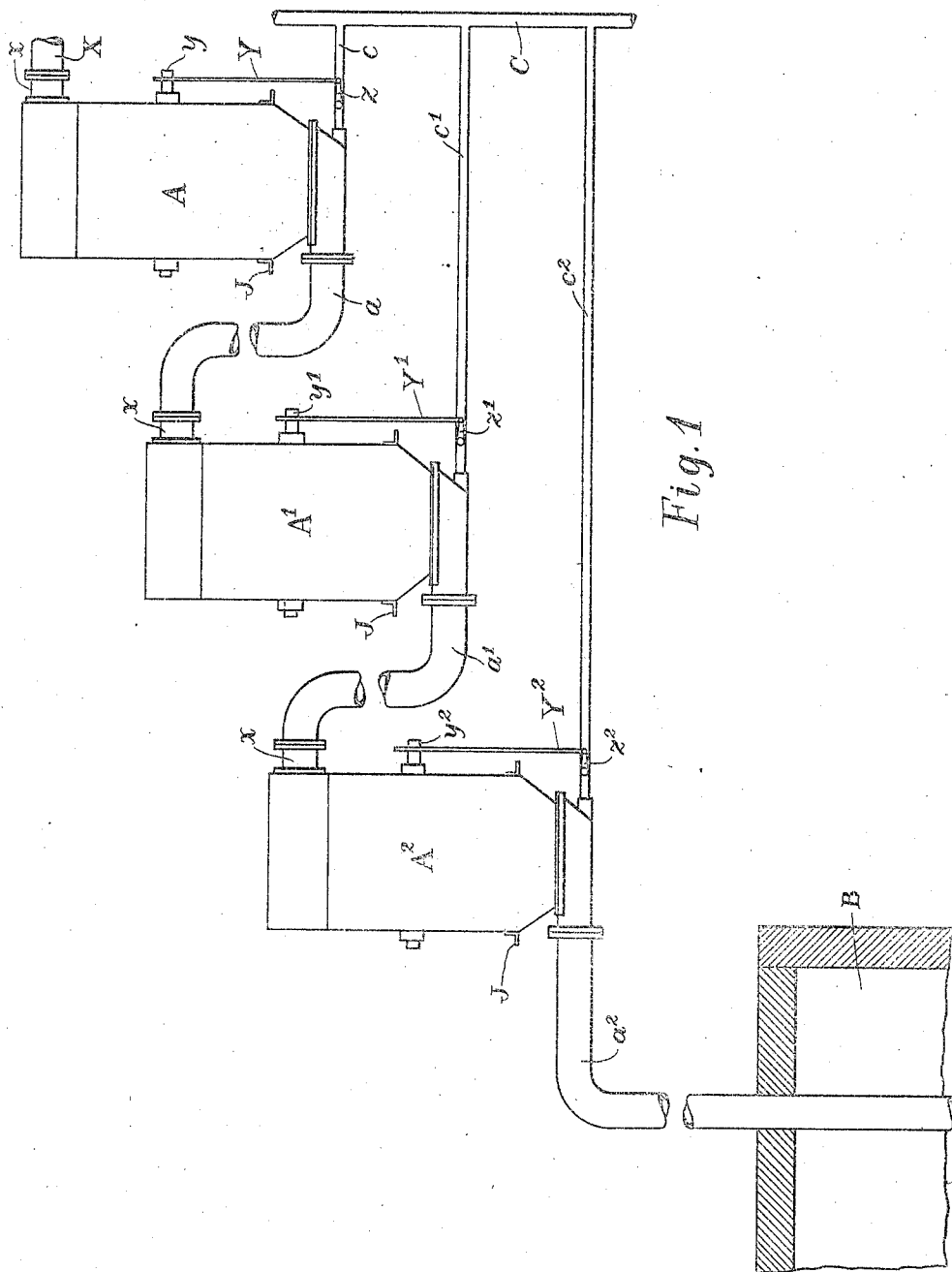


Fig. 1

WITNESSES:

David J. Walsh
 John Clark

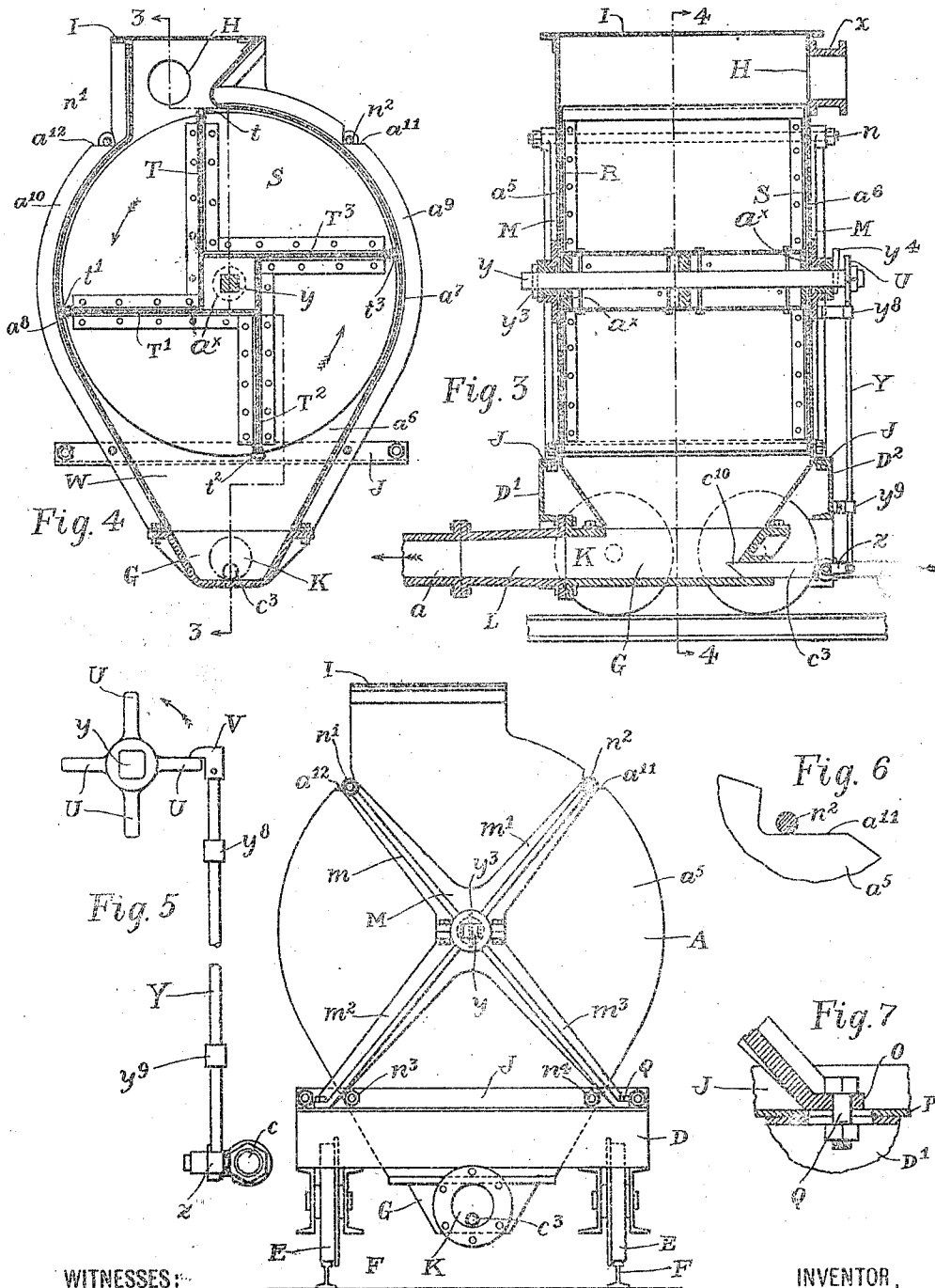
INVENTOR,
 RUDOLPH WELCKER,
 BY
 Howard Osborn
 ATTORNEY.

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David J. Walsh
John Clarke

Fig. 2

INVENTOR,
 RUDOLPH WELCKER,
 BY *John Deane*
 ATTORNEY

UNITED STATES PATENT OFFICE.

RUDOLPH WELCKER, OF YONKERS, NEW YORK.

APPARATUS FOR HANDLING CONCRETE.

1,038,806.

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Application filed May 26, 1910. Serial No. 563,647.

To all whom it may concern:

Be it known that I, RUDOLPH WELCKER, a subject of the Queen of the Netherlands, residing at Bronx Manor, city of Yonkers, county of Westchester, State of New York, have invented a new and useful Apparatus for Handling Concrete; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to conveying of concrete and other material having similar characteristics, and also to details of apparatus employed in such conveying.

The improvements relate to means whereby concrete materials, mortar or like semi-solids, will be fed in comparatively small, and more or less discontinuous masses, into a stream or blast of air under pressure, with the result that the material is delivered to a more or less distant point of use.

In the drawings, Figure 1 illustrates, diagrammatically, a form of my relay system for transporting concrete over a long distance, and also shows the delivery of concrete directly into a caisson. Fig. 2 is a view, at its discharge end, of a container also embodying my invention. Fig. 3 is a section (on the line 3—3, of Fig. 4) through such a container, and Fig. 4 is a section on the line 4—4 of Fig. 3. Fig. 5 illustrates details of the device for controlling the intermittent supply of compressed air to a container. Fig. 6 illustrates details which permit the adjustment of the device for admitting concrete to a container. Fig. 7 illustrates other details which permit such adjustment.

Referring to Fig. 1, A, A', A², illustrate containers for concrete or other material, and these are, preferably, situated at considerable distances apart, or widely separated, and at any desired relative levels. The system may include any number in its succession of containers, this being dependent, for the most part, upon the distance along which the concrete is to be conveyed. I have shown a system comprising three as an example. Each container (A, A', A²) will, preferably, be of the construction shown in the remaining drawings and hereinafter described. Concrete, from a mixer or otherwise, is first filled into container A. For this purpose, the concrete may be led through pipe X and collar *x*. Air or other fluid under pressure is then supplied so as to remove or force the concrete from container

A. This may be effected by an injection action, by means such as shown at *c*³, *c*¹⁰, Fig. 3. The compressed air may be supplied by a main pipe C and by a branch *c*. The concrete thus removed is carried, under pressure, by a pipe *a*, and discharged through collar *x* and into the second container A'. Air under pressure, supplied through pipe *c*¹, removes or forces the concrete from the second container, and the concrete is carried, under pressure, by a pipe *a*¹, and is discharged through collar *x* into the third container A². Air under pressure, supplied through pipe *c*², removes or forces the concrete from the third container, and the concrete is carried, under pressure, by a pipe *a*², to any suitable point of discharge. In the instance illustrated, the concrete is directly led into a caisson. So far as concerns the supply of air or other fluid under pressure, for effecting removal of concrete from a container, this may be intermittent. For effecting this, each branch (*c*, *c*¹, *c*²) may have a valve controlled by an arm (*z*, *z*¹, *z*²), the latter being operated by a rod (*Y*, *Y*¹, *Y*²). The reciprocations of the rods may be controlled from the axles (*y*, *y*¹, *y*²), by means shown, for instance, in Fig. 5, and hereinafter described.

With apparatus of the kind shown in Fig. 3, the air is injected into the material at widely-separated points, in the direction of movement of and during the passage of the material from a supply point to a point of discharge. This injection action, as hereinafter pointed out, results in driving concrete out of a container.

While containers of any suitable form may be used, I prefer to employ the form shown in Figs. 2, 3 and 4. I desire it to be understood that the latter form of container is useful alone as well as in succession in a relay system.

Referring to Figs. 2, 3 and 4, D indicates any suitable base, for instance a car having front and rear beams or channels D¹ and D² and mounted on wheels E E, to run along tracks F F. Each container may be made up of front and back plates *a*³ and *a*⁴, and curved side plates *a*⁵, *a*⁶. The latter may have flanges *a*⁷ and *a*⁸. The front and rear plates are tied or held together by the top and bottom rods, *n*¹, *n*², *n*³, *n*⁴, the upper ones (*n*¹, *n*²) passing through openings in the upper arms, *m* and *r*¹, of X-shaped castings M, while the lower rods pass

through the upright flanges of channels J which are bolted to the beams D' and D². The bottom of the casing is completed by a casting or receiving part G having downwardly and inwardly inclined sides. This receiving part is provided at its inner end with a small port within which is fitted the air-supply pipe c^3 , and a larger discharge port, K, for discharging through a pipe section L and pipe a , in the direction of arrow of Fig. 3. The said ports are in line, and upon injection of air through the downwardly and rearwardly beveled end c^{10} of the air-supply pipe, the concrete is driven out, with the air through the port K. Material may be filled into the casing through the collar x and opening H, and the container may have a top plate, I. The casing will preferably have movable concrete-admission means, readily permitting supply of concrete while still maintaining substantially air-tight the portion of the casing below said means; thus a container will have a substantially air-tight chamber, W, into which the concrete falls, and which may have a tapering bottom to guide the concrete toward the discharge port K. The movable concrete-admission means, may be one having a plurality of blades and having side plates, so as to provide a succession of compartments. It may be mounted on and rotatable with an axle y , and may itself be made of circular side-plates or disks R and S, and of blades T, T', T², T³, secured to angle-irons which, in turn, are secured to the parts R, S. As a consequence the blades may be arranged as shown in Fig. 4, in which case, as is well understood, the concrete (supplied through opening H) falls upon the blade T', accumulating in the compartment between the side disks, R, S, until the weight causes a partial rotation of the axis sufficient to bring the top of plate T in position to receive concrete. The continuation of the rotation of the device will cause the concrete to drop from the blade T' into the casting G. The side plates (a^7 , a^8) of the container, are curved, as before mentioned, and sufficiently to have the edges of the blades, or of air-tight packing (t , t' , t^2 , t^3) thereof sweep, for a major portion of their rotation, against such plates a^7 , a^8 . By this means, the space below the admission device is maintained substantially air-tight. The position and fit of the side plates or disks R and S, relative to the front and rear plates (a^5 and a^6) of the container, are such as to assist in thus maintaining the parts air-tight. The pressure of the air below the admission device may also be utilized to cause said device to turn in the direction of supply of concrete—such direction being indicated by the arrows in Fig. 4. Taking up the last-mentioned view, it will be seen that if the rotatable device is shifted,

as a whole, to the left, the packings t , t' , t^2 and t^3 will be compressed and the area of blade T' will be shortened while that of T³ will be increased. This shifting may be attained by moving the concrete-admission device relatively to the base D. To permit this, I have shown a construction wherein two adjustments are necessary. The first of these comprises the formation of cut away portions a^{11} and a^{12} in the edges of the plates a^5 and a^6 , to permit the passage of rods n' , n^2 ; the second of said adjustments comprises means which permit the extremities of the lower arms m^2 m^3 of each frame M, to have a slight movement widthwise of the base or truck D. In the latter event, each extremity, O, of the arms, carries a bolt Q, fitting slots in the channels D' D'' and J (Fig. 7). Upon loosening the nuts carried by these bolts, and upon loosening nuts carried by the upper tie-rods n' and n^2 , the casting M and the axle y may be shifted, either forwardly or rearwardly, for a slight distance, the holes a^x (Figs. 3 and 4) in the plates a^5 and a^6 , through which the axle y passes being made larger than the axle for that purpose. After the adjustment has been made all of the nuts are again tightened.

Hereinbefore, it has been pointed out that the compressed air may be supplied intermittently, or in blasts, into the chamber W, of the container. This may be effected in any desired manner, but I prefer that the arms z shall be operatively controlled by the rotation of the concrete admission means. To assure this, the rod, Y, may have a hook end V which is engaged successively by each of the arms U of a part rotating in unison with axle y . Any suitable means (not shown) will return the rod Y, and the latter may be slidably guided in eyes formed in parts y^8 and y^9 .

What I claim is:

1. In an apparatus for handling concrete and the like, the combination of an air tight casing having side walls sloping downwardly and inwardly and terminating in an elongated channel extending lengthwise of the bottom of the casing; an outlet conduit at the exit end of the channel; an air supply pipe at the rear end of the channel and so disposed as to deliver a blast of air lengthwise of the channel; and means above the sloping walls for dropping small masses of concrete upon said walls for direction thereby into said blast of air.

2. In an apparatus for handling concrete and like material, the combination of an air-tight container adapted to hold highly compressed air therein and having a downwardly projecting tapering extension at its lower part; a downwardly narrowed elongated receiving part secured to the lower part of said tapering extension and form-

ing a continuation thereof; an air supply pipe entering the lower part of one end of the receiving part, parallel to the axis thereof; a discharge pipe of much larger diameter than the air supply pipe and extending from the opposite end of the receiving part co-axial therewith; and movable means for at intervals conducting small masses of material in front of the air supply pipe, whereby the masses are separately moved at high velocity into the discharge pipe, whereupon the pressure of the air in the casing is added to the momentum of the masses.

3. In an apparatus for handling concrete and like material, the combination of an approximately cylindrical axially horizontal casing provided with a hopper like extension on its upper part and a downwardly projecting tapering extension at its lower part; a downwardly narrowed elongated cast metal receiving part secured to the lower part of said tapering extension and forming a continuation thereof; an air supply pipe entering the lower part of one end of the receiving part parallel to the axis thereof; a discharge pipe of much larger diameter than the supply pipe and extending from the opposite end of the receiving part co-axial therewith, a rotatable axle passing longitudinally through the casing; and a rotatable device formed of blades and compressible packings mounted on said axle and fitting snugly within the casing.

4. In an apparatus for handling concrete and the like, the combination of a substantially cylindrical air-tight casing having an outlet near the bottom thereof, and having a central opening in each end thereof; means for supplying fluid under pressure to said casing; horizontally adjustably supported bearings in line with said central openings, an axle passing through said bearings and openings; a rotatable device formed of compressible rotatable blades mounted on said axle and fitting in said casing.

5. An apparatus comprising an approximately cylindrical air-tight casing having inlet and outlet parts and having its ends each provided with a central opening; horizontal pieces supported adjacent to the ends of the casing; bearing supports adjustably mounted on the horizontal pieces respectively and each having its bearing adjacent to one of said central openings; an axle passing through the casing, said central openings and said bearings; and a rotatable device formed of rotatable blades and compressible packings therefor mounted on said axle, said device being adjustable eccentrically of the casing by adjusting the bearing supports on the horizontal pieces.

6. An apparatus comprising an approximately cylindrical casing provided with an

inlet at one side of its upper part and having its ends each provided with a central opening and an edge flange having cut away portions in the upper part thereof; an elongating receiving part communicating with the bottom of the casing, an air supply pipe entering one end of the receiving part; a discharge pipe extending from the opposite end of the receiving part; channel pieces supported at the ends of the casing; X-shaped castings each having the ends of its lower arms adjustably secured to said channel pieces and the ends of its upper arms adjacent to said cut away portions, each X-shaped piece having a central bearing; upper bolts connecting and passing through the upper ends of the respective X-shaped pieces, the upper bolts passing also through the cut away portions; the lower bolts connecting and through the respective channel pieces and also passing through the edge flange; an axle passing through the casing, said central openings and the bearings; and a rotatable device formed of rotatable blades and compressible packings therefor mounted on said axle; said device being movable eccentrically of the casing by adjusting the X-shaped castings on the channel pieces and moving the axle in the central openings.

7. An apparatus comprising an approximately cylindrical casing provided with an inlet at one side of its upper part and a downwardly projecting extension at its lower part and having its ends provided with a central opening; and an edge flange provided with cutaway portions in the upper part thereof; an elongated receiving part secured to the lower part of said extension; a bevel-ended supply pipe entering the lower part of one end of the receiving part; a discharge pipe of larger diameter than the supply pipe extending from the opposite end of the receiving part approximately in line therewith and with the supply pipe; channel pieces disposed at the ends of the casing; X-shaped castings each having its lower ends adjustably secured to the channel pieces and its upper ends adjacent to said cut away portions, and each having a central bearing; lower bolts passing through the opposite channel pieces and through the ends of the casing; upper bolts passing through the upper ends of the X-shaped member and through said cut away portions; an axle passing through the casing, said central openings and said bearings; and a rotatable device formed of rotatable blades and compressible packings mounted on said axle said device being movable eccentrically of the casing by moving the axle in the central opening by adjusting the lower ends of the X-shaped castings on the channel pieces.

8. In an apparatus for handling concrete

and the like, a casing having a discharge opening, a movable device for the admission of concrete thereinto and adapted to maintain the latter substantially air-tight, means for supplying fluid under pressure to the interior of the casing, and a device operatively controlled by that first-mentioned for cutting off and supplying the said fluid under pressure.

9. In an apparatus for handling concrete and the like, the combination of a substantially cylindrical air-tight casing having an outlet near the bottom thereof, and having a central opening in each end thereof; means for supplying fluid under pressure to said casing; horizontally adjustably supported bearings in line with said central openings, an axle passing through said bearings and openings, a rotatable device formed of compressible rotatable blades mounted on said axle and fitting in said casing; and a means operatively connected to said rotatable device for at intervals cutting off the supply of air to the air supply pipe.

10. An apparatus comprising an approximately cylindrical air-tight casing having

inlet and outlet parts and having its ends each provided with a central opening, horizontal pieces supported adjacent to the ends of the casing; bearing supports adjustably mounted on the horizontal pieces respectively and each having its bearing adjacent to one of said central openings; an axle passing through the casing, said central openings and said bearings; an air supply pipe communicating with the casing; a discharge pipe opposite the air supply pipe; a rotatable device mounted on said axle for feeding concrete in front of the air supply pipe; a cut-off device for said air supply pipe; and an operative connection between the rotatable device and the cut-off device for at intervals cutting off the supply of air to the air supply pipe.

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

RUDOLPH WELCKER.

Witnesses:

WILLIAM H. BERRIGAN,
ALFRED R. ANDERSON.