L. M. REED.

APPARATUS FOR MAKING CONCRETE, MORTAR, AND THE LIKE.

APPLICATION FILED AUG. 7, 1908.

930,084.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.

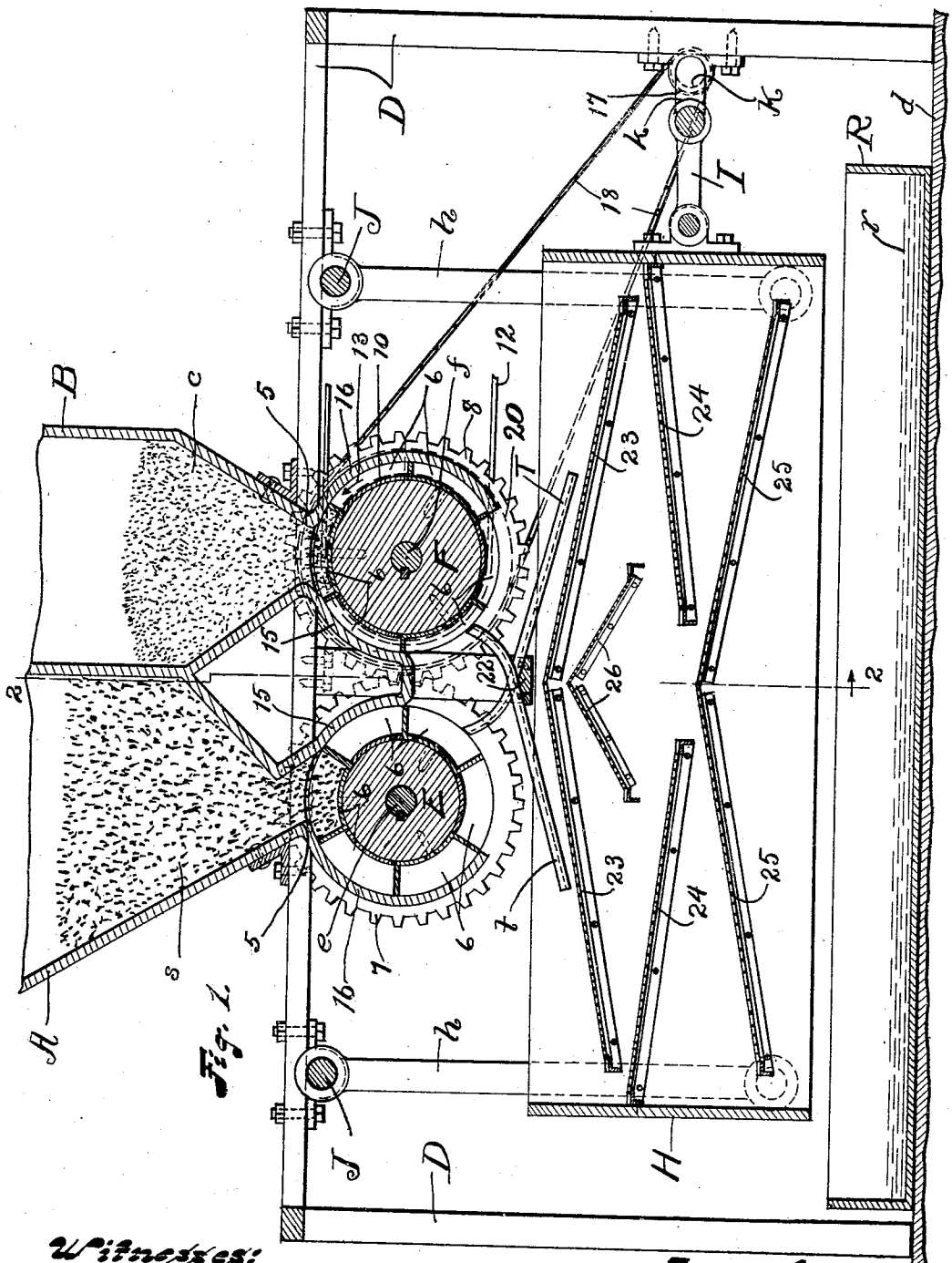

Fig. 1.

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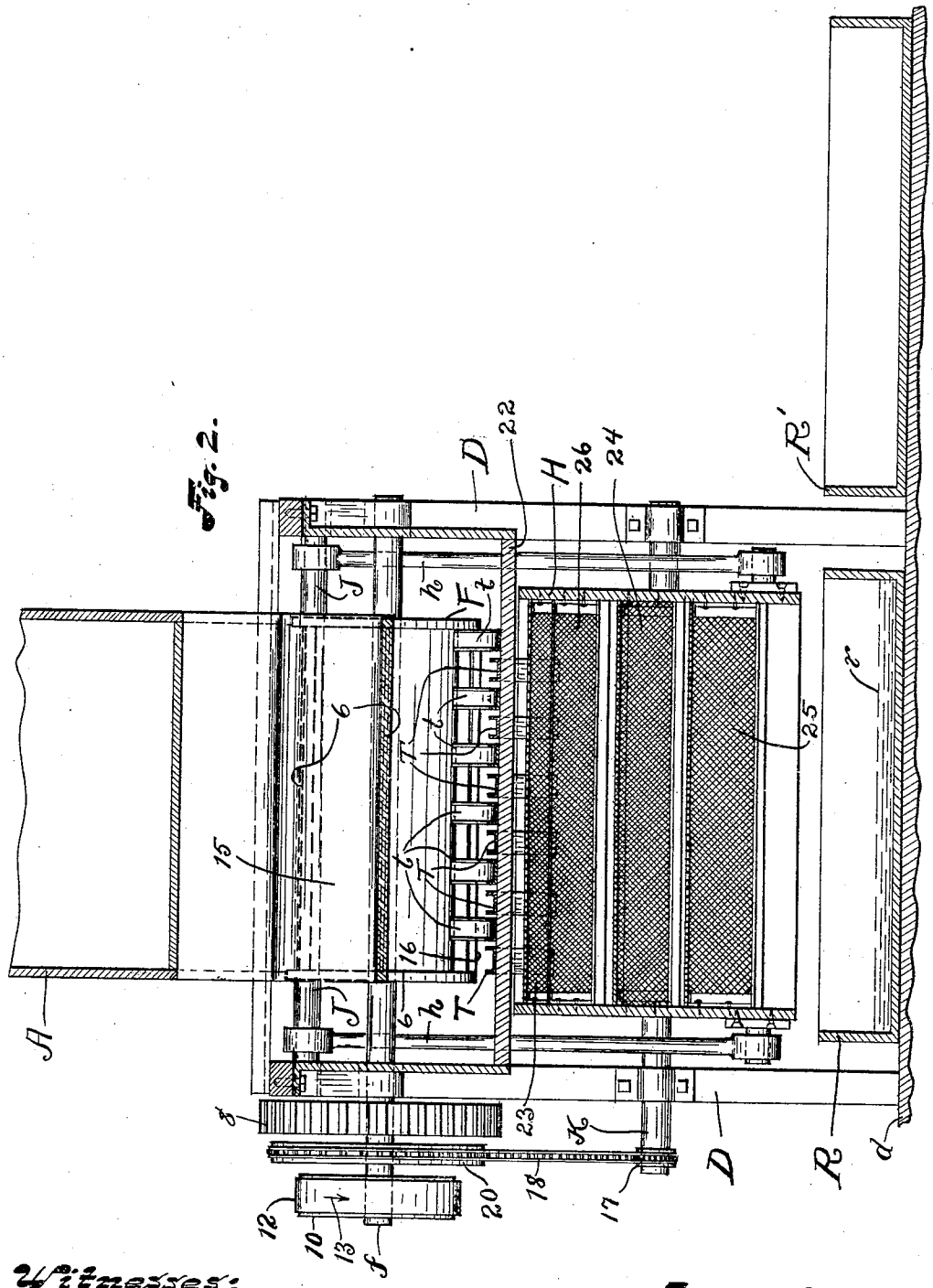
2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING CONCRETE, MORTAR, AND THE LIKE.

No. 930,084. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed August 7, 1908. Serial No. 447,373.

To all whom it may concern:

Be it known that I, LEMON M. REED, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Apparatus for Making Concrete, Mortar, and the Like; and I hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in apparatus for making concrete, mortar and the like, and pertains more especially to apparatus whereby sand and Portland or hydraulic cement are mixed in the proper proportion and in a dry state, and the mixture showered into the body of water or liquid required to complete the production of the desired cementitious mass.

The primary object of this invention is to convey sand and Portland or hydraulic cement from different hoppers respectively and to thoroughly mix the said cement and sand while in a dry state over the aforesaid body of liquid and to cause the dry mixture to descend in a shower into the said liquid and thereby result in the production of a homogeneous concrete or cementitious mass.

Another object is to provide apparatus of the character indicated which is simple and durable in construction and convenient and reliable in its operation.

With these objects in view, and to the end of realizing any other advantages hereinafter appearing, this invention consists in certain features of construction, and combinations of parts, hereinafter described, pointed out in the claims and illustrated in the accompanying drawings.

In the said drawings, Figure 1 is a side view in central vertical section of apparatus embodying my invention. Fig. 2 is a vertical section on line 2—2, Fig. 1, looking in the direction indicated by the arrow.

My improved apparatus comprises two hoppers A and B for supplying sand *s* and Portland or hydraulic cement *c* respectively. The hoppers A and B are arranged side by side and preferably in contiguity and suitably supported from stationary framework D erected upon the floor *d*. The hoppers A and B are each provided at the lower end with a downwardly discharging outlet 5.

Two laterally spaced parallel rotary conveyers E and F are arranged horizontally under the outlet of the hoppers A and B respectively. Preferably the conveyers E and F are operatively mounted on correspondingly arranged shafts *e* and *f*, respectively, which are supported from the stationary framework D.

The conveyers E and F are each provided with peripheral chambers 6 which are spaced circumferentially of the respective conveyer and are arranged to successively communicate with and receive material from the outlet 5 of the superimposed or adjacent hopper during the rotation of the said conveyer.

A spur-gear 7 which is operatively mounted on the shaft *e* at one end of the shaft, meshes with a corresponding spur-gear 8 operatively mounted on the adjacent end of the shaft *f* which is operatively provided with a driving pulley 10 which is driven by a suitably actuated belt 12 in the direction indicated by the arrow 13 and as required to rotate the conveyers in the direction necessary to feed material toward each other. Circumferentially of and in close proximity to each conveyer are arranged two guards 15 and 16 which are located at opposite sides respectively of the outlet of the hopper arranged to deliver material to the said conveyer, which guards are each large enough in dimensions to cover a chamber 6 of the said conveyer. The guard 15 extends from the outlet of the respective hopper in the direction in which the said conveyer is rotated to a point substantially in line horizontally with the axis of the said conveyer so that material conveyed in a chamber 6 of the said conveyer from the said hopper is not discharged from the said chamber until the chamber during the rotation of the conveyer opens into the space below the said guard.

Upon the floor *d* below the conveyers E and F is placed a box or receptacle R, and the conveyers are arranged far enough above the said receptacle to accommodate the interposition between the said receptacle and conveyers of mixing apparatus employed in thoroughly mixing the sand and Portland or hydraulic cement during the passage of the cement and sand downwardly from the said conveyers to the said receptacle. The receptacle R is, of course, open at the top and supplied with the quantity of water *r* requisite to complete the formation of the

cementitious mass to be produced upon the showering of the dry mixture of sand and cement into the said water.

The mixing and showering apparatus comprises a vertically arranged tubular casing H which is arranged between the receptacle R and the conveyers E and F. The casing H is suspended by upright links *h* from the top of the stationary framework D. The casing H is operatively connected by a pitman I with the crank *k* of a crank-shaft K which is arranged horizontally and parallel with the axes of the conveyers and suitably supported from the stationary framework. Preferably two laterally spaced axles J, which are arranged horizontally and parallel with the axes of the conveyers, are supported from the top of the stationary framework, and on each axle are journaled two links *h* which are suitably spaced longitudinally of the axle and pivoted at their lower ends horizontally and parallel of the said axle to the casing H. It will be observed therefore that each link *h* is pivoted at its lower end horizontally and parallel with the crank-shaft to the casing H, and pivoted at its upper end horizontally and parallel with the said shaft to the stationary framework. The crank-shaft K is operatively provided at one end with a sprocket-wheel 17 which is operatively connected by a chain 18 with a considerably diametrically larger sprocket-wheel 20 operatively mounted on one of the conveyer-bearing shafts. It will be observed therefore that during the rotation of the conveyers to feed material to the mixing and showering apparatus the casing H is rapidly reciprocated in a horizontal plane.

Laterally spaced troughs T and *t* are arranged under and spaced longitudinally of the conveyers E and F. The troughs T are parallel and have their receiving ends arranged in close proximity to the conveyer E and in position to receive material discharged from the said conveyer and extend downwardly from the said conveyer in the direction of and under the conveyer F. The troughs *t* are parallel and have their receiving ends arranged in close proximity to the conveyer F and in position to receive material discharged from the said conveyer and extends downwardly from the said conveyer in the direction of and under the conveyer E. The troughs T are arranged therefore to conduct material from the conveyer E in one direction and the troughs *t* are arranged to conduct material from the conveyer F in the opposite direction. The troughs T and *t* preferably alternate and correspond in number. Preferably adjacent troughs T and *t* cross each other centrally between but of course below the axes of the conveyers E and F, and the said troughs are preferably mounted on and suitably secured to a bar 22 which extends under the said troughs where they cross each other, which bar forms a portion of the stationary framework D. The troughs T and *t* extend into the upper portion of the chamber formed internally of the casing H.

Two meshed screens 23 and 23 borne by the casing H are arranged within the upper portion of the said casing H and under the troughs T and *t* and diverge downwardly from a point below the upper end-portion of the troughs, and preferably from a point under the trough-supporting bar 22, and extend to and beyond and are suitably spaced from the outer ends of the said troughs.

Two downwardly converging meshed screens 24 are arranged under and suitably spaced from the screens 23 and in position to receive material passing over the lower ends of the screens 23. The screens 24 are supported from the casing H.

Two downwardly diverging meshed screens 25 borne by the casing H are arranged under and suitably spaced from the screens 24 and in position to receive material passing over the lower ends of the screens 24 and to discharge the said material into the receptacle R.

Preferably two downwardly diverging meshed screens 26 are arranged below the upper portions of the upper downwardly diverging screens 23 and in position to discharge material passing over their lower ends onto the lower portions of the screens 24.

The troughs T, the screens, the vibratory screen-support formed by the casing H and the means for actuating the said support are all instrumental in mixing the materials conveyed by the conveyers from the hoppers, and it will be observed that the screens are arranged to conduct material, which is too coarse to pass through the meshes of the screens, in a sinuous path from the discharging ends of the troughs to the receptacle R.

By the construction hereinbefore described it will be observed that during the operation of my improved apparatus the dry cementitious mixture is caused to descend in a shower into the body of water or liquid *r* within the receptacle R and the showering of the said mixture into the said body of liquid results in the formation of a cementitious mass which is homogeneous and in the best possible condition for use in making cementitious products.

I would also remark that the capacity of each chamber 6 of the conveyer E and the capacity of each chamber 6 of the conveyer F bear the same proportion to each other as the quantities of sand and cement to be mixed. That is, if one part of cement is to be mixed with three parts of sand, the capacity of each chamber 6 of the conveyer F is one-fourth of the capacity of each chamber 6 of the conveyer. The conveyers E and F are not only employed therefore in conveying material from the hoppers but in measur-

ing the amount of material to be conveyed from the hoppers.

In Fig. 1 an empty receptacle R′ is shown at one side of the receptacle R and in position ready for use in lieu of the receptacle R as soon as the latter, after the production therein of a batch of the desired cementitious material, is shoved out of the way.

The process carried out by the apparatus described in this specification is disclosed and claimed in application No. 457,075 filed by me in the U. S. Patent Office October 10, 1908.

What I claim is:—

1. In apparatus for making concrete, mortar or the like, the combination, with a receptacle open at the top and adapted to hold a liquid, of means instrumental in showering a dry cementitious mixture into the said receptacle and comprising vertically spaced meshed screens arranged over the said receptacle; a vibratory support for the screens, which support is movable to actuate the screens; means whereby the said support is actuated to rapidly move the screens in opposite directions alternately, and means whereby constituent materials of the aforesaid mixture are fed onto the uppermost of the said screens.

2. In apparatus for making concrete, mortar or the like, the combination, with a receptacle open at the top and adapted to hold liquid, of a laterally movable upright tubular casing arranged over the said receptacle, means whereby the said casing is rapidly actuated in opposite directions alternately, vertically spaced meshed screens arranged within and borne by the casing, and means for feeding materials onto the uppermost of the said screens.

3. In apparatus for making concrete, mortar and the like, two hoppers arranged side by side and provided each at the lower end with a downwardly discharging outlet; two suitably supported rotary measuring conveyers arranged under the different hoppers respectively and provided each with peripheral chambers arranged circumferentially of the respective conveyer and adapted to successively communicate with and receive material from the outlet of the adjacent hopper during the rotation of the said conveyer; means whereby the conveyers are rotated in opposite directions respectively and to feed material toward each other; suitably supported laterally spaced troughs arranged under the conveyers and in position to receive material discharged by the conveyers; a receptacle open at the top and adapted to hold liquid, said receptacle being arranged under and a suitable distance below the troughs, and means between said troughs and said receptacle for mixing and showering said materials into said receptacle.

4. In apparatus for making concrete, mortar and the like, two hoppers arranged side by side and provided each at the lower end with a downwardly discharging outlet, two suitably supported rotary measuring conveyers arranged under the different hoppers respectively and provided each with peripheral chambers arranged circumferentially of the respective conveyer and adapted to successively communicate with and receive material from the outlet of the adjacent hopper during the rotation of the conveyer, suitably supported inclined troughs arranged to receive material from and spaced longitudinally of the conveyers and crossing each other centrally between but below the axes of the conveyers, a receptacle open at the top and adapted to hold liquid, said receptacle being arranged a suitable distance below the troughs, and vertically spaced meshed screens between the receptacle and the troughs.

5. In apparatus for making concrete, mortar and the like, two hoppers arranged side by side and provided each at the lower end with a downwardly discharging outlet, two suitably supported rotary measuring conveyers arranged under the different hoppers respectively and provided each with peripheral chambers arranged circumferentially of the respective conveyer and adapted to successively communicate with and receive material from the outlet of the adjacent hopper during the rotation of the conveyer, inclined troughs arranged to receive material from and spaced longitudinally of the conveyers and crossing each other centrally between but below the axes of the conveyers, a suitably supported bar bearing the troughs where the latter cross each other, a receptacle open at the top and arranged a suitable distance below the troughs, and vertically spaced meshed inclined screens between the receptacle and the troughs and arranged to conduct material, which is too coarse to pass through the meshes of the screens, in a sinuous path to the said receptacle from the troughs.

In testimony whereof, I sign the foregoing specification, in the presence of two witnesses.

LEMON M. REED.

Witnesses:
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