L. M. REED.

PROCESS OF MAKING CONCRETE OR CEMENTITIOUS COMPOUNDS.

APPLICATION FILED OCT. 10, 1908.

930,085.

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Fig. 1

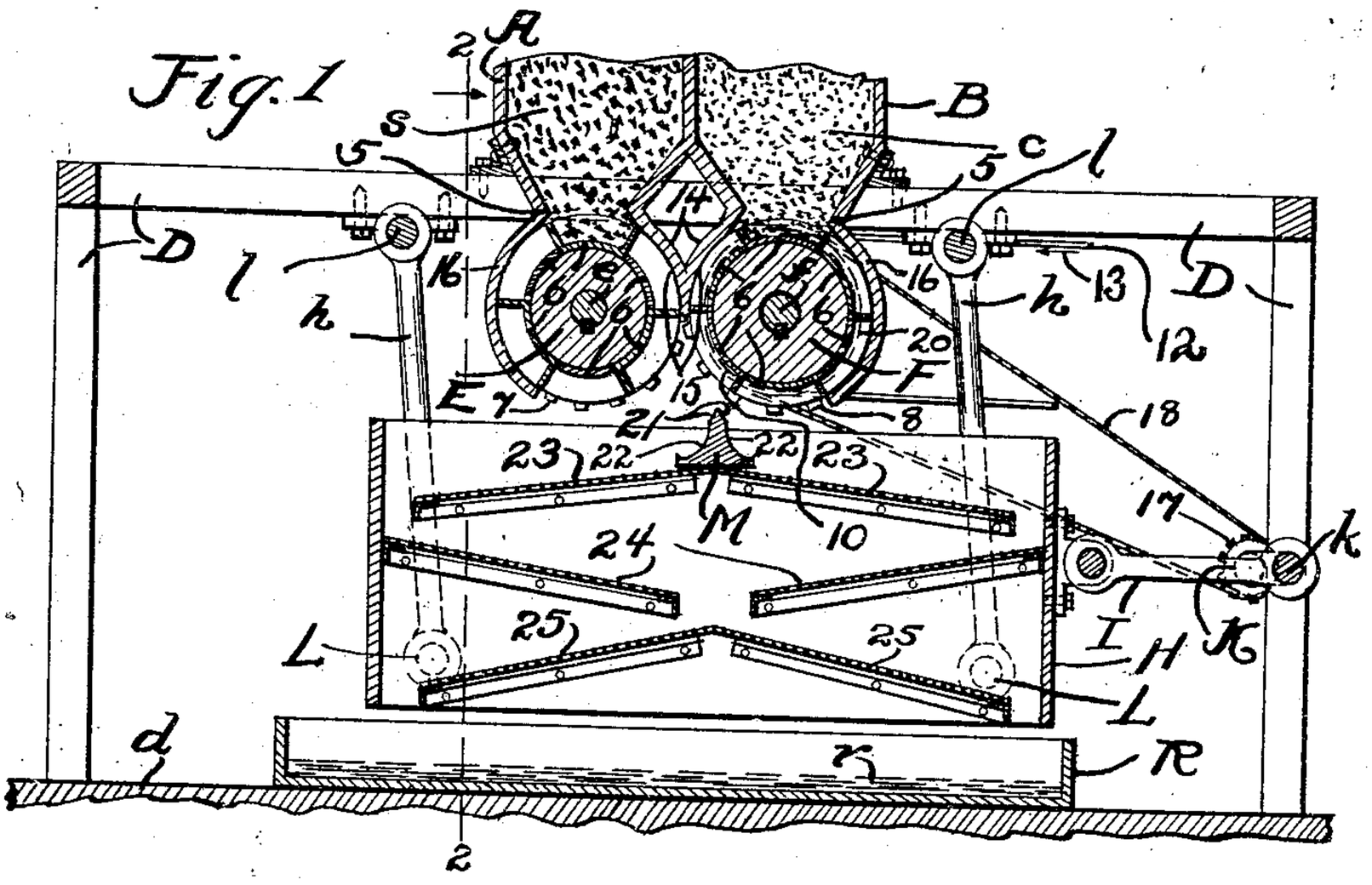
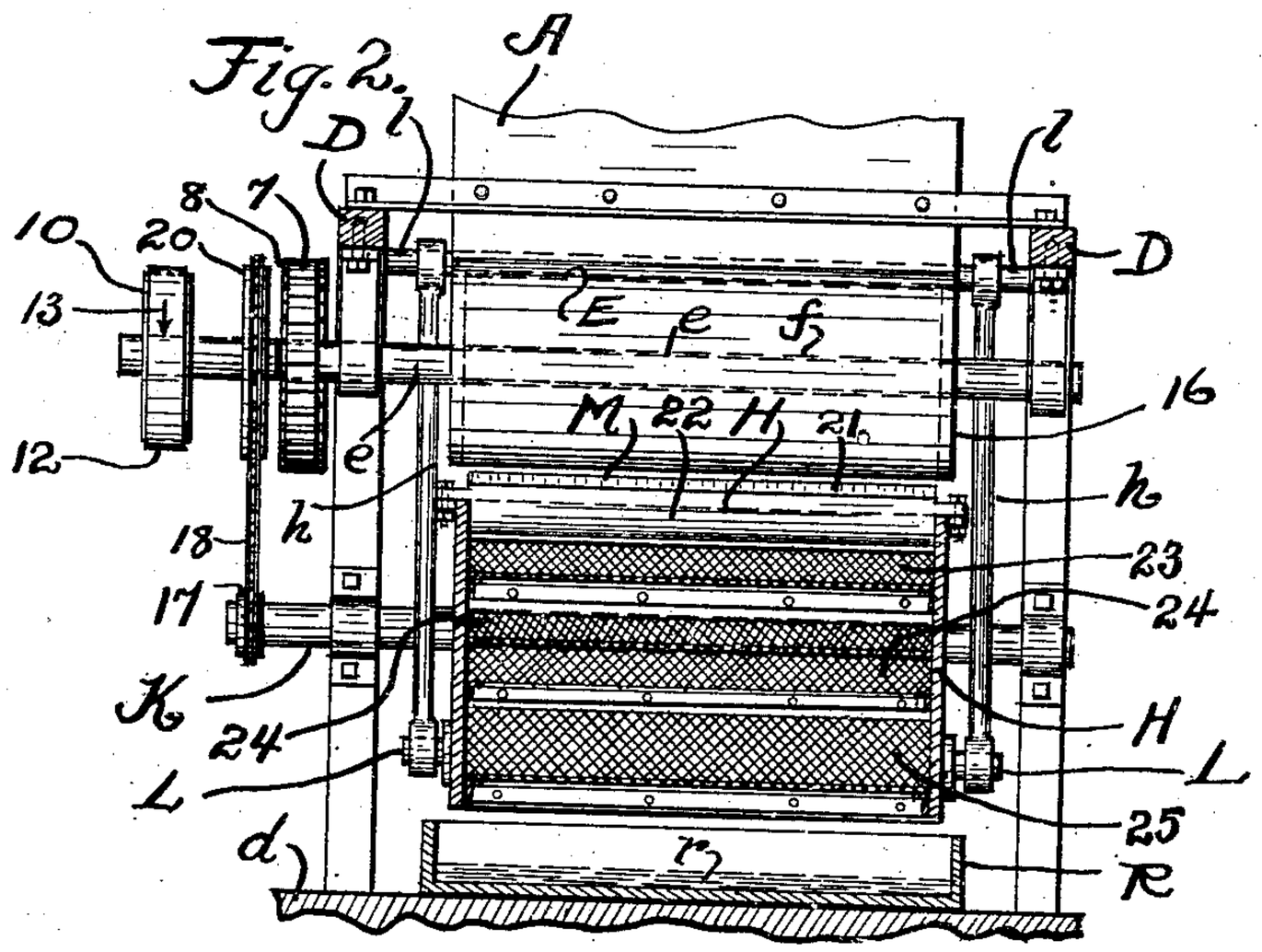


Fig. 2.



Witnesses:
H. J. Gettins.
B. L. Brown

Inventor:
Lemon M. Reed
By Spencer & Spencer
His Attorneys.

UNITED STATES PATENT OFFICE.

LEMON M. REED, OF CLEVELAND, OHIO.

PROCESS OF MAKING CONCRETE OR CEMENTITIOUS COMPOUNDS.

No. 930,085. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed October 10, 1908. Serial No. 457,075.

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 Processes of Making Concrete or Cementitious Compounds; 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 an improved process of making concrete or cementitious compounds, and pertains more especially to a process 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 material.

The primary object of this invention is to thoroughly mix sand and Portland or hydraulic cement while in a dry state and cause the dry mixture to descend into the said body of liquid and thereby result in the production of a cementitious mass which is homogeneous and in the best possible condition for use in making cementitious products.

With this object in view, and to the end of realizing any other advantages hereinafter appearing, this invention consists in the steps or process hereinafter described and pointed out in the claim.

Apparatus suitable for use in carrying out the said process is illustrated in the accompanying drawings in which—

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

The said apparatus comprises two hoppers A and B for supplying dry sand *s* and dry Portland or hydraulic cement *c* respectively. The hoppers A and B are arranged side by side and preferably in contiguity and supported from a 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. 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 each arranged to successively communicate with and receive material from the outlet 5 of the superimposed or adjacent hopper during the rotation of the said conveyers.

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.

Between the two conveyers E and F is arranged a guard 14 which has opposite side surfaces 15 thereof extending from the outlet of the different hoppers respectively downwardly and toward each other circumferentially of the different conveyers respectively and meeting or closely approaching each other at their lower ends. Each surface 15 should be large enough in dimensions to cover a chamber 6 of the conveyer circumferentially of which the said surface extends and is arranged in close proximity to the said conveyer. By this construction each chamber of each conveyer does not discharge the contents thereof until the said chamber during the rotation of the conveyer has begun to move below the lower extremities of the surfaces 15, and the arrangement of the chambers 6 of each conveyer is such relative to the arrangement of the chambers 6 of the other conveyer that two chambers of the different conveyers respectively during the rotation of the conveyers begin to simultaneously discharge the contents thereof under the lower extremities of the surfaces 16 so that the contents of both of the said chambers begin to mix as soon as the said chambers during the rotation of the conveyers begin to move below the said extremities.

Two guards 16 are located at the outer side of the different conveyers respectively. Each guard 16 extends from the outlet of the adjacent hopper circumferentially of the adjacent conveyer in the direction opposite to the direction in which the said conveyer is rotated and is arranged in close proximity to

the conveyer and large enough in dimensions to cover a chamber 6 of the said conveyer.

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 the conveyers, of 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 and showering the mixture into a body of water *r* contained in the said receptacle, which is, of course, open at the top and supplied with the quantity of water 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, which links are arranged externally of the said casing. Preferably each link *h* is pivoted at its lower end, as at L, horizontally and parallelly with the crank-shaft to the casing H, and pivoted at its upper end, as at *l*, horizontally and parallelly with the said shaft to the stationary framework. The casing H is operatively connected by a pitman I with the crank *k* of a crank-shaft K which is arranged horizontally and parallelly with the axes of the conveyers and suitably supported from 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 apparatus the casing H is rapidly reciprocated in a horizontal plane.

Upon and centrally of the casing H is mounted a cross-bar M which is arranged parallelly with the axes of the conveyers. The bar M has opposite sides of its upper portion converging upwardly and meeting at the top of the bar so as to form two surfaces 21 which slope downwardly and laterally outwardly from the top of the bar, and opposite sides of the bar below the surfaces 21 curve inwardly and outwardly, as at 22. The bar M is suitably secured at its ends to the casing H. The bar M is arranged at one side of the space into which the conveyers discharge when the crank of the crank-shaft is at either end of its throw, and the length of the throw of the crank and the relative arrangement of the parts are obviously such therefore that the bar is at the one or the other side of the said space according as the crank is at the one or the other end of its throw. Two meshed screens 23 and 23 borne by the casing H are arranged within the upper portion of the casing H and extend and diverge downwardly from under the bar M.

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. The bar M, the screens, the vibratory screen-support formed by the casing H and the means for actuating the said support are all instrumental in mixing and showering 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 sinuous paths to opposite ends of the receptacle R.

It will be observed that the bar M during the rapid reciprocation of the casing H moves rapidly in a horizontal plane from the one to the other extremity of its range of movement and by the peculiar trend of the side surfaces of the said bar material discharged at the one or the other side of the bar during the operation of the apparatus is scattered or distributed by the bar over the one or the other of the upper screens and that the bar materially participates therefore in a thorough mixture and showering of the material discharged from the hoppers. It will be observed therefore that during the operation of the apparatus a dry mixture of sand and Portland or hydraulic cement descends in a shower into the body of water *r* and the showering of the said mixture into the water 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 E. The conveyers E and F are not only employed therefore in conveying material from the hoppers but in measuring the amount of material to be conveyed from the hoppers. The receptacle R is replaced by a corre-

sponding receptacle upon the production in the former of a batch of the desired cementitious material.

It will be observed that by my improved process the dry mixture of sand and Portland or hydraulic cement is showered over and into a stationary pool or body of water or liquid which is provided to receive the said mixture. The dry mixture is uniformly distributed over the said pool or body of liquid and gravitates in the form of a shower which is spread or distributed over the said pool or body of liquid so that the incasing of substantially every particle of sand by cement when the dry mixture settles in the water is insured and the result is the production of a moist cementitious mass which is homogeneous throughout and in the best condition possible for use in concrete construction or in making cementitious products.

The apparatus described and illustrated in this specification is disclosed and claimed in applications No. 447,373 and No. 457,076 filed by me in the United States Patent Office August 7th, 1908, and October 10th, 1908, respectively.

What I claim is:—

The herein described process consisting in mixing sand and Portland or hydraulic cement in a dry state and showering the dry mixture into a stationary pool or body of liquid.

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

LEMON M. REED.

Witnesses:
C. H. DORER,
B. C. BROWN.