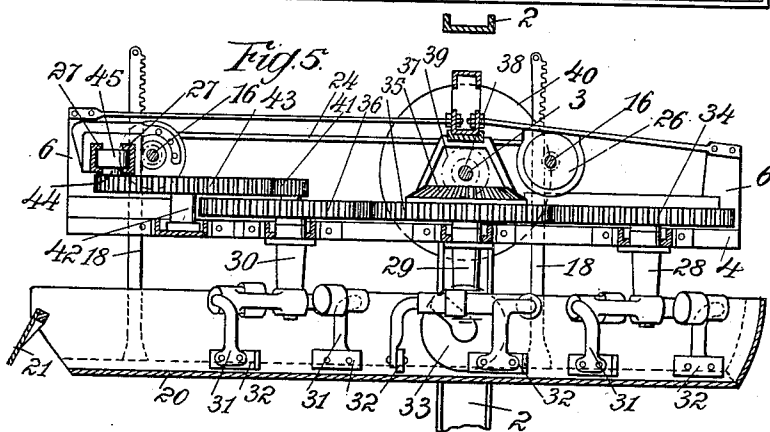
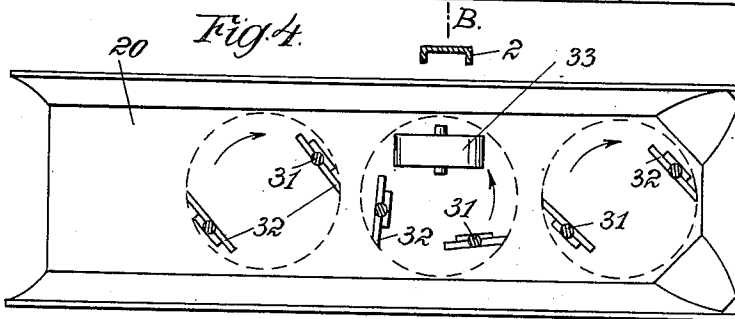
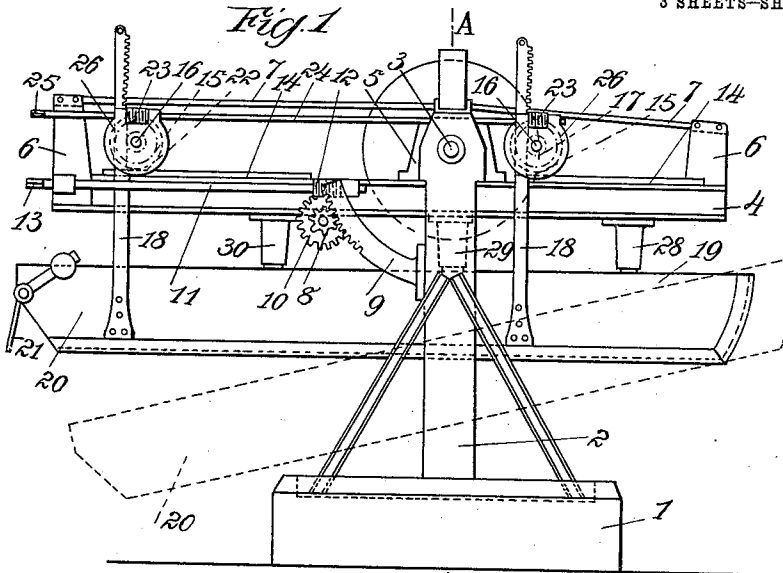


L. & J. EIRICH.
MACHINE FOR MIXING CONCRETE AND THE LIKE.
APPLICATION FILED MAR. 14, 1913.

1,095,980.

Patented May 5, 1914.

3 SHEETS—SHEET 1.

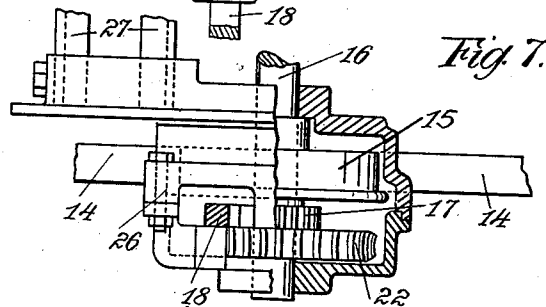
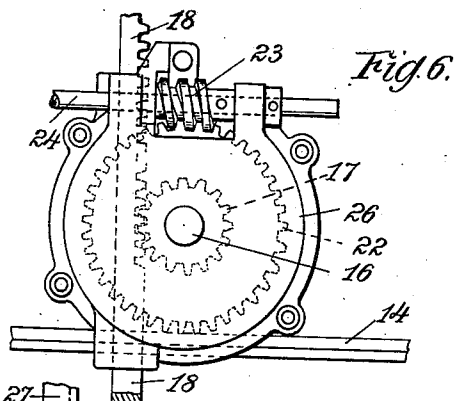
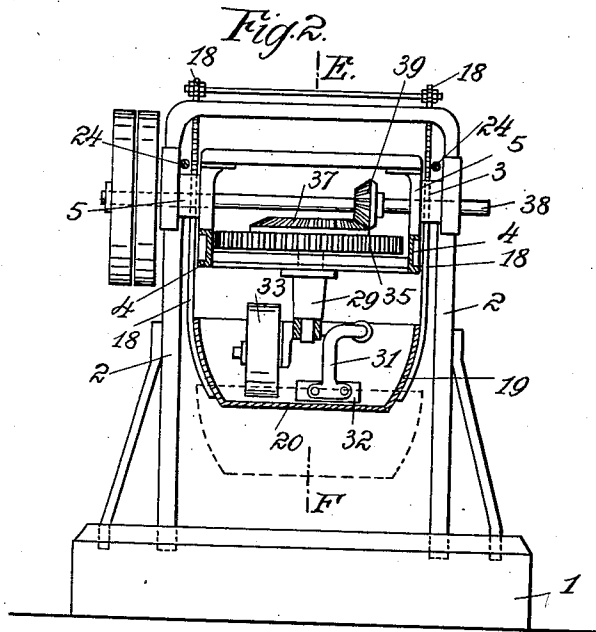


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3 SHEETS—SHEET 2.



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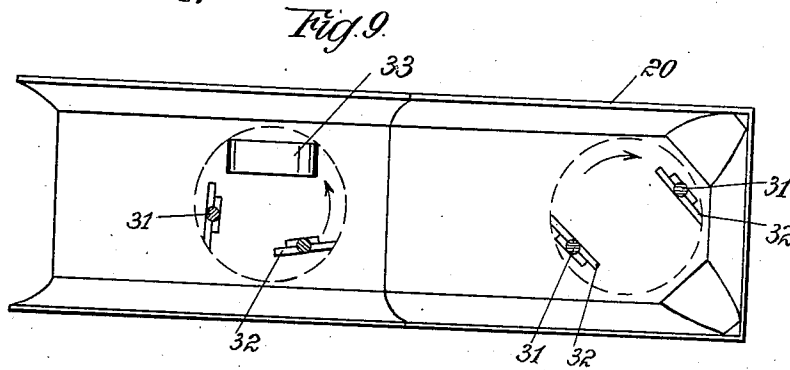
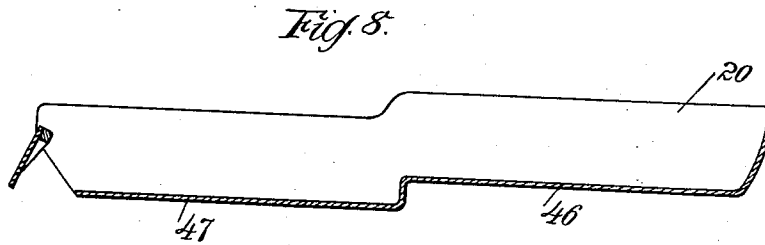
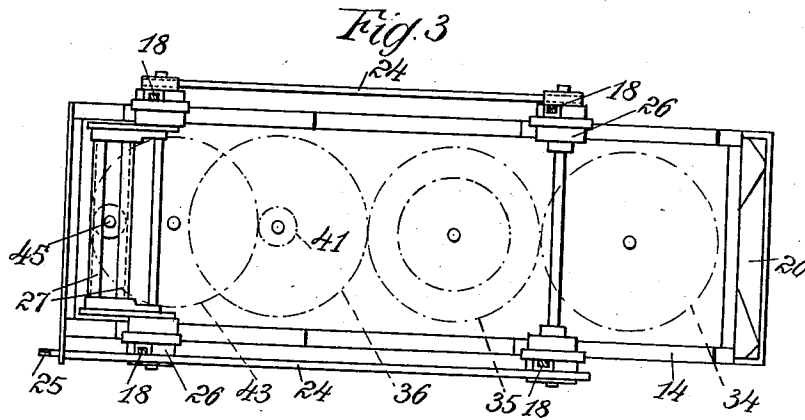
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UNITED STATES PATENT OFFICE.

LUDWIG EIRICH AND JOSEPH EIRICH, OF HARDHEIM, GERMANY.

MACHINE FOR MIXING CONCRETE AND THE LIKE.

1,095,980.

Specification of Letters Patent.

Patented May 5, 1914.

Application filed March 14, 1913. Serial No. 754,226.

To all whom it may concern:

Be it known that we, LUDWIG EIRICH and JOSEPH EIRICH, both manufacturers and citizens of the German Empire, and residents of Hardheim, in the Grand Duchy of Baden, Germany, with the post-office address Walldürnerstrasse 65 and 68, have invented new and useful Improvements in Machines for Mixing Concrete and the like, of which the following is a specification.

Many machines hitherto employed for mixing concrete and like materials usually treat the material in certain measured quantities, without continuous working while in other apparatus where continuous working is employed, such as have also been proposed, the separate constituents of the material are not thoroughly mixed. For many substances and more particularly for concrete, however, this thorough intermixing is precisely of extraordinary importance, as the durability of the concrete depends, primarily, in addition to the selection of the material, on a thorough intermixing of the various constituents.

Now this invention has for its object a mixing machine which while allowing of continuous working produces a thorough intermixing of the constituents of the material.

The machine consists substantially of an elongated trough, the bottom of which is preferably flat, and on this bottom several mixing appliances travel one behind the other in a circle; in addition to thoroughly intermixing the constituents these also at the same time convey the material to the end of the trough. In particular the trough may also be adjusted vertically, so that it is possible to vary the distance of the mixing devices from the trough bottom. The trough may also be turned about a horizontal axis in such a way that it assumes an inclination either downward or upward relatively to its horizontal position. The object of this is to enable the speed at which the material is conveyed inside the trough to be varied, and thereby the time of mixing and also the thoroughness of the mixing to be regulated. The trough also receives a longitudinal, reciprocating movement, whereby all parts of the trough bottom are encountered by the mixing appliances and thus the whole of the material treated at each point. If desired the trough bottom may also be arranged in different tiers or steps, in order to separate the dry mixing

of the material from the wet mixing. An example of construction of such a machine is shown in the accompanying drawings, in which:—

Figure 1 is a side view; Fig. 2, a section on the line A—B of Fig. 1; Fig. 3, a plan view; Fig. 4, a view seen from above of the trough and the mixing devices; Fig. 5, a section on the line E—F of Fig. 2; Figs. 6 and 7, side view and plan view respectively on an enlarged scale partially in section, of the apparatus for adjusting the trough vertically; Figs. 8 and 9 are a section and plan view respectively of a form of construction of the trough, in which the bottom is formed in steps.

A yoke-shaped frame 2 is mounted on a foundation 1, and forms the fixed framework of the machine. In this framework a second frame is pivotally mounted, consisting of two U-irons 4, connected with one another in the middle by means of a bracket 5. On the ends are mounted closing pieces 6 which are connected with the central bracket 5 by means of drawbars 7. This frame which is pivoted at 3 has on each side a toothed wheel 8 which gear with two toothed sectors 9 mounted on each side of the yoke 2. One toothed wheel 8 is firmly attached to a worm wheel 10 with which engages a worm 12 mounted on a shaft 11. The shaft 11 is preferably formed with an angular outer end 13 on which a crank or hand wheel may be fitted. By turning the worm 12 both toothed wheels 8 mounted on a common shaft may be moved to and fro on the sectors 9 and the entire frame, which is pivoted at 3 thus adjusted relatively to the fixed frame 2.

Four rails 14, on which run four wheels 15, rest on the U-irons 4. These wheels are loosely mounted on shafts 16, as may be seen more particularly in Fig. 7, and form with these shafts a carriage on which the mixing trough is hung in the manner hereinafter indicated. On the shaft 16 are mounted toothed wheels 17 with which rackbars 18 engage. The trough 19 is suspended on these rackbars 18 and has a substantially rectangular, flat bottom 20 and may be closed by a flap 21 at its open end. In order to be able to move the rackbars 18 and therewith the trough 19 up and down by means of the toothed wheels 17, worm wheels are mounted on one side of the carriage near each toothed wheel 17 and are in engagement with worms 23 mounted on a

common shaft 24 which has a preferably rectangular end 25 for the reception of a crank or hand wheel.

Each wheel 15 and toothed wheel 17 and worm 22 is inclosed in a casing 26 in such manner that only a portion of the wheel 15 extends below the same and each pair of opposite casings 26 are connected with one another by means of bars 27.

Three sets of mixing appliances work in the trough in the following way: Three vertical shafts 28, 29 and 30 are mounted between the bars 4 of the frame which is pivoted at 3, and these shafts carry arms 31 which in turn carry mixing members 32 preferably shaped like plowshares. These mixing members may be of any suitable form and are preferably resiliently or elastically mounted to prevent overstraining in the event of large pieces being present in the material. A roller 33 is also mounted on the central shaft 29 and has for its object to crush lumps in the material. Each of the three shafts 28, 29 and 30 carries at the top a horizontal toothed wheel 34, 35, 36 respectively, the center one of which (35) is connected with a bevel wheel 37 which is caused to rotate by means of a small bevel wheel 39 arranged on the shaft 38. The shaft 38 passes through the pivot 3 of the entire frame, which pivot is journaled in the frame 2, and a fast and loose pulley 40 are carried by said shaft 38 in order to enable it to be driven. A smaller toothed wheel 41 is also connected with the toothed wheel 36 of the vertical shaft 30 and engages with a larger toothed wheel 43 which is rotatably mounted on the pin 42. This toothed wheel 43 has a roller 45 on a crank pin 44, which roller is adapted to travel to and fro between the two connecting bars 27 of the runner wheels 15 lying at this end of the carriage. As the toothed wheel 43 is rotated the roller 45 will act as a crank and the carriage is thereby caused to reciprocate on the rails 14, whereby the trough receives a similar reciprocating longitudinal movement.

The action of the machine is as follows:— The shaft 38 is rotated through the medium of the pulley 40 and by means of the bevel wheels 39 and 37 and the toothed wheels 34, 35 and 36, causes a rotation of the three vertical shafts 28, 29 and 30. Consequently the mixing member 32, mounted on each shaft and the roller 33 rotate in a circle and work the material contained in the trough 19 in such a way that it is thoroughly intermixed and conveyed to the end 21 of the trough. The suitably measured material is thrown in at the closed end of the trough. If desired some water may be first introduced at the point where the second set of mixing appliances are working. *i. e.* those attached to the vertical shaft

29. The entire carriage on which the trough 19 hangs by means of the rack-bars 18 receives from the crank pin 44 a reciprocating movement causing the wheels 15 to run on the rails 14. The result of this is that each portion of the trough is encountered by the mixing members and thus the material uniformly worked throughout. By rotating the shaft 25, the worms 23, the worm wheels 22 and the toothed wheels 17 connected therewith are set in motion to raise or lower the racks 18, so that the trough may be moved up and down parallel with itself in a vertical direction, whereby it can be adjusted to the necessary or desired distance from the mixing members 32. This adjustment may also be done with respect to the level of the layer of material in the trough. Finally the entire frame with the trough may be tilted on the pivot 3 by rotating the shaft 11 and worm 12 and also the worm wheel 10 and toothed wheels 8. These wheels 8 in consequence will travel along the toothed sectors 9 and thereby bring about the adjustment of the trough. In this way one end of the trough can be lowered, as shown in dotted lines in Fig. 1, in order to increase the speed at which the material is forwarded inside the trough and to enable the trough at the end of the operation to be fully discharged. The end of the trough however may also be raised somewhat above the horizontal line in order to substantially diminish the speed of movement of the material and thereby to obtain its more thorough intermixing. The actual inclination of the trough is dependent on the material and on the desired degree of mixture. When the trough and the mixing appliances are to be cleaned it may be let down on the rackbars 18 to the full extent so that all the parts are quite accessible.

In the form of construction of the trough shown in Figs. 8 and 9, the bottom is stepped in the middle, so that one half 46 of the trough bottom lies higher than the other half 47. In this case only two sets of mixing members are provided, which by the reciprocatory movement of the trough from time to time completely traverse both portions of the bottom. This stepped formation of the trough bottom is preferable when it is desired to introduce water or any other liquid, only after the otherwise dry materials have already been preliminarily mixed. This preliminary mixing takes place on the portion 46 and the wet final mixing on the portion 47. Instead of adjusting the trough vertically of course the arrangement adopted may be such that the mixing members are vertically adjustable. Also instead of giving the trough a reciprocatory movement such movement may be given to the mixing members. For special cases the reciproca-

tory movement of the trough may also be omitted and the entire machine can also obviously be employed for mixing other materials than concrete. If desired the trough may also be made of two or more times the width of the one shown, and in addition to one set of mixing members, two or more may be provided whereby without the machine having substantially larger dimensions, double or more times the efficiency is obtained.

Now what we claim and desire to secure by Letters Patent is the following:

1. A mixing machine for concrete or the like comprising a trough open at one end, a series of movable mixing members arranged in a row and extending into said trough, means for actuating said mixing members, and means for bringing about a relative reciprocation between said trough and said mixing members in the direction in which said members extend in a row.

2. A mixing machine for concrete or the like comprising a trough open at one end adapted to be reciprocated in the direction of its length, a series of rotatable mixing members arranged in a row lengthwise of said trough and in the direction of its reciprocation, means for rotating said mixing members in said trough and means for reciprocating said trough relatively to said mixing members.

3. A mixing machine for concrete or the like comprising a trough open at one end, a series of mixing members arranged in a row lengthwise of said trough, and rotatable in horizontal planes therein, means for actuating said mixing members and mechanism for adjusting the position of said trough relatively to said mixing members whereby the operative planes of said mixing members in said trough may be changed.

4. A mixing machine for concrete and the like comprising a frame, a trough, racks for suspending said trough beneath said frame, mixing means carried by said frame and extending into said trough, means for actuating said mixing means, pinions in operative engagement with said racks, worm gearings connected to move in unison with said pinions for actuating same, and a rotatable shaft common to said worm gearings whereby said trough may be raised or lowered relatively to said mixing means.

5. A mixing machine for concrete or the like comprising a frame, rails on said frame, a carriage arranged to travel back and forth on said rails, a trough suspended from said carriage, mixing devices carried by said frame, and extending into said trough, mechanism for actuating said mixing devices and means operatively connected with said mechanism whereby said carriage is

moved back and forth on said rails and said trough is reciprocated relatively to said mixing devices.

6. A mixing machine for concrete or the like comprising a frame, rails on said frame, a carriage arranged to travel back and forth on said rails, a trough suspended from said carriage, mixing devices carried by said frame, and extending into said trough, gearing for actuating said mixing devices, a crank pin operatively connected with said carriage and with said gearing, and means for actuating said gearing to operate said mixing devices and said crank pin whereby said carriage is moved back and forth on said rails and said trough is reciprocated relatively to said mixing devices.

7. A mixing machine for concrete or the like comprising a trough having portions of its bottom arranged at successively higher levels whereby different masses of material are maintained separate from each other, mixing means extending into said trough at said different levels and operating in said different masses of material, and means for reciprocating said trough whereby the mass of material on one level after having been mixed is transferred to the next adjacent lower level in said trough.

8. A mixing machine for concrete or the like comprising a trough having an exit end and adapted to contain the material to be mixed, mixing devices extending into said trough, means for actuating said devices and means for tilting said trough whereby the material is moved toward the exit end thereof with more or less speed and is subjected to the action of the mixing devices for a longer or shorter period.

9. A mixing machine for concrete or the like comprising a trough having an exit end and adapted to contain the material to be mixed, mixing devices extending into said trough, means for actuating said devices, means for reciprocating said trough, whereby said material is thoroughly mixed and moved toward one end thereof, and means for tilting said trough whereby the speed of said material in said trough during its reciprocation is increased or diminished and said material is subjected to the action of the mixing devices for a longer or shorter period.

In testimony, that we claim the foregoing as our invention, we have signed our names in presence of two witnesses, this twenty-sixth day of February, 1913.

LUDWIG EIRICH.
JOSEPH EIRICH.

Witnesses:

WILHELM BOERLEMAN,
JOSEPH PFEIFFER.