J. A. SVENSON.

MIXING APPARATUS.

APPLICATION FILED JULY 13, 1906.

900,227.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.

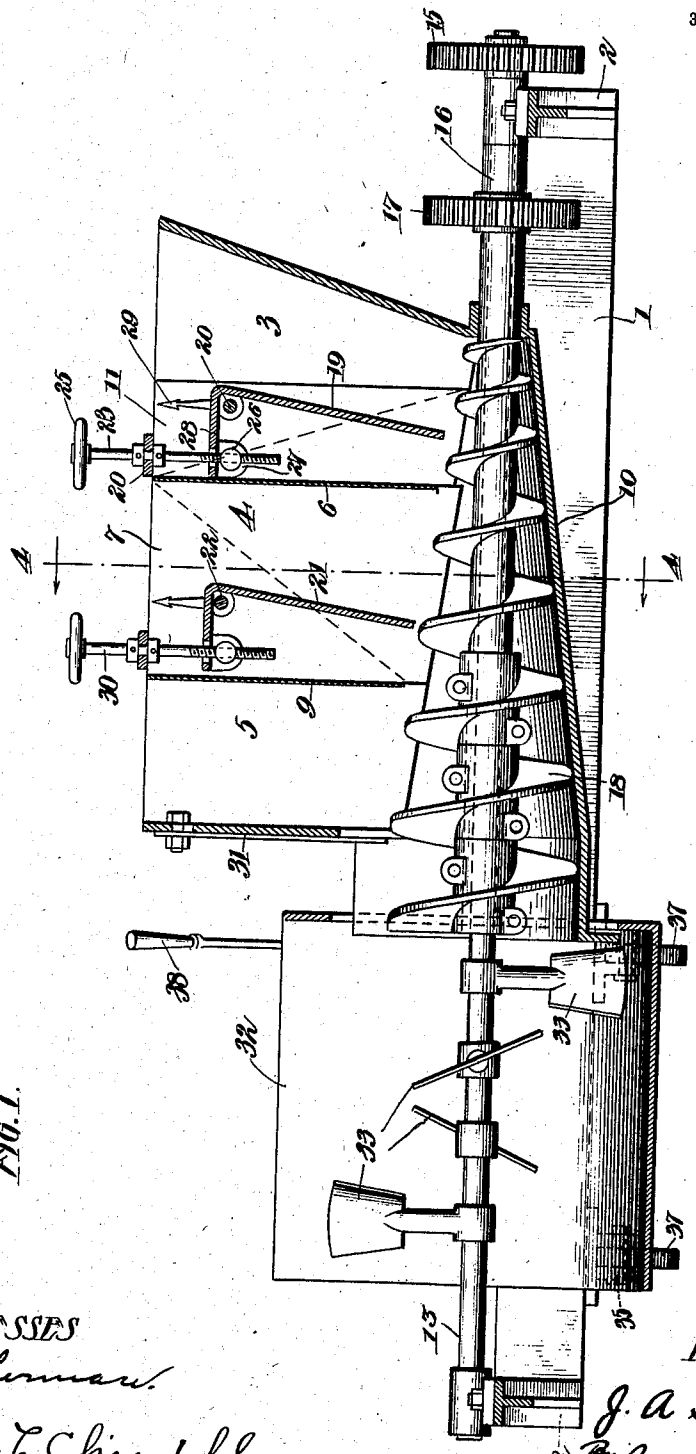


FIG. 1.

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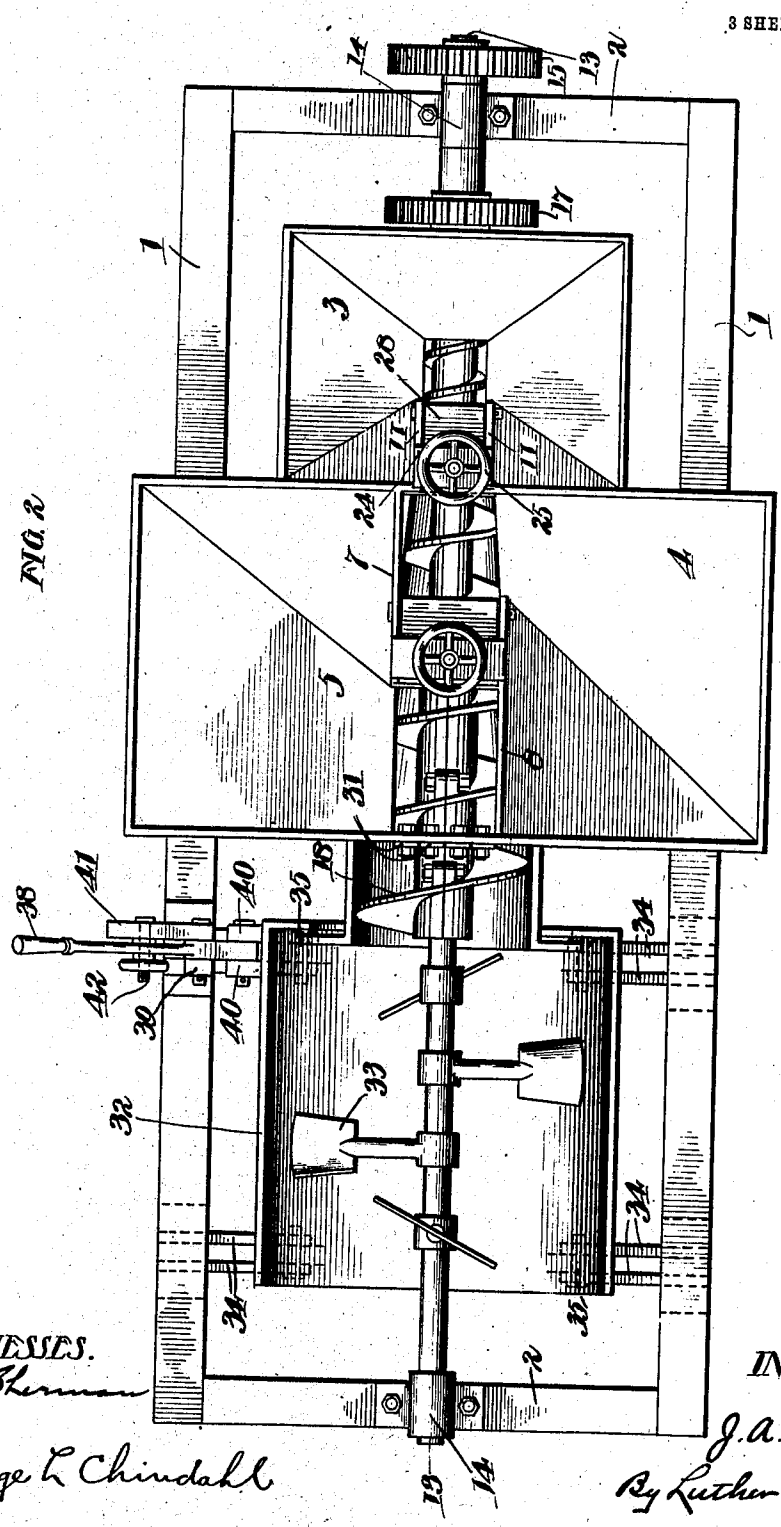
APPLICATION FILED JULY 13, 1906.

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Patented Oct. 6, 1908.

3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

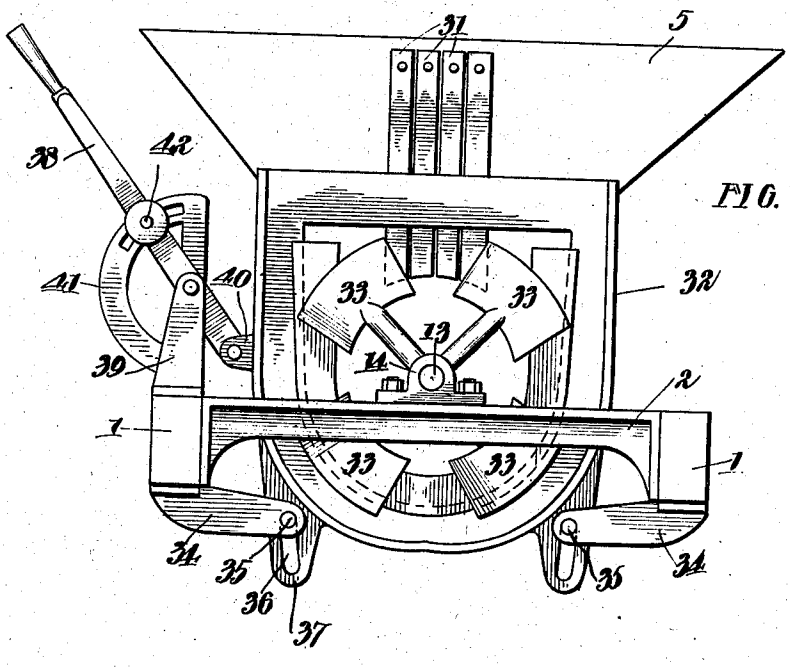
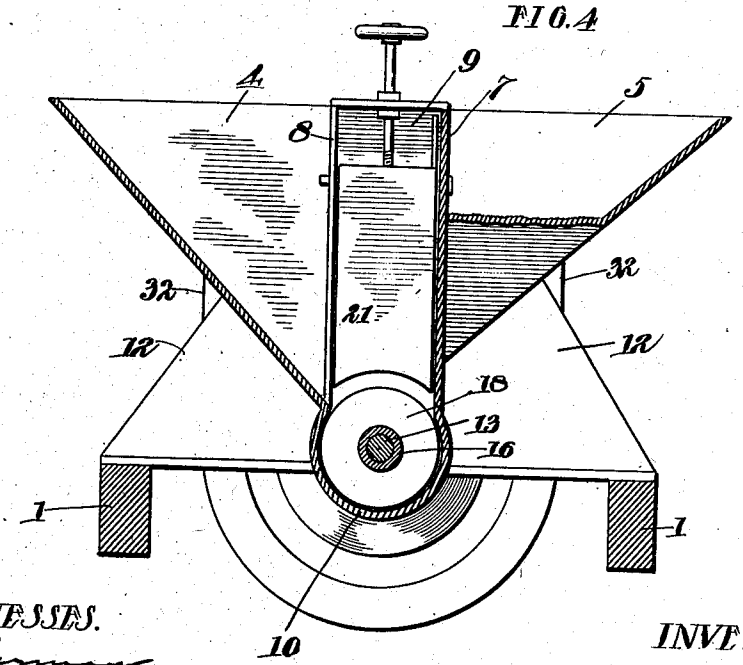


FIG. 3.

FIG. 4



WITNESSES.

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MIXING APPARATUS.

No. 900,227. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed July 13, 1906. Serial No. 326,050.

To all whom it may concern:

Be it known that I, JOHN A. SVENSON, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mixing Apparatus, of which the following is a specification.

Concrete mixers may be roughly divided into two classes, to wit, those in which the mixing drum itself revolves, and those which comprise a stationary semicircular trough in which paddles carried on a revolving shaft agitate and mix the ingredients. In the last named class of machines (to which the embodiment herein shown of my invention belongs), it usually becomes necessary to let the outer points of the mixing paddles revolve in a circle considerably smaller than that of the trough; that is to say, the paddles do not touch the trough by about two inches, in order that the irregular pieces constituting the coarser part of the mixture may not wedge themselves between the paddles and the trough and cause stoppage or breaks. As a result a layer of material always remains on the inside of the trough, which layer would, since water is added in the mixing process, become set and harden into an objectionable mass if not periodically removed. Ordinarily the layer of material referred to is removed by hand at the expense of considerable labor and time. This invention provides means for making the trough self-cleaning at intervals and while the apparatus is in operation.

I have mentioned the mixing of concrete merely by way of illustration, not intending to imply that the invention is limited to the production of that compound.

In the accompanying drawings, Figure 1 is a longitudinal vertical central section through a mixing apparatus embodying the features of my invention. Fig. 2 is a plan view of said apparatus. Fig. 3 is an elevation of the forward end of the machine. Fig. 4 is a transverse section on dotted line 4 4 of Fig. 1.

The embodiment herein shown of this invention comprises a supporting frame consisting of two longitudinal beams 1 joined together at their ends by two transverse beams 2. Upon said frame is supported a plurality of hoppers for receiving the materials to be measured and mixed. In the present embodiment there are three hoppers 3, 4, and 5, although it is apparent that a greater number may be provided, if desired. The hoppers 3 and 4 are separated from each other by the partition 6, and the hoppers 4 and 5 by the partitions 7, 8 and 9. The lower or discharge ends of all of said hoppers communicate with a conical conveyer casing 10 secured to said hoppers in any suitable way. In the hopper 3 are two vertical partitions 11, the space between said partitions communicating with the conveyer casing 10. The hoppers 3, 4 and 5 and the conveyer casing 10 are supported upon the main frame by means of brace-arms 12 (Fig. 4).

A shaft 13 is rotatably supported upon the main frame in bearings 14 carried by the transverse beams 2, said shaft being rotated by means of a gear 15 driven from any suitable source of power. Upon said shaft is rotatably mounted a sleeve 16 extending the length of the conveyer casing 10 and projecting beyond one end of said casing, the projecting end of said sleeve having fixed thereto a gear 17 by means of which motion may be communicated to said sleeve for rotating it independently of the shaft 13. Within the conical conveyer casing 10 the sleeve 16 bears a conical conveyer screw 18 fitting its casing closely. To facilitate renewal of the conveyer screw, said screw is made in sections, and the larger sections in halves, as shown in Figs. 1 and 2.

In order to permit of varying the proportions of the materials to be compounded, I provide means for moving the outlets from certain of the hoppers along the center line of the conveyer casing. Since the amount of material that may be fed into the conveyer depends upon the diameter of the screw beneath the outlet from the hopper, it will be seen that moving said hopper (or the outlet therefrom) toward the larger end of the screw permits an increased flow of material, and a movement of the hopper or outlet toward the smaller end of the screw will decrease the amount of material discharged into the conveyer. The feed-regulating means for the hopper 3 comprises a diaphragm 19 pivotally mounted upon a shaft 20 supported in the partitions 11, said diaphragm forming one wall of the outlet and being located at the side toward the larger end of the screw. The diaphragm 21 for the hopper 4 is pivoted upon a shaft 22 carried by the partitions 7 and 8. The lower ends of

said diaphragms extend to a point near the periphery of the conveyer screw 18 and are curved to conform to said screw. The diaphragm 19 is swung to increase or decrease the size of the opening communicating with the conveyer casing 10, in the direction of the axis of the conical screw, (and thus to virtually shift said opening along said screw), by means of a screw 23 supported in a cross-bar 24 extending from one of the partitions 11 to the other. The upper end of the screw 23 carries a hand wheel 25. The lower screw-threaded end of the screw 23 engages a nut 26 pivotally supported in ears 27 depending from an angular portion 28 of the diaphragm 19. A pointer 29 fixed to the diaphragm 19 near its pivot serves to indicate upon any suitable scale (not shown) the positions of the diaphragm which have been found by trial to permit of the passage of desired amounts of material. The position of the diaphragm 21 is adjusted in a similar manner by means of a screw 30.

In making concrete, the cement may be placed in the hopper 3, the sand in the hopper 4, and the broken stone in the hopper 5. This order is preferable when making concrete, as the materials needed in smaller quantities are fed to the conveyer at the smaller end of the screw; however, the order mentioned is not essential.

It is desirable to provide against choking of the apparatus by reason of pieces of stone becoming caught between the conveyer and some portion of the hopper from which the broken stone is being fed. To guard against such choking, I make a portion of the hopper wall adjacent to the outlet from the conveyer yielding or elastic. Said yielding wall consists of a plurality of spring blades 31 attached at their upper ends to the hopper 5, and extending to a point near the periphery of the conveyer screw 18. The blades 31 are stiff enough to withstand the pressure due to the ordinary weight of the material in the hopper, but will yield to permit the passage of a piece of stone that might become wedged between the conveyer screw and said blades. A plurality of narrow blades is used, in preference to a single wider blade, in order that the yielding action shall be local, and to avoid forming such a large opening as to permit an excessive amount of material to escape from the hopper 5.

The materials fed forward by the conveyer screw 18 are discharged by said screw into a mixing trough 32 where they are thoroughly mixed by means of paddles or blades 33 fixed to the shaft 12. In order that the mixed materials may be fed toward the forward open end of the trough 31 by the rotation of the blades 33, said blades are set at an angle with the shaft 13. To guard against any of the pieces of broken stone becoming wedged between the blades 33 and the sides of the trough 32, said blades are arranged so as to leave a space between their outer ends and the walls of the trough. This space, as hereinbefore suggested, becomes filled with a mass of material which may harden and form an objectionable crust. To permit of readily removing this layer of material at suitable intervals, I mount the trough 32 in such a manner that it may be rocked from its normal or operative position into inoperative positions wherein its bottom and the lower portions of its sides are close to the blades 33.

Referring to Fig. 3, 34 are brackets rigidly fixed in pairs to the longitudinal beams 1, four pairs of brackets being provided in the present instance. The outer ends of said brackets carry pins 35 which pass through elongated openings 36 formed in lugs 37 fixed to the trough 32. A tilting lever 38 is supported in a bracket 39 fixed to one of the beams 1, which lever is pivotally connected with ears 40 fixed to one of the sides of the trough 32. If desired, means comprising a slotted sector 41 and a clamping screw 42 may be provided for locking the lever 38 in position.

In the operation of making concrete, the cement is placed in the hopper 3, the sand in the hopper 4, and the broken stone in the hopper 5. The diaphragms 19 and 21 are adjusted so as to obtain a proper proportioning of the materials. The shaft 13 and the sleeve 16 being rotated, the materials are fed by the screw conveyer 17 into the mixing trough 32, where water is added and the mixing completed. As the screw conveyer delivers all the different materials into the mixing trough at one point, said materials are quickly and uniformly mixed by the blades 33. It will be seen that the cement, sand and stone will be quite thoroughly mixed in their passage through the conveyer, thus making possible the use of a smaller mixing trough than is usual in mixing machines. It should also be noted that the employment of a conical conveyer makes possible the use of several hoppers. If the screw were of uniform diameter it could empty but one hopper, but being conical its increased diameter on the portion beneath each successive hopper permits the entrance of additional material at each point in its length. At suitable intervals the trough 32 is rocked by means of the lever 38 to bring first one side and then the other of said trough up to the revolving paddles 33, in order to scrape off the concrete adhering to the sides and bottom of the trough. In thus rocking the trough, say to the right, it is lifted off the supporting pins 35 upon the left side, the trough being guided back to its normal position by means of the slotted lugs 37.

Various changes may be made in the embodiment herein shown without departing from the spirit and scope of my invention. I

therefore desire not to limit myself to the precise details herein set forth except as called for in the appended claims.

I claim as my invention:

1. In a mixing apparatus, in combination, a supporting frame comprising brackets provided with pins, a mixing trough resting upon said pins, mixing devices in said trough, means for tilting one side of said trough free of said pins, and means for guiding said trough back to its normal position upon said pins.

2. In a mixing apparatus, in combination, a mixing trough; a support for said trough at opposite sides thereof; mixing devices in said trough; and means interposed between one of said supports and said trough for moving said trough first off one support and then off the other toward said mixing devices.

3. In a mixing apparatus, in combination, a mixing trough; a support for said trough at each side thereof, mixing devices in said trough; means engaging said trough for tilting one side of said trough free of the support for that side; and means engaging said trough for guiding said trough back to said support.

4. In a mixing apparatus, in combination, a non-rotatable non-sectional mixing trough; a supporting frame comprising brackets at each side of said mixing trough upon which said trough is movably supported; mixing devices in said trough movable with relation to said trough; and means for moving said trough upon said brackets.

5. A concrete mixer comprising a supporting frame; a non-rotatable, non-sectional mixing trough; a supporting means in said frame for said trough at opposite sides of said trough, the supporting means at each side of said trough being adapted to serve as a separate pivot for the entire trough; mixing devices in said trough; and a lever pivoted in said frame and connected with said trough for moving the latter toward and away from the mixing devices.

6. A concrete mixer comprising a mixing trough; supports for said trough at opposite sides thereof; a pivotal connection between said trough and said supports; movable mixing devices in said trough; said pivotal connection permitting a movement of said trough toward and away from said mixing devices, and means for moving said trough upon said supports from its operative position to an inoperative position in which inoperative position the walls of said trough are closer to said mixing devices than when said trough is in the operative position.

7. In a mixing apparatus, in combination, a supporting frame, comprising brackets provided with pins; a mixing trough; lugs at opposite sides of said trough, said lugs having elongated openings therein into which said pins extend; means for tilting said trough on said pins; and mixing devices in said trough.

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