G. B. & W. GREEN.

CONCRETE MIXER.

APPLICATION FILED JUNE 10, 1912.

1,070,798.

Patented Aug. 19, 1913.

3 SHEETS—SHEET 1.

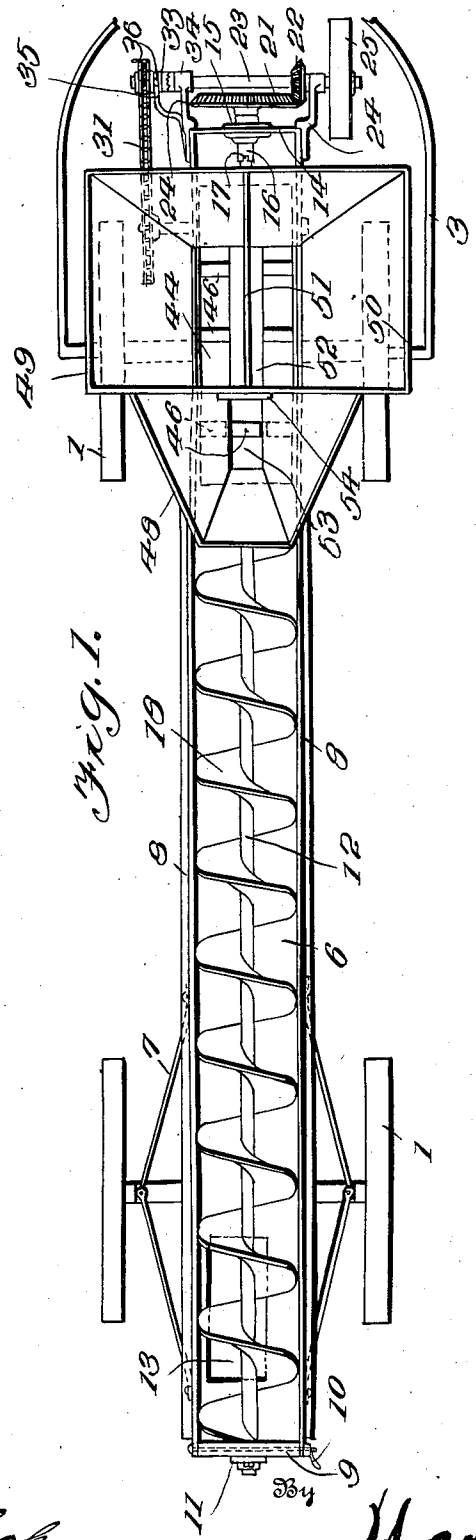


Fig. 1.

Witnesses

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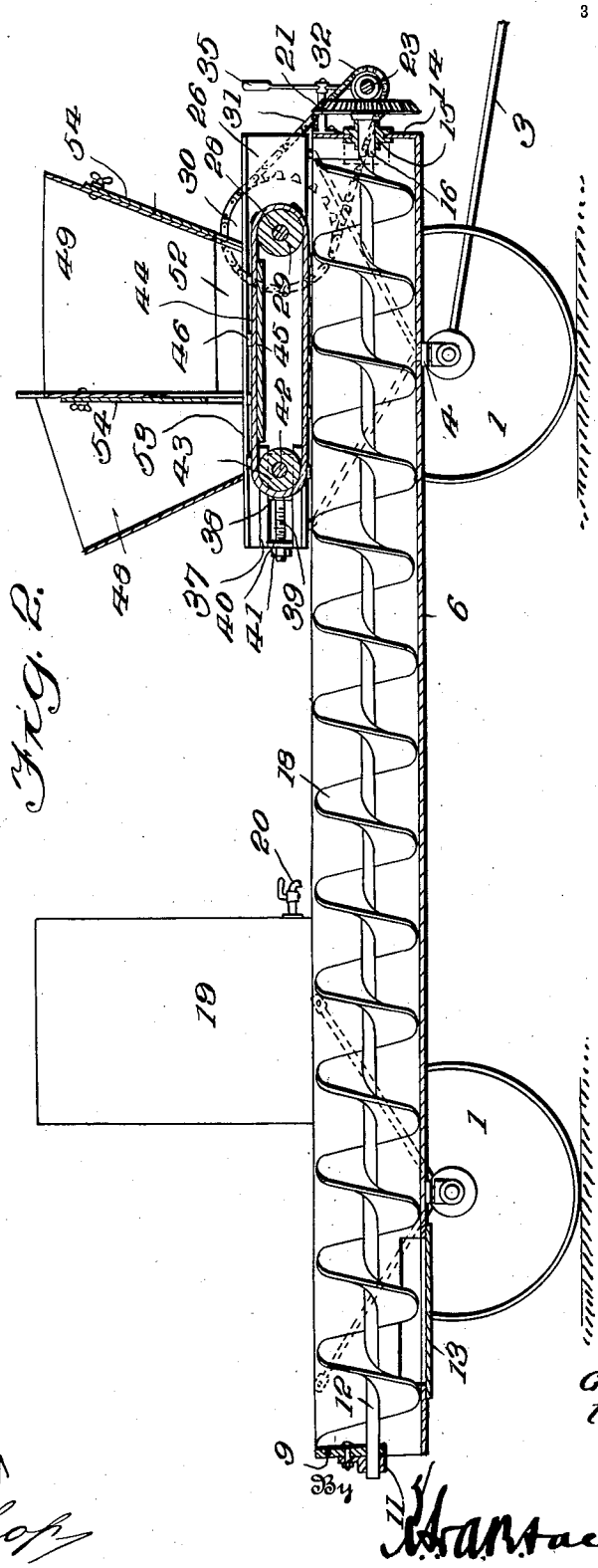


FIG. 2.

Witnesses

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3 SHEETS—SHEET 3.

Fig. 3.

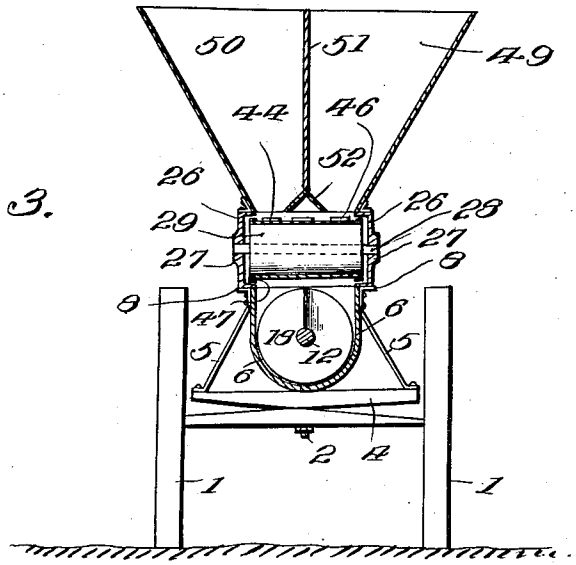
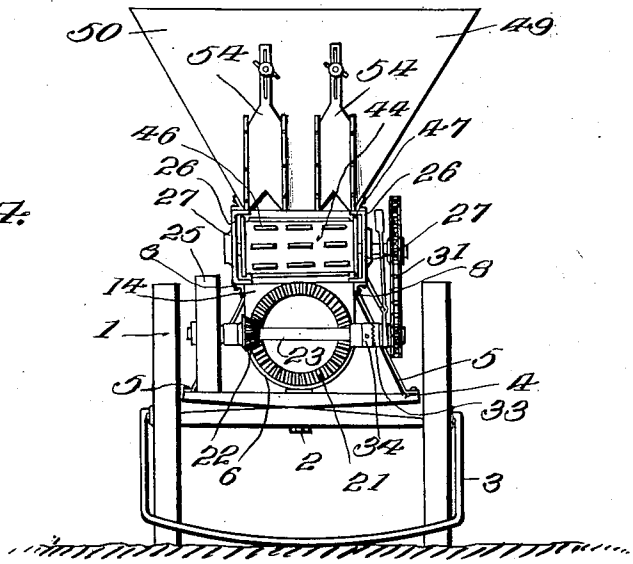


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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CONCRETE-MIXER.

1,070,798. Specification of Letters Patent. Patented Aug. 19, 1913.

Application filed June 10, 1912. Serial No. 702,836.

To all whom it may concern:

Be it known that we, GEORGE B. GREEN and WILLIAM GREEN, citizens of the United States, residing at Morgan, in the county of Redwood and State of Minnesota, have invented certain new and useful Improvements in Concrete-Mixers, of which the following is a specification.

Our invention relates to concrete mixers and has special reference to that class of mixers which may be drawn from place to place by the application of light draft, the object of the invention being to provide a device which will be composed of few parts constructed and arranged in a simple manner, whereby the several ingredients may be thoroughly and continuously mixed without requiring the application of a high degree of power and without requiring the intervention of complicated trains of gearing.

The invention seeks to improve, generally, the construction of this class of machines whereby the efficiency and durability of the same will be increased.

These stated objects, and such other objects as will incidentally appear hereinafter, are attained in such a mechanism as is illustrated in the accompanying drawings, and the invention consists in certain novel features which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the annexed drawings: Figure 1 is a plan view of our improved concrete mixer; Fig. 2 is a longitudinal vertical section of the same; Fig. 3 is a transverse section taken through the hopper; Fig. 4 is a front end elevation.

In carrying out our invention, we employ supporting wheels, 1, arranged in pairs, as will be readily understood, the front wheels being mounted upon a king bolt 2 and having a handle or draft bar 3 connected to the ends of their axle. The said king bolt passes through a fifth wheel or supporting bar 4 from which braces 5 extend upwardly to support the trough or receptacle 6 constituting the main frame of the mixer. The rear end of this trough or main frame is connected and supported upon the axle of the rear wheels by braces 7 which extend forwardly and rearwardly from the said axle and are secured to the opposite sides of the trough at or near the top of the same, as shown.

The trough or main frame 6 consists preferably of a sheet metal plate having its side edges bent upwardly whereby it is formed into a U-shaped member having an open top, as shown most clearly in Fig. 3, and the edges of this receptacle or trough are reinforced by angle bars 8 secured thereto and extending the full length of the same. A bar 9 is secured transversely in the rear end of the trough by a long bolt inserted therethrough and through the sides of the trough and equipped with a wing nut 10 on one end whereby it may be securely clamped in place. This bar supports a bearing 11 for the rear end of the conveyer shaft 12 and it will be readily understood that by releasing the wing nut the bolt may be withdrawn to facilitate the removal of the conveyer when it is desired to clean, repair, or renew the same. The bar should be of such dimensions and so connected to the bearing as to leave the largest possible opening for the discharge of the mixed concrete. Adjacent the rear end of the trough, at the bottom of the same, is a door 13 which may be utilized as a discharging point if the apparatus is being used to wash gravel or stone. The front end of the trough is permanently closed by a plate 14 in which is secured a bearing 15, and in the said bearing is journaled a shaft 16 having its inner end recessed or socketed to be engaged by a tenon or angular lug 17 on the front end of the conveyer shaft, whereby motion imparted to the shaft 16 will be transmitted directly to the conveyer so as to effect the desired operation.

The conveyer consists of a continuous spiral blade 18 extending the full length of the shaft and rigid therewith and of such diameter as to fit closely to the bottom and sides of the trough, whereby as the conveyer is rotated the materials fed into the trough will be forced longitudinally through the trough and will be given a rotary spiral movement about the conveyer shaft, so that they will be thoroughly commingled.

Supported upon the trough 6 at some point in rear of the front end thereof, is a tank 19 having a valved outlet 20 arranged directly over the trough whereby the water within the tank may be permitted to flow into the trough and directly upon the materials being fed along the same in such quantity as may be necessary for the proper production of the concrete. While the provision of the tank directly upon the trough

is preferable in many instances, it will be understood, of course, that the necessary water may be supplied from any convenient source if the apparatus is to be operated at any one place for a considerable period of time. As the machine, however, is primarily intended to be moved from point to point, the provision of a tank of sufficient capacity directly upon the trough will be generally found more convenient.

On the front end of the shaft 16 is secured a large bevel gear wheel 21 which meshes with a bevel pinion 22 secured upon a transverse driving shaft 23 which is mounted in brackets 24 secured to and projecting from the front end of the receptacle or trough, and upon one end of this driving shaft is a band pulley 25 which may be driven from any convenient source of power. It will thus be seen that when the prime motor is started, the conveyer will be rotated so as to mix the material within the trough or receptacle and feed the same toward the rear discharge end thereof, as before stated.

Secured upon the sides of the trough or receptacle are channel irons 26 constituting a hopper supporting frame, and in the said channel irons, near the front end thereof, are secured bearings 27 in which are journaled the ends of a shaft 28 carrying a roller 29 disposed between the said channel irons. One end of the shaft 28 is extended beyond the adjacent channel iron and a sprocket wheel 30 is secured thereon, said sprocket wheel being connected by a sprocket chain 31 with a sprocket pinion 32 loosely mounted on the end of the driving shaft 23 and having its hub constructed with ratchet teeth, whereby it constitutes a clutch member 33. A co-acting clutch member 34 is secured upon the driving shaft and is adapted to be engaged by the clutch member 33, a lever 35 being fulcrumed in any convenient manner upon the side of the trough and having its lower end engaging an annular groove 36 in the clutch member 33, so that by vibrating the said lever the clutch members may be moved into and out of engagement, so that the operation of the feeding mechanism may be started or stopped, as may be desired.

Adjacent their rear ends, the channel irons 26 are provided with guiding ribs 37 on their inner faces, while fitted to and between the said ribs are bearings 38 which may be caused to slide along the said guides by screws 39 attached to the said bearings and extending through lugs or brackets 40 on the channel irons. Nuts 41 mounted on the rear extremities of the said screws are adapted to be turned home against the said brackets or lugs and thereby adjust the screws, so that the bearings may be moved longitudinally of the channel irons and held at any desired point.

A shaft 42, carrying a roller 43, is journaled in the said bearings 38 and extends between the same, the said roller 43, together with the roller 29, constituting supports and driving means for a feeding apron 44 which is trained around the said rollers and passes over a platform or shelf 45 carried by the sides or channel irons 26 to support the upper run of the apron and prevent its sagging under the weight of the material taken up by it. This apron or endless belt has secured upon its outer surface a series of transverse strips or feeding lugs 46, which, as the apron is drawn through the bottoms of the hoppers, will take into the material within the hoppers and force a quantity of the same forward upon the apron until it reaches the forward turn of the apron around the roller 29, whereupon it will be discharged into the trough 6 and taken up by the spiral conveyer therein. Upon the side edges of the apron are longitudinal ribs or enlargements 47 which prevent the material on the apron passing over the side edges thereof and choking the space between the apron and the sides or channel irons 26 so as to interfere with the free movement of the apron. The said material is thus caused to travel positively with the apron and will all be fed into the receptacle or trough 6 to be taken up by the spiral conveyer. It will be seen, also, that the discharge of the material into the receptacle, at a point remote from the front end of the same, is thus obviated and consequently materials will be thoroughly and completely commingled, so that the resulting mixture will have a uniform consistency.

Secured upon and rising from the sides or channel irons 26 are hoppers 48, 49, and 50, the said hoppers having open bottoms and having downwardly converging sides, so that the material placed in the hoppers will be caused to gravitate to and onto the apron 44 passing beneath the same. The hopper 48 is intended to hold the loose dry cement, while the hoppers 49 and 50 are provided for the reception of the supply of sand and gravel, respectively. The said hoppers 49 and 50 are disposed side by side, having a common inner wall or partition 51, and the hopper 48 is disposed in rear of the hoppers 49 and 50, the rear walls of the sand and gravel hoppers constituting the front wall of the cement hopper. The partition 51 has inclined lower edges extending inwardly toward the respective hoppers and constituting an inverted V-shaped deflector 52 with an inclosed conduit, the base of which is approximately equal to the width of the opening 53 in the bottom of the cement hopper, the cement taken up by the apron being thus caused to travel through the conduit defined by the deflector 52, so that the sand and gravel will be held from the cement until

all the materials are discharged into the receptacle or trough. Upon the front wall of each hopper is a gate or valve 54 which is vertically adjustable to control the flow from the hopper, and these gates permit us to regulate the proportions of the several ingredients so that the proper amount of each ingredient may be fed into the receptacle according to the requirements of any particular work or the quality of the materials.

It is thought the operation of our improved concrete mixer will be readily understood from the foregoing description, taken in connection with the accompanying drawings. The materials to be mixed are placed in the respective hoppers, and the motor started after the clutch member 33 has been thrown into engagement with the clutch member 34. Motion will thus be imparted to the driving shaft 23, so that the spiral conveyer will be rotated through the medium of the bevel pinion and the bevel gear wheel 21, while the sprocket gearing will be actuated to cause a travel of the apron 44. As the apron 44 travels through the bottoms of the hoppers, the bars or lugs 46 thereon will take into the material in the hoppers and will remove a portion of the said material, so that there will be a constant supply of the ingredients fed into the spiral conveyer.

Should the supply of material be exhausted or should the apron choke for any reason or for any cause it be necessary to cease the feeding of material to the spiral conveyer, the clutch members may be disengaged, so that the feeding mechanism will cease to operate without causing any stoppage of the rotation of the spiral conveyer and the material already in the trough may be mixed without necessitating the stoppage of the operation. When the supply of material has been replenished, the clutch members may again be thrown into engagement, so that the rotation of the driving shaft will at once start the feeding operation and the production of the concrete continue. Should any one ingredient be feeding faster or slower than is desirable, the cut-off or gate may be adjusted to obtain the proper feed without stopping the operation of the machine, and should the belt or apron tend to sag or stretch so as to feed improperly or irregularly, the bearings 38 may be quickly adjusted to take up the slack and restore the apron to a taut condition, so that the defect in the feeding will be cured.

The device will be found advantageous, also, for washing gravel. The several hoppers may be filled with gravel and the machine operated as before, but as no sand and cement will now be fed through the spiral conveyer, it will be obvious that concrete will not be formed and the gravel or stone will be subjected merely to the washing action of the water from the tank or other source of supply. The door 13 will preferably be open continuously when washing gravel, but when making concrete it will be closed. The several ingredients, of course, are mixed dry until they pass under the outlet from the tank, after which they are mixed wet until discharged. The spiral conveyer works the material to one side of the trough while feeding it rearwardly and if more water be supplied than the material will absorb, the surplus water will travel at the bottom of the trough. When washing gravel, sand or stone, the door 13 is opened just enough to let out the water and fine dirt or mud while the sand, gravel and stones are discharged at the rear end, thus separating the dirt from the sand, gravel or stones. The door 13 is at the bottom of the trough but away from the side toward which the material is worked by the conveyer and it may be held open to a greater or less degree by any convenient means.

It will be noted that the front end of the conveyer shaft has a detachable connection with the shaft 16 and that the end gate supporting the rear end of the shaft is removable, so that, if the removal of the spiral conveyer is advisable for any reason, this removal may be effected without requiring any disarrangement or dis-assembling of any other parts of the machine.

Our device is obviously simple in the construction and arrangement of its parts and may be manufactured at a low cost, while it will be found highly efficient in use for the purposes for which it is intended.

What we claim is:—

1. A machine for the purpose set forth comprising a receptacle, a feeding apron disposed over the front end of said receptacle, a pair of hoppers supported by the receptacle and arranged over and discharging onto said feeding apron and having a common intermediate wall having inwardly inclined lower ends forming an arched deflector at the lower end thereof with inclosed conduit, and a third hopper arranged in rear of the first-mentioned hoppers with its bottom in alinement with the said conduit to discharge under the deflector onto the apron.

2. A machine for the purpose set forth comprising a receptacle, side plates secured to and rising from said receptacle adjacent the front end thereof, rollers journaled in and extending between said side plates, means acting on one of said rollers to rotate the same, an endless apron trained around said rollers and arranged to discharge into the front end of the receptacle, a hopper supported by said side plates and extending over the apron and arranged to discharge upon the rear portion of the apron along the medial line of the same, and a pair of hop-

pers supported by the side plates and arranged side by side over the forward portion of the apron to discharge thereon at opposite sides of the medial line of the same, the lower adjacent inclined sides of said pair of hoppers forming a conduit for the passage of the material discharged from the first-mentioned hopper.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE B. GREEN. [L. S.]
WILLIAM GREEN. [L. S.]

Witnesses:
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