G. F. NYE.

CONCRETE MIXER.

APPLICATION FILED MAR. 17, 1913.

1,103,534.

Patented July 14, 1914.

4 SHEETS-SHEET 1.

Fig. 1.

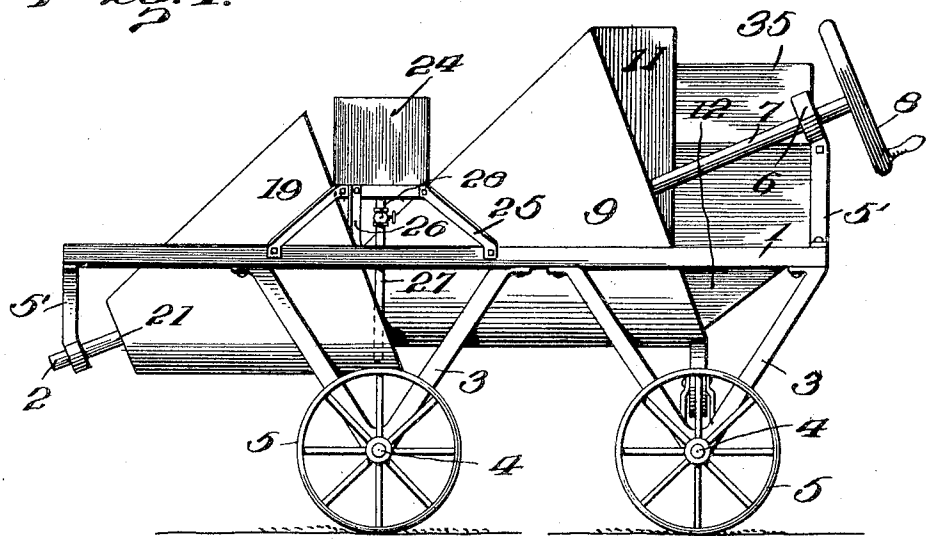
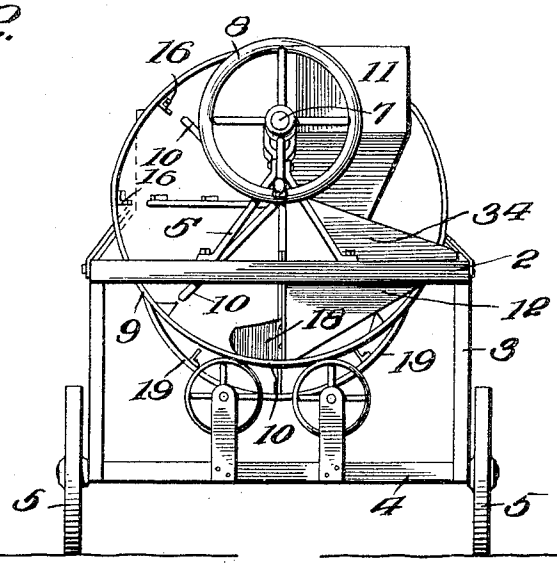


Fig. 2.



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4 SHEETS—SHEET 2.

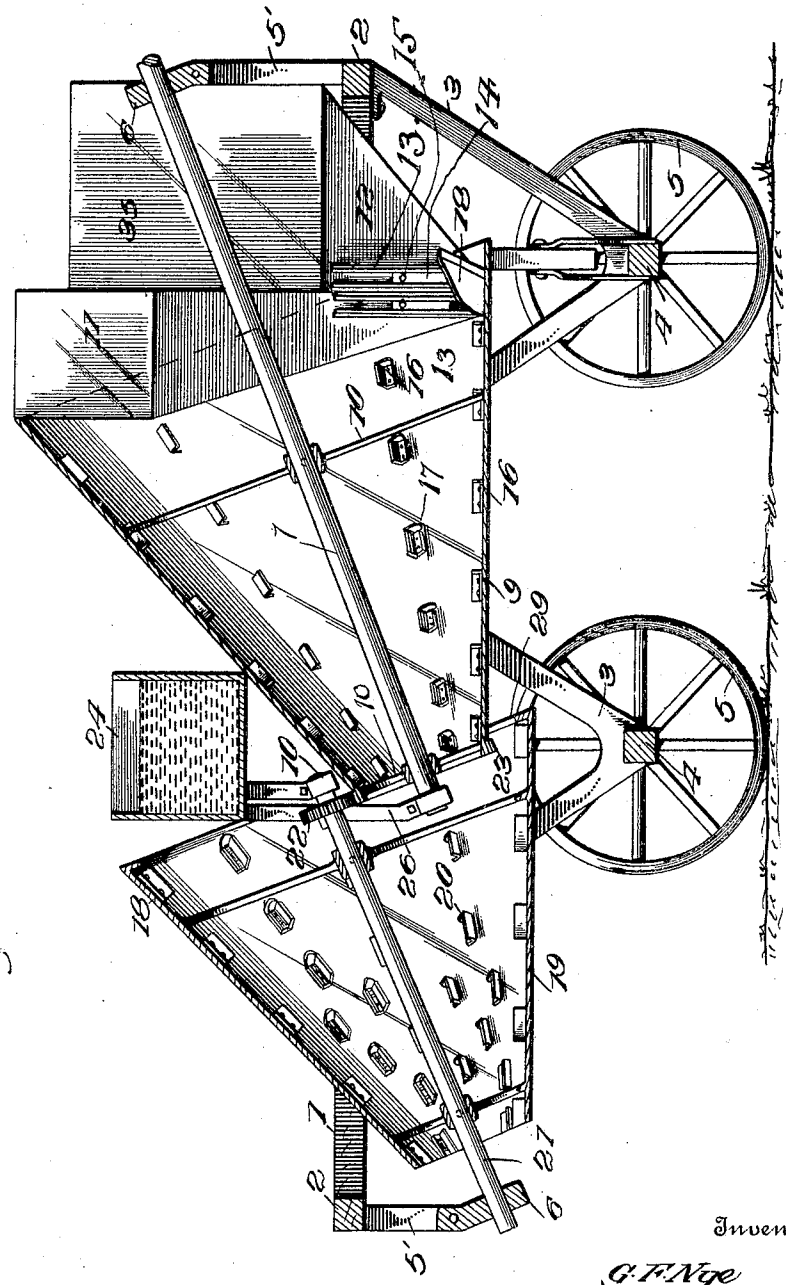


FIG. 3.

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4 SHEETS—SHEET 3.

Fig. 4.

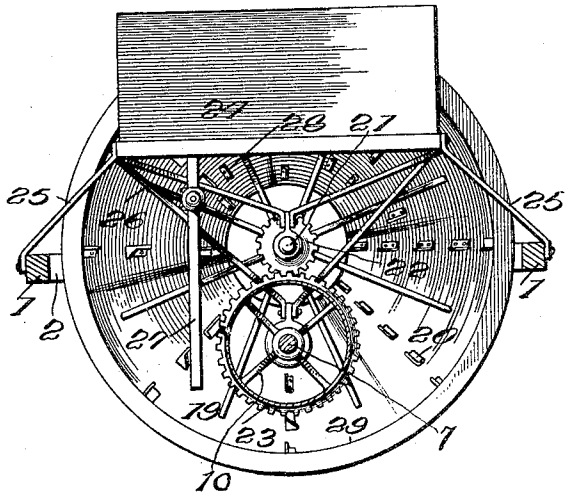


Fig. 5.

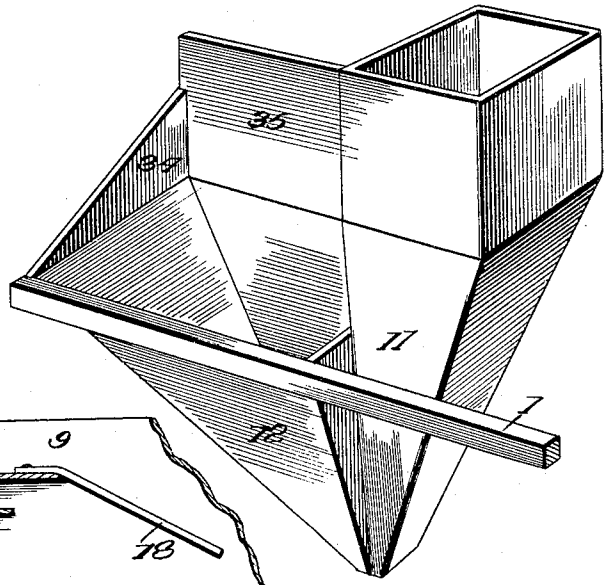
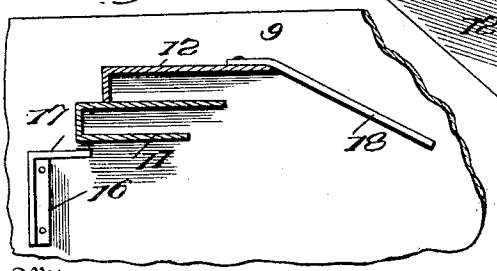


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 9.

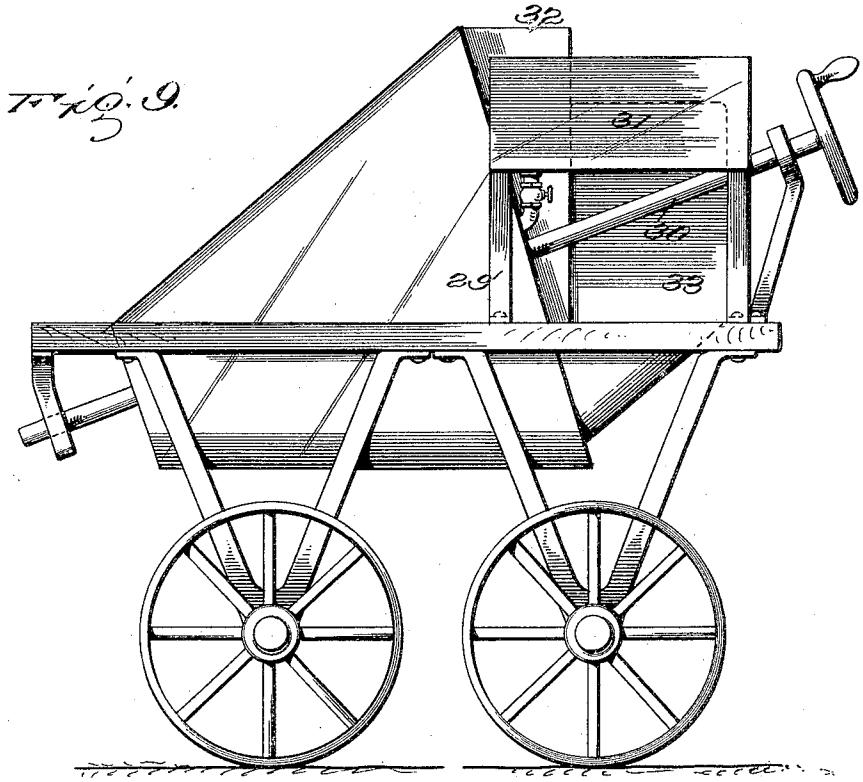
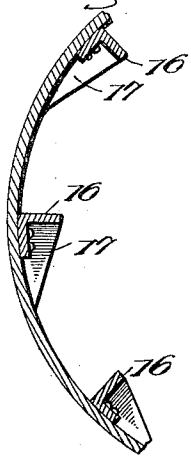


Fig. 7.



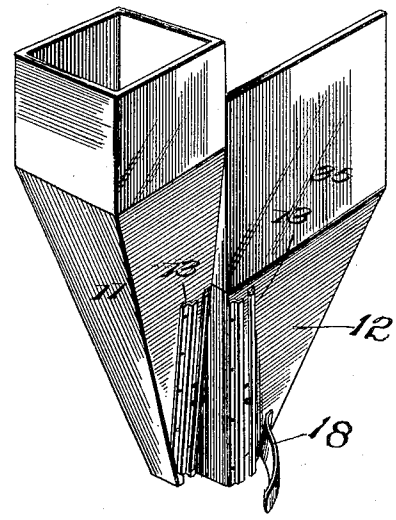


Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE F. NYE, OF KEARNEY, NEBRASKA.

CONCRETE-MIXER.

1,103,534. Specification of Letters Patent. Patented July 14, 1914.

Application filed March 17, 1913. Serial No. 754,904.

To all whom it may concern:

Be it known that I, GEORGE F. NYE, a citizen of the United States, residing at Kearney, in the county of Buffalo and State of Nebraska, have invented certain new and useful Improvements in Concrete-Mixers, of which the following is a specification.

This invention relates to concrete mixers, and has for its object the provision of a compact portable apparatus by which cement, sand and water may be rapidly, easily and thoroughly commingled.

A further object of the invention is to provide an improved apparatus for the stated purpose in which the feeding of the materials to be mixed will be dependent upon the rotation of the mixing drum.

A further object of the invention is to provide a concrete mixer which may be built at a low cost and which will prove efficient in operation and in which the parts will be readily accessible when it is necessary to clean or repair the same.

All these several stated objects, and other incidental objects which will appear as the description of the invention proceeds, are attained in apparatus of the character illustrated in the accompanying drawings, and the invention consists in certain novel features which will be particularly pointed out in the claims following the description.

In the drawings: Figure 1 is a side elevation of the preferred embodiment of the invention; Fig. 2 is an end elevation of the same; Fig. 3 is a longitudinal vertical section on a somewhat larger scale; Fig. 4 is a sectional end elevation showing the gearing between two drums; Figs. 5 and 6 are detail perspective views of the hoppers; Fig. 7 is a detail section of a portion of the drum and the agitators thereon; Fig. 8 is a diagram illustrating the relative positions of the lower ends of the hoppers; Fig. 9 is a side elevation of a modification.

In carrying out my invention, I employ a main frame consisting of longitudinal beams 1 connected at their ends by cross bars 2 and to which are secured depending brackets 3 carrying axles 4 in their lower ends, ground wheels 5 being mounted upon the ends of the axles so that the apparatus may be readily moved from point to point. To the cross bars 2, I secure brackets, standards or hangers 5′ which constitute bearings for the axles or operating shafts which carry the mixing drums. The bracket at the front end of the machine is in the form of a hanger depending therefrom, while the bracket at the rear end of the frame is in the form of a standard rising from the same, both brackets having their extremities turned to a slight angle, as shown at 6, whereby the shafts or axles of the drums will be supported in oblique positions.

In the preferred type of mixer, a plurality of drums is provided, the rearmost drum delivering into the drum in advance of the same, as will be readily understood. The main driving shaft 7 is journaled in the upper end of the bracket or standard 5′ at the rear end of the frame and is equipped with a power wheel 8 through which motion may be imparted to the shaft by hand or from any convenient portable motor, as preferred. The shaft is disposed at such an angle that the lower side of the drum 9 carried thereby will be horizontal or approximately horizontal, the drum being conical, as shown, with its larger end toward the rear. The drum is secured to the shaft by spokes or radial arms 10 rigid with the shaft and with the shell of the drum, as clearly shown in Fig. 3. Between the rear end of the drum and the rear end of the frame, I provide hoppers 11 and 12 supported by the frame and intended to hold cement and sand, respectively, said hoppers tapering to their open lower ends which are in juxtaposition to the inner surface of the drum near the rear edge of the same. Upon the side walls of the hoppers nearer the axis of the drum, are ways 13 in which are slidably mounted doors or cut-offs 14 carrying thumb-screws 15 which are adapted to bind against the adjacent side walls of the hoppers. It will be readily understood that the walls of the hoppers upon which the doors are mounted terminate above the surface of the drum thereby providing openings which form the outlets for the material and the flow is regulated by adjusting the cut-offs.

Upon the inner surface of the drum, I provide a series of short ribs, ridges, or baffle-plates 16 which extend longitudinally of the shell of the drum and, consequently, converge toward the smaller end of the drum, as clearly shown in Fig. 3, whereby, as the drum is rotated, the ribs or baffles will pass through the cement and sand delivered onto the bottom of the drum and will tend to lift the same and discharge it onto a point of the drum nearer the smaller

end thereof. When the ribs or baffles enter the body of sand or cement deposited in the drum, they will be substantially in the longitudinal plane of the apparatus and will lie horizontally, but, as they ascend with the movement of the drum, they will assume an inclination toward the smaller front end of the drum and, consequently, the material raised by them will gravitate toward the front end of the drum and will drop to the bottom of the drum, being repeatedly and successively taken up and caused to fall onto the bottom of the drum so that they will be thoroughly commingled and will be gradually worked to and out of the smaller front end of the drum. The baffle plates are preferably provided at their rear ends with lateral extensions or guards 17 which enter the material in advance of the baffles and prevent its movement rearwardly away therefrom, and the rearmost annular row of baffles is arranged to move past the hoppers close to the same so as to act upon the material immediately adjacent the hoppers. A deflector or guard 18 extends from the outer hopper 12 adjacent the outlet port of the same so as to direct the material into the path of the baffles and prevent its loss over the rear edge of the drum.

The drum 9 has its smaller end extending within the larger end of a second drum 19 which is supported upon the main frame with its lower side horizontal or approximately horizontal and which is also provided with baffles 20 of the same construction and arrangement as the baffles 16. This second drum 19 is carried by a shaft 21 which is journaled in the bracket or hanger 5′ at the front end of the frame and is equipped with a pinion 22 at its rear end which pinion meshes with a gear wheel or ring 23 fixed upon and around the smaller end of the drum 9, so that, if the driving shaft 7 be rotated, the drum 9 will be rotated in one direction and the drum 19 will be rotated in the opposite direction and at a higher speed. Located between the two drums is a water tank 24 supported upon suitable brackets 25 upon the main frame, and hangers 26 depend from the said brackets to support the rear end of the shaft 21 and the front end of the shaft 7. A pipe 27 provided with a cut-off valve 28 leads from this tank into the second drum at the larger end thereof.

The operation of the apparatus, it is thought, will be evident from the foregoing description taken in connection with the accompanying drawings. The hoppers 11 and 12 being filled and the cut-offs 14 being adjusted to properly regulate the flow, the driving shaft 7 is rotated and the material at the bottoms of the hoppers resting upon the bottom of the drum 9 will be drawn through the outlets by the movement of the drum. As the rotation of the drum continues, the baffles will take up the materials, as before described, so that they will be thoroughly agitated and mixed and gradually fed into the second drum. Water will be supplied to the commingled ingredients in the second drum, and to prevent the escape of this water the said second drum is preferably provided with an annular flange 29 around its larger end, as shown in Fig. 3 and as will be readily understood. The material will be thoroughly mixed in the second drum and will be delivered through the smaller front end thereof, it being understood that the apparatus is a continuous mixer. By supplying a door at the discharge end of the second drum, the device will be converted into a batch mixer. When a sufficient quantity of concrete has been mixed to meet the needs at one point, the apparatus may be easily pushed to another point where a second batch may be mixed and deposited and it will, therefore, be readily seen that the apparatus is especially adapted for use in laying cementitious sidewalks and for similar purposes. By employing a drum in which a preliminary dry mixing of the ingredients is effected and subsequently adding water to the commingled ingredients in a second drum, the concrete will have an even composition throughout and will wear uniformly.

While I prefer to employ a plurality of successive drums as I believe better results are attained thereby, I do not limit myself to such arrangement, and, in Fig. 4, I have illustrated the apparatus as comprising a single drum 29 which is constructed in all respects like the drum 19 and has its shaft 30 journaled in the bearings at both ends of the main frame so that it will be rotated by the direct application of power to its axis. In this form of the apparatus, the tank 31 is mounted upon the frame at the rear end thereof and at one side of the same, while the cement hopper 32 and the sand hopper 33 are secured upon the frame at the opposite side of the same and at the rear end thereof. It will thus be seen that the cement, sand, and water are all delivered into the one drum and the mixing may be very rapidly accomplished. If the rotation of the drum be continued for a sufficient interval, a very thorough commingling of the several ingredients will be effected and a high grade product obtained. This device will be found very efficient where a cheaper apparatus is desired and in which the sidewalk or other article to be produced from the concrete is not subjected to very severe usage.

In both forms of the mixer the cement hopper is tall enough to extend to the top of the drum and will hold a considerable quantity of material. While the sand hop-

per is lower, its upper end is wide so that the material may be easily placed therein by means of shovels. At the end of the frame, a small guard plate 34 is provided to prevent the sand escaping over the end wall of the hopper and upon the inner side wall of the hopper is erected a large guard plate or shield 35 to prevent the sand being thrown beyond the hopper.

It will be readily noted that I have provided a very compactly arranged concrete mixer which may be easily moved from point to point and which may be readily operated so as to mix the several ingredients thoroughly and rapidly and discharge the concrete at the point where it is to be used.

By arranging the mixing drums so that their axes are inclined and their lower sides approximately horizontal, I obtain a very thorough agitation of the materials without the use of complicated and costly mixing devices within the drum and automatically feed the mixed materials toward the smaller discharge end of the drum so that the operator may confine his attention to the hoppers and is not required to constantly watch the progress of the mixing. The only work required of the operator is to see that the rotation of the driving shaft is continued and that the hoppers are kept filled.

It will be noted that the hoppers extend to the inner surface of the drum and that the drum constitutes the bottoms of the hoppers. Consequently, when the drum is rotated, it drags from the hoppers the layer of material resting on the drum so that the ingredients of the concrete will be fed evenly and continuously into the drum and may be easily, rapidly and thoroughly mixed.

What is claimed is:

1. A concrete mixer comprising a drum having its lower side substantially horizontal and having an open inclined end, a substantially vertical hopper extending through said end of the drum and having an open bottom in juxtaposition to the lowest point of the inner surface of the drum and having an opening in one side communicating with the open bottom and discharging in the direction of rotation of the drum, and means for rotating the drum.

2. A concrete mixer comprising a drum, a hopper extending into the drum and having an open lower end in juxtaposition to the inner surface of the drum, a deflector extending inwardly over the surface of the drum adjacent the mouth of the hopper and in the path of the material issuing therefrom, and means for rotating the drum.

3. A concrete mixer comprising a drum, a hopper extending through the end of the drum and having its lower end in juxtaposition to the inner surface of the drum at the lowest point of the same and having an outlet discharging in the direction of rotation of the drum, a deflector carried by the lower end of the hopper and extending therefrom laterally and inwardly over the surface of the drum in the path of the material issuing from the hopper, and means for rotating the drum.

4. A concrete mixer comprising a conical mixing drum having its axis inclined and its lower side approximately horizontal, means for rotating the drum, means for depositing material upon the bottom of the drum, baffles on the inner surface of the drum extending longitudinally of the same, and lateral extensions at the rear ends of the baffles projected forwardly from the baffles in the direction of rotation of the drum.

5. A concrete mixer comprising a conical drum having its lower side substantially horizontal, means for rotating the drum, a hopper having an open bottom in juxtaposition to the inner surface of the drum at the larger end thereof, and baffles on the inner surface of the drum extending longitudinally thereof, the rearmost baffles being arranged to move past the innermost wall of the hopper in close relation thereto.

6. A concrete mixer comprising a drum, a plurality of hoppers having open bottoms in juxtaposition to each other and the inner surface of the drum at the larger end thereof, means for rotating the drum, a deflector extending from the side of the outer hopper inwardly immediately over the surface of the drum, and baffles disposed longitudinally upon the inner surface of the drum, the rearmost baffles moving past the inner hopper and the end of the deflector in close relation therewith.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE F. NYE. [L. S.]

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."