

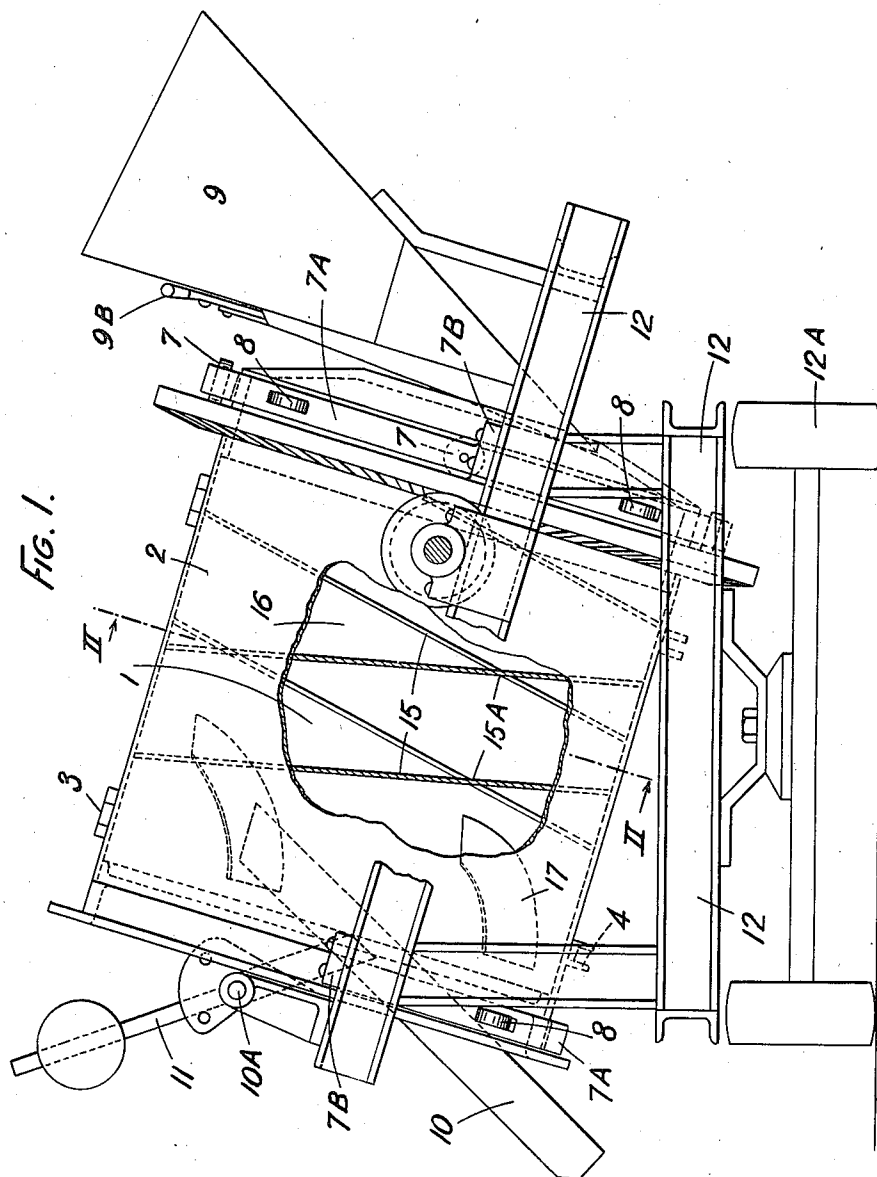
Nov. 25, 1924.

1,516,773

J. S. LANCASTER
MACHINE FOR MIXING CONCRETE MIXTURES AND FOR WASHING
SAND AND THE SOLID INGREDIENTS THEREOF

Filed Nov. 28, 1923

3 Sheets-Sheet 1



Inventor:
John Stuart Lancaster,
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att'y.

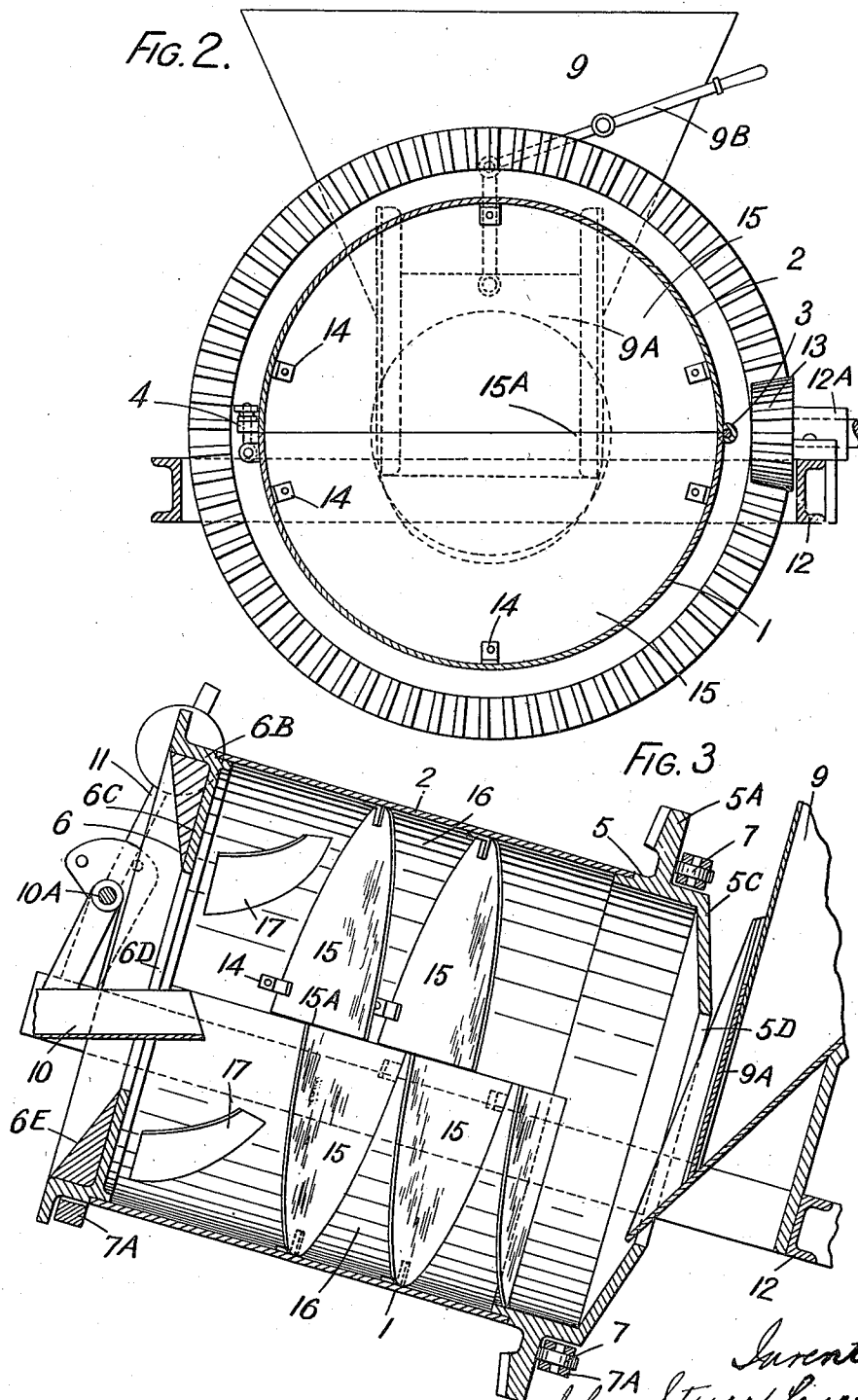
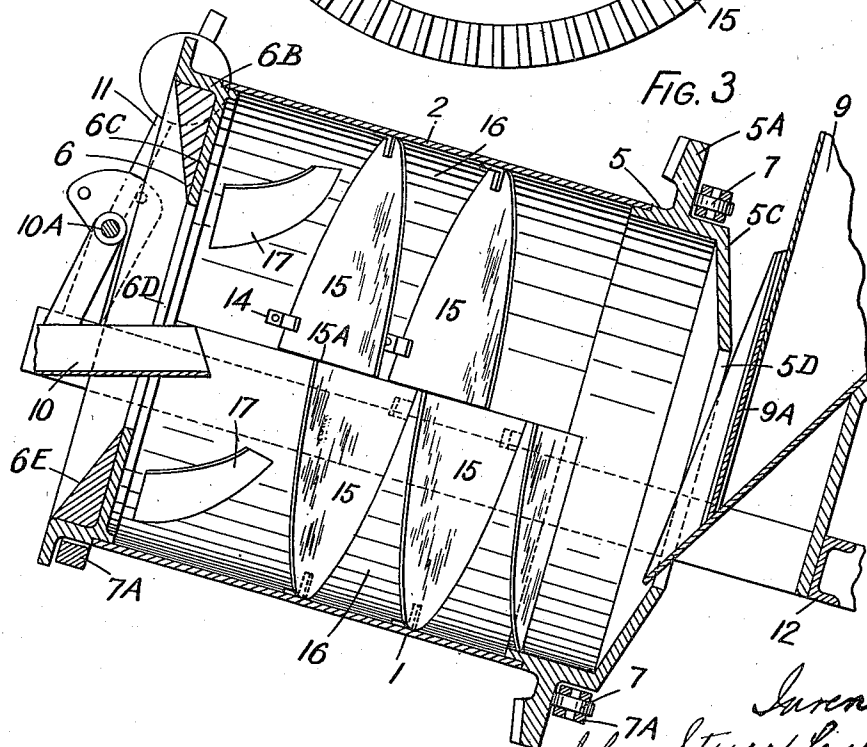
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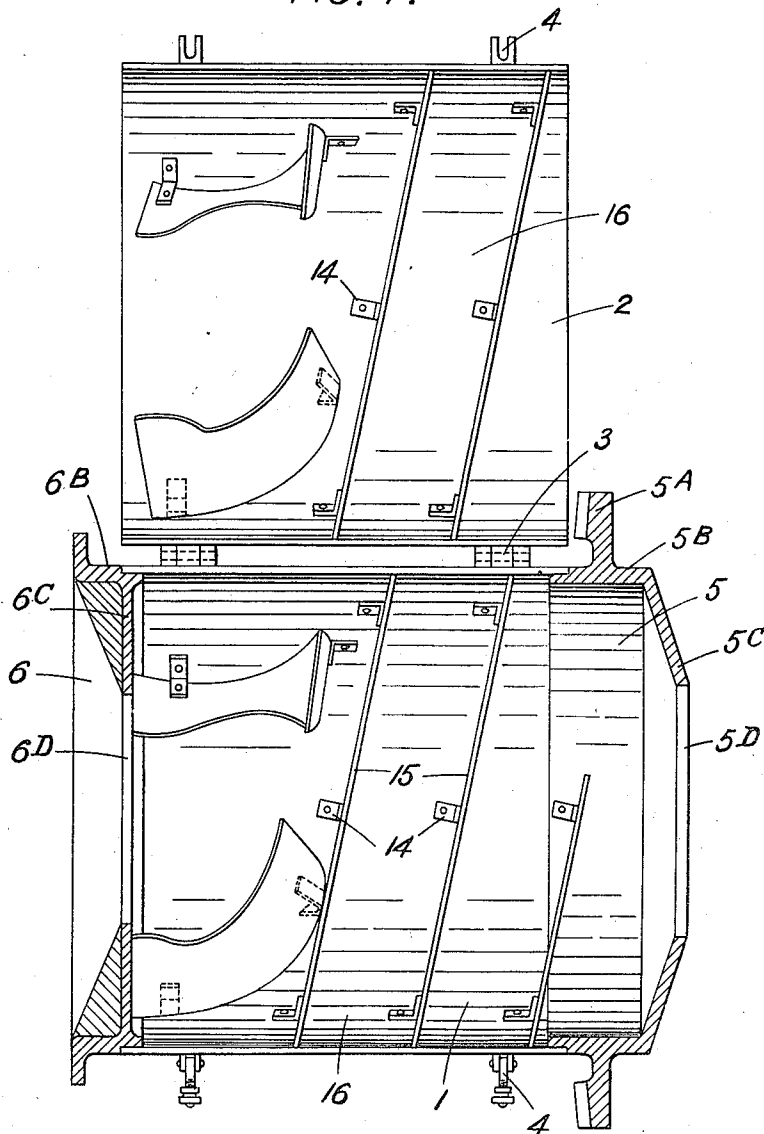
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3 Sheets-Sheet 3

FIG. 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MIXING CONCRETE MIXTURES AND FOR WASHING SAND AND THE SOLID INGREDIENTS THEREOF.

Application filed November 28, 1923. Serial No. 677,487.

To all whom it may concern:

Be it known that I, JOHN STUART LANCASTER, of 106 Emscote Road, Warwick, in the county of Warwick, England, a subject of the King of Great Britain and Ireland, have invented a new and Improved Machine for Mixing Concrete Mixtures and for Washing Sand and the Solid Ingredients Thereof (for which I have filed application in Great Britain No. 32,753—filed the 30th November, 1922, and accepted Feb. 29, 1924, and numbered 211,965), of which the following is a specification.

This invention relates to a machine for mixing concrete, the same structure being adapted to be used for mixing ingredients of other substances. The invention has advantages, inasmuch as it provides a machine which may deliver a continuous discharge of the mixture if suitably fed, and the point of discharge may conveniently be arranged to be higher than the feeding hopper, so that the machine partakes of the nature of an elevator as well as fulfilling its primary function.

According to the invention, a mixing cylinder or drum is provided, rotating on its axis, which is inclined to the horizontal, and means are provided for feeding in the ingredients or substance to be dealt with into the lower end, for continuously agitating it and simultaneously effecting an axial displacement until it approaches the upper end from whence it is discharged, through a chute, such means comprising an arrangement of inclined segmental baffle plates and beyond the higher baffle plates lifters for carrying and discharging the mixture into a chute which is maintained so that one end will enter the higher end of the drum, as will be described.

The invention, as applied to a machine for mixing concrete, comprises a rotatable cylindrical drum, which is maintained at a suitable angle, say 25°, to the horizontal and means are provided for rotating the drum on its axis. The upper end of the drum is open, and the lower end partially closed by an annular conical end-plate, through the central space of which, the material is fed by a hopper or chute. Water may be fed

also into the lower end or any other convenient part of the cylinder. Inside the drum are provided pockets which are formed by fixed segmental partitions or plates, and in effect, presenting a substantially helical series of pockets through which the material passes, being carried by the plates and falling from a lower pocket into another higher up the series. The individual pockets are arranged so that, with respect to the direction of rotation of the drum, their leading ends are axially lower than their rear ends, so that the material is axially translated or carried whilst in the pocket. Further, the leading end of one pocket is arranged to come partially beneath the rear end of the previously occupied pocket, in the rotation of the drum. Thus the material being fed into the lower or first pocket in the series, is carried around therein until, falling back by its own weight, it leaves the pocket higher up the drum axially, than it entered. It leaves one pocket, moreover, mostly to fall into the next, which carries it still further up the drum, a very effective agitation and mixture-promoting movement being continuously maintained.

The machine as applied to a washing machine is provided with a water supply at or near the upper end of the drum. The segmental plates are in this case perforated, the size of the perforations depending on the nature or grading of the material which is intended to be washed from the bulk. Suitable draining holes are provided at the lower end of the drum for emitting the washings.

In certain cases it may be found desirable to retain the material in the pocket until it has been carried well up by the rotation of the drum. This may be provided for by retaining pieces over the rear ends of the pockets so constructed as to retain the material in the pocket considerably after the point where it would normally fall into the next pocket of the series.

The drum of the present mixer is rotated preferably at a slow speed, giving the advantage over existing types that the material has time to slide down the walls of the pockets, further it is very thoroughly and intimately mixed.

The drawings illustrate the invention as applied to a transportable mixer for concrete or the like, adapted to be driven from any convenient power source. The features of the invention are shown in—

Fig. 1 which is an elevation of the drum on its carriage, part being broken away and hidden parts being shown in broken lines.

Fig. 2 is an end elevation of the drum, sectional on line 2^x of Fig. 1, the drum being rotated through 90°.

Fig. 3 is a sectional elevation showing the interior arrangement, the view being that of Fig. 1, the drum being rotated through 90°.

Fig. 4 is a partly sectional view of the drum showing one half swung back as for cleaning etc.

The mixing drum comprises two semi-cylindrical casing portions 1 and 2, hinged together along adjacent edges by hinges 3 and fitted with suitable simple fasteners 4 to hold their other edges together in use.

The half 1 of the casing is permanently attached to end pieces 5 and 6. End member 5 has formed integrally with it or suitably attached to it, a large bevel pinion 5^A, a roller track 5^B and a frustro-conical annular flange 5^C through the central aperture 5^D of which, material is fed into the drum. The member 6 has also a roller track 6^B, an annular flange 6^C, and an aperture 6^D. The mouth or exterior of the flange 6^C is flared, as is seen from Figs. 3 and 4 at 6^E, to aid discharging. The rear face of the bevel 5^A conveniently forms a race for small rollers 7 which take the axial thrust of the inclined drum (see Figs. 1 and 3) and rollers 8 co-operate with tracks 5^B and 6^B to take the weight of the drum. The drum is thus a rotatable cylinder, constructed so as to permit of its being opened for inspection etc.

The opening 5^D is entered by the lower chute portion of a hopper 9 for feeding material into the drum, and a discharge chute 10 is pivotally mounted at 10^A and provided with an operating and balance lever 11 so that it may be swung outwardly to the horizontal when not required to discharge, in the position shown in Fig. 3. The hopper 9 is preferably provided with a sliding gate 9^A operated by a lever 9^B, in order that the flow of material into the drum may be regulated.

The rollers 7 and 8, supporting the drum, are carried in rings 7^A suitably attached as by bolted brackets 7^B to the framework 12 of the machine. The ring 7^A at the upper end of the drum may be complete or only semicircular, as shown, as desired.

The framework 12 is conveniently made up of stout H or U section members, and conveniently is borne on cast iron running rollers or wheels 12^A for transport of the machine from one location to another. The

frame 12 also carries in a journal bracket 12^B a driving bevel pinion 13, co-operating with the bevel 5^A to rotate the drum. A motor may be carried on the frame 12 or an auxiliary plant may be used for driving.

The principal constructional feature of the invention relates to the internal arrangement of the drum. As stated, the drum consists primarily of two halves 1 and 2. Each half has mounted in it, secured by suitable angle pieces 14 baffle plates 15 in the form of semicircular plates of metal, and disposed with their straight edges diametrically to the drum and at an angle to its axis. The corresponding plates 15 in opposite halves 1 and 2 of the drum are arranged so that their straight edges cross, and, where they cross, practically if not actually meet, at points 15^A which is only approximately indicated in Figs. 2 and 3. The plates 15 in each half, are arranged in parallel planes and thus form deep segmental pockets 16 in which is to be found the "mix." Owing to the disposition of the plates which on one side are preferably at a greater inclination to the axis than on the other, the pockets 16 on opposite sides of the drum overlap so that, in the course of rotation of the drum, a part of the material in one pocket falls or slips down into the next pocket on the opposite side of the drum. The inclination of the plates 15 is in effect helical, so that the material in the pocket 16 is, during the rotation, carried up the slope of the drum as it falls or slips back in the pocket. Above the series of pockets 16 in the drum are arranged deflecting blades 17, disposed so as to pick up material and carry it up to a certain height, and then to shoot their contents in an axial direction on to the discharge chute 10 if the latter is in its operative position or alternatively simply to drop the material back into the lower part of the drum. The chute 10, when in operative position, interrupts the fall and directs the material out through aperture 6^D thus discharging the drum. The hopper 9 of course feeds the lower end of the drum so that the first plate 15 catches the material.

The tumbling and agitation of the "mix" renders it effective in promoting thorough and even mixing. Water is fed into the drum by a pipe conveniently arranged to project through the aperture 5^D in mixing ordinary concrete. It will be observed that operation may be rendered continuous even though the feed or discharge may be interrupted for limited periods without practically affecting the desired delivery. It is advisable to open the drum and flush it with water before leaving the machine out of action.

It will be realized that the drawings illustrate and the above description refers to one type of concrete mixer only. As previously

mentioned, the device may readily be adapted to varying requirements without departure from the invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a machine for mixing concrete, a cylindrical drum maintained for rotation with the axis thereof inclined, said drum having a central portion formed of two sections, semi-circular plates carried by the sections and so assembled that the chords of the semi-circular plates will cross each other, and means for feeding material into the lower end of the drum and discharging the same from the higher upper end of the drum.

2. In a machine for mixing concrete, a drum having semi-cylindrical central portions, semi-circular blades attached to the interior of the sections of the drum and positioned so that the chords of the semi-circular blades will cross each other at an angle, lifting scoops carried by the interior of the drum and located adjacent to the discharge end thereof, a discharge chute adjustably connected to the supporting frame of the drum, and means for changing the position of the chute.

3. In a concrete mixing machine, a drum mounted at an inclination and provided with means for rotating the same, one head of said drum having an inclined flange with an aperture therethrough, a chute leading into and discharging material at the lower portion of the drum, the opposite end of the drum having inclined portions surrounding the discharge opening, blades located adjacent to the upper end of the interior of the drum, semi-circular plates attached to the interior of the drum and maintained

therein so that the chords of said plates will be in intersecting relation one to the other, and means for rotating the drum maintained at an inclination to the horizontal.

4. In a mixing machine, a cylinder mounted for rotation on an inclined axis, the central portion of said cylinder being made up of two semi-cylindrical portions each having at the inner sides thereof semi-circular plates, the straight margin of the said semi-circular plates being attached to respective sections of the drum so that they will cross each other in line with the junction of the two sections of the drum, means for feeding material to be mixed into the lower end of the cylinder, means for maintaining and rotating the cylinder while in an inclined position, heads attached to the semi-cylindrical sections of the cylinder, each of the heads having apertures therethrough, the parts being organized whereby the material fed into the cylinder is progressively carried upward and toward the higher opposite discharge end.

5. In a mixing machine, a cylinder, a central portion thereof comprising two connected semi-cylindrical portions which are hingedly connected one to the other, a plurality of semi-circular plates attached to each section of the cylinder, the plates of each section being parallel and spaced so that the chords thereof will cross the chords of the plates on the opposite section, curved blades adjacent to one end of the cylinder, and a discharge chute maintained to extend into the higher portion of the cylinder so that said inwardly extending end will be below the blades when in their raised position.

In witness whereof I have signed this specification.

JOHN STUART LANCASTER.