C. W. LEVALLEY.

CONCRETE MIXING APPARATUS.

APPLICATION FILED NOV. 10, 1908.

1,026,958.

Patented May 21, 1912.

5 SHEETS—SHEET 1.

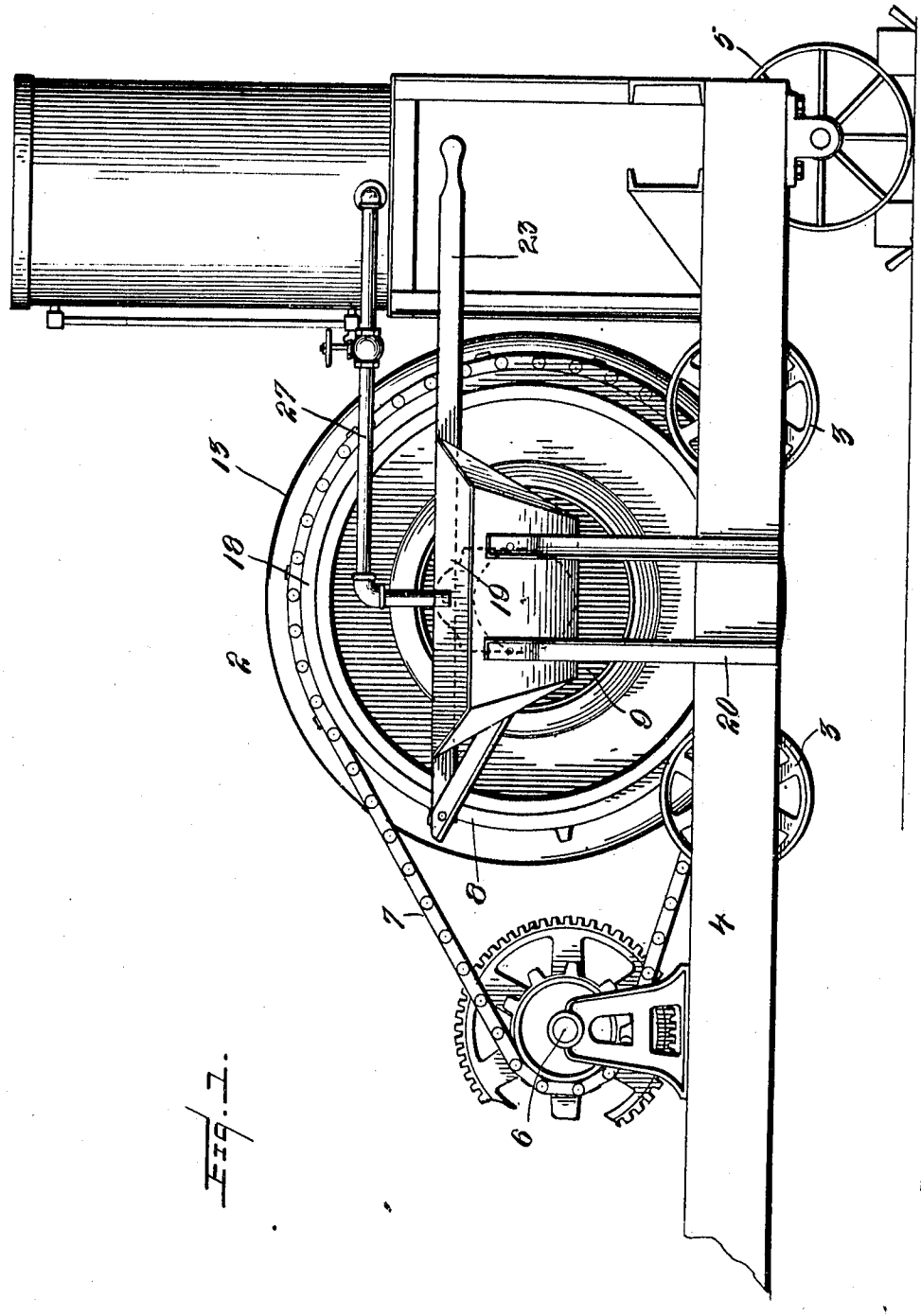

Fig. 1.

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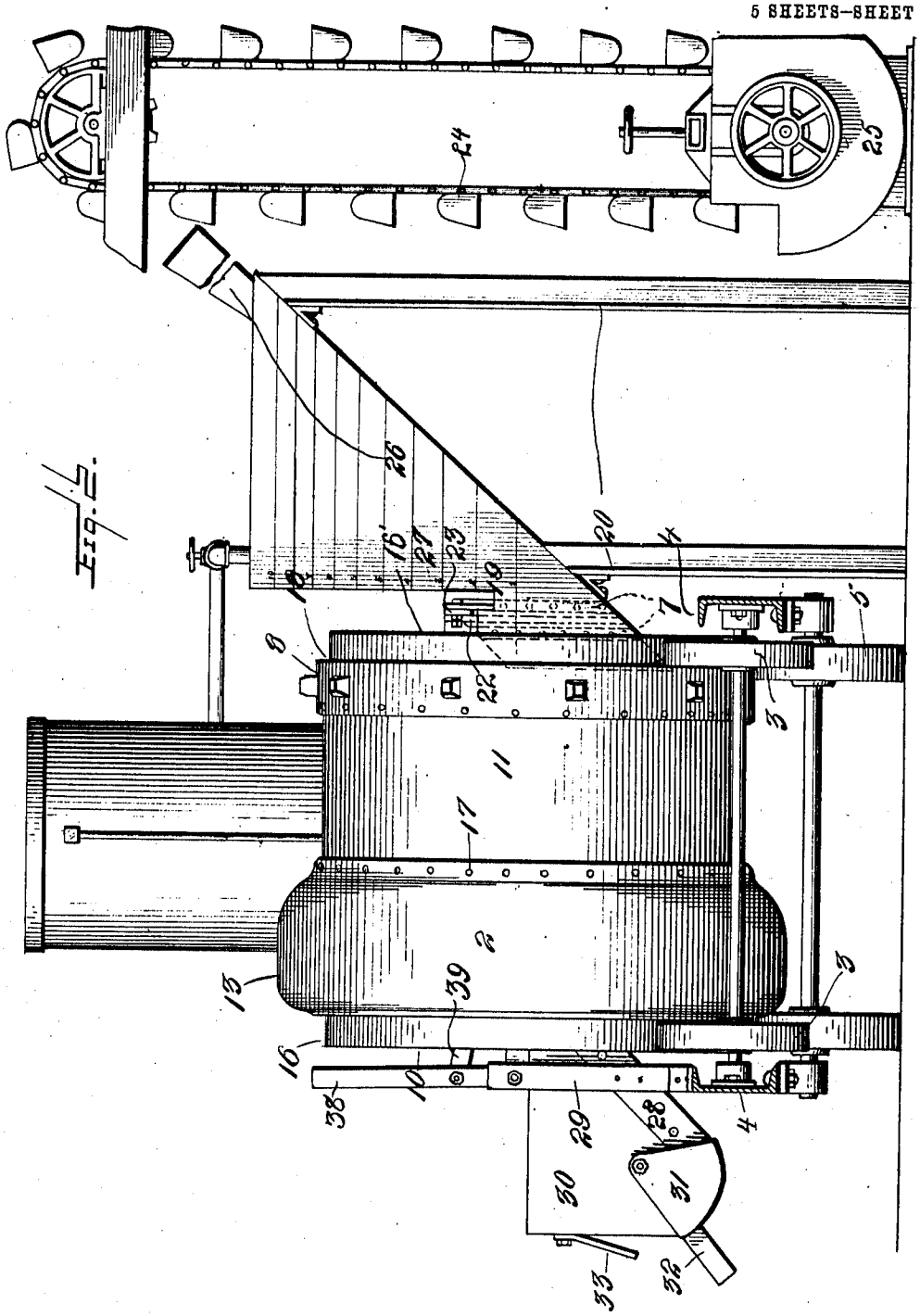

Fig. 2.

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5 SHEETS—SHEET 3.

Fig. 4.

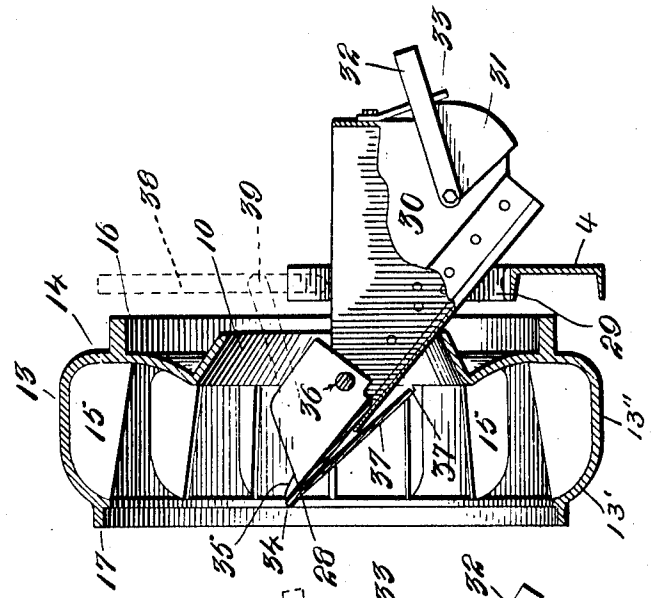
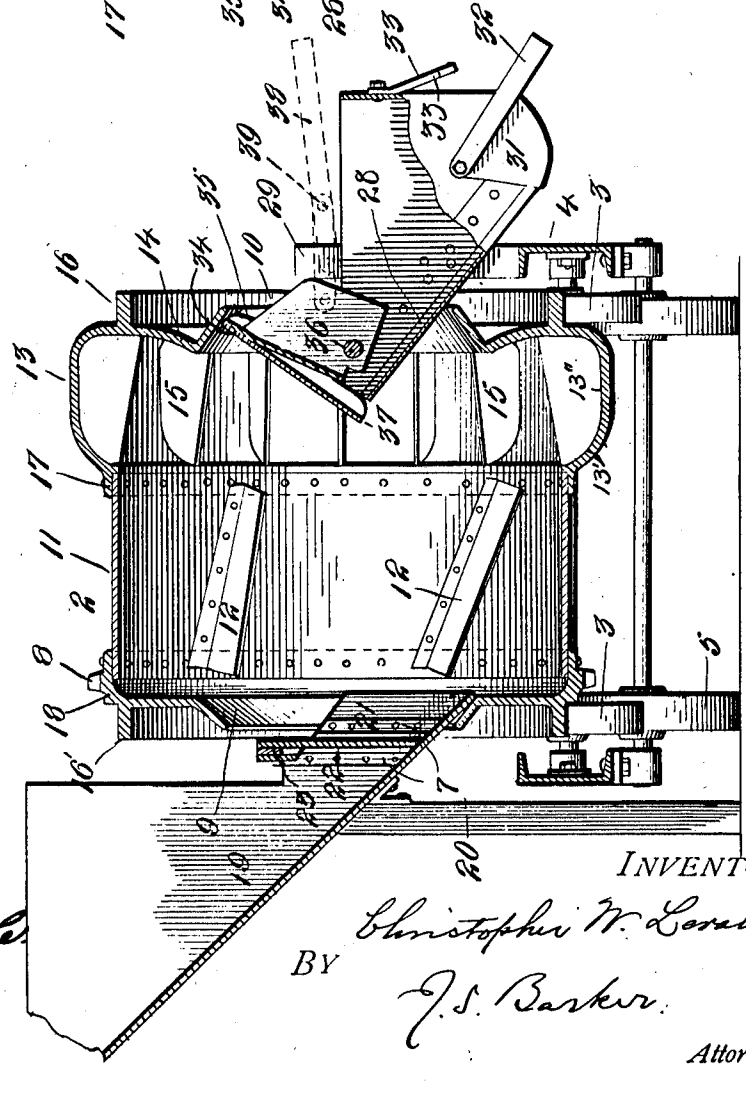


Fig. 5.



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5 SHEETS—SHEET 4.

Fig. 5.

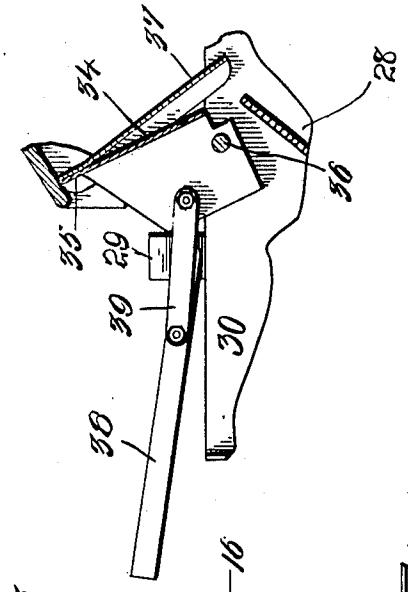
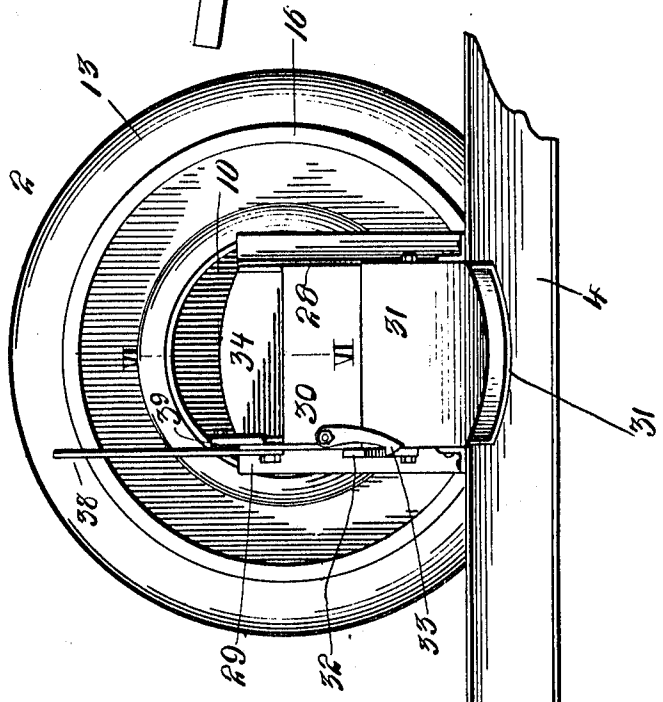


Fig. 5.



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5 SHEETS—SHEET 5.

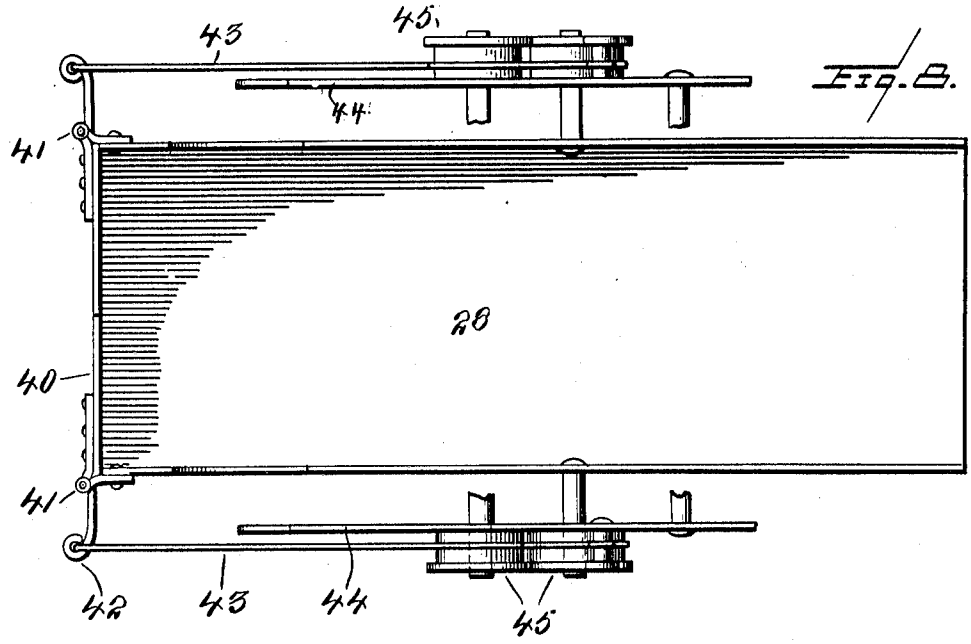

Fig. 8.

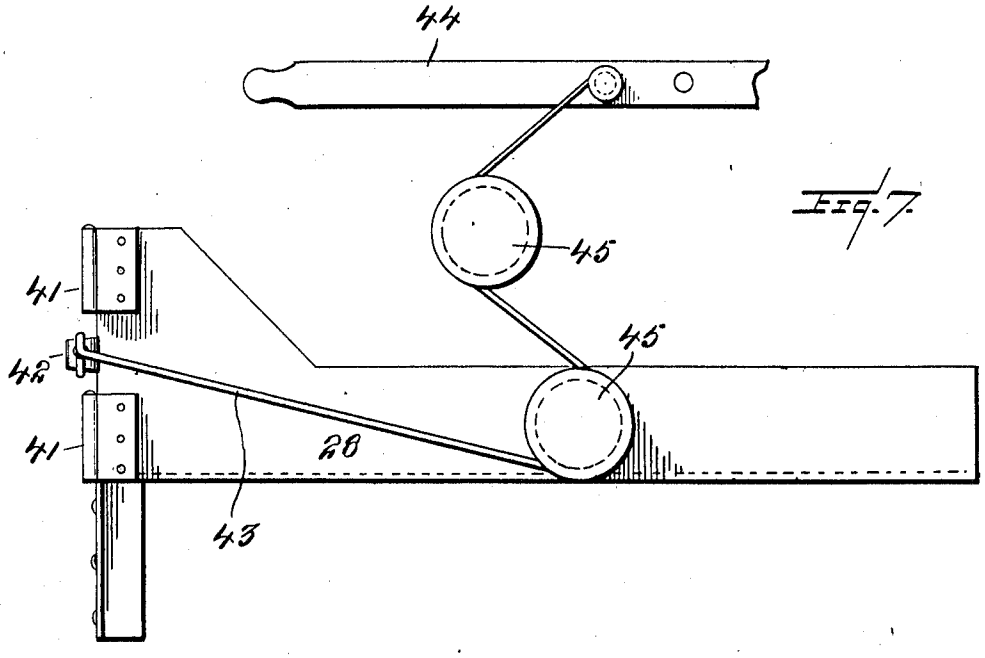

Fig. 7.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER W. LEVALLEY, OF MILWAUKEE, WISCONSIN.

CONCRETE-MIXING APPARATUS.

1,026,958. Specification of Letters Patent. Patented May 21, 1912.

Application filed November 10, 1908. Serial No. 461,891.

To all whom it may concern:

Be it known that I, CHRISTOPHER W. LEVALLEY, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Concrete-Mixing Apparatus, of which the following is a specification.

My invention relates to a machine for mixing concrete, and it has for its object to improve machines of this character in the several particulars to be pointed out.

In the accompanying drawings: Figure 1 is an elevation of a machine embodying my invention as seen from the feed side. Fig. 2 is an end view of the apparatus, part of the supporting-frame being represented in section. Fig. 3 is a sectional view taken centrally through the mixing drum or cylinder. Fig. 4 is a central sectional view of the delivery end of the machine, showing the devices for controlling the discharge differently adjusted from what is shown in Fig. 3. Fig. 5 is an elevation of the discharge end of the machine. Fig. 6 is a sectional view taken on the line VI—VI of Fig. 5. Fig. 7 illustrates in side elevation a different embodiment of the invention from that shown in the other views, in so far as concerns the means for controlling the delivery of material from the mixing drum. Fig. 8 is a plan view of the mechanism illustrated in Fig. 7.

In the drawings 2 indicates, as a whole, a concrete mixing drum or cylinder supported so as to be rotatable upon wheels or rollers, 3, that are mounted in a frame, 4. This frame may be of any preferred construction, that illustrated being of a portable type and mounted upon wheels, 5, of which those at one end only are shown, the framework, 4, being extended beyond what is represented and supporting an engine or other motor, which however it is not necessary either to illustrate or describe in this case. The drum receives its motion from a driven shaft, 6, with which it is connected by a sprocket chain, 7, or other means of power transmission, the chain being arranged to engage with a sprocket ring, 8 on the frame. The drum is formed with central or axial openings, that at 9 being for the feed thereto of the material to be mixed and that at 10 for the discharge of the concrete.

While some of the features of my invention are applicable to concrete mixers of the revolving drum type whatever the construction of the drum, I have found it desirable to make the mixing cylinder or drum of a novel construction, which I will now proceed to describe.

A portion, 11, adjacent to the feed end and preferably extending about half the length of the drum or a litle more, is cylindrical in shape and is provided with internal mixing and advancing flights, 12, these being arranged to carry upward and let fall the material delivered to the mixer, and at the same time advance it longitudinally through the machine. The portion of the drum, 13, adjacent to the delivery end is enlarged, that is, its side walls bulge outward in a longitudinal direction between the section 11 and the rear end wall, 14, forming a sort of pocket in the lower segment of this section of the drum as clearly represented in Fig. 3. I prefer that that part of the drum section 13 which is next to the section 11, and which is designated 13′ in the drawings, should curve outward relative to the axis of the drum; thus forming a concave curved surface over which the material being mixed can easily slide with a somewhat accelerated speed, in passing from the cylindrical section 11 of the drum to the substantially cylindrical part 13″ of the section 13, and where it will not tend to collect and becoming hardened clog the machine. This form of drum insures a thorough preliminary mixing of the ingredients of the concrete that are delivered to the machine in the part 11, where, however, the material is not retained, but advanced more or less rapidly, according to the inclination at which the flights, 12, are set. On the other hand the enlarged or recurving bulging portion, 13, of the mixing cylinder constitutes a sort of receptacle in which the concrete mass collects and receives its final mixing, and where it can be retained until it is desired to discharge it. This part of the drum is provided with suitable internal flights or mixing blades, 15.

It often happens in mixing concrete that the ingredients have not been properly mixed when they arrive at the discharge end of the drum; or that the concrete when it arrives at this part of the mixer is not in the desired condition for use, as for instance, being either too thin or too thick. A drum of the construction just described, that

is, having a bulging section near its discharge end, when combined with discharge devices which are in their operation under the control of the attendant, permits the retention of the mass of concrete within the drum a sufficient length of time to effect a thorough mixing of the ingredients. And when a drum of such construction is used in connection with adjustable means arranged to return the concrete from the rear or discharge end of the drum toward the head or feed end, such as will be presently described, it is possible to collect in the rear end of the drum a sufficient mass of the concrete to observe and test its consistency and if that be not what is desired, such body of concrete can be returned to the forward part of the drum for remixing with added materials which will give it the consistency desired.

I prefer that section 13 of the drum should be an integral casting formed with a track, 16, adapted to rest upon one pair of the supporting wheels, 3, and with a flange, 17, to which may be riveted the front section, 11. This latter is preferably formed of sheet steel, to the front edge of which is attached a cast ring, 18, shaped to form the front end wall of the drum, a track, 16, for the supporting wheels and the sprocket wheel or ring, 8.

The materials that enter into the concrete mixture may be fed into the mixing drum through the opening, 9, in any suitable manner. I prefer, however, to combine with the mixing drum a feed hopper, 19, which may be either supported directly from the portable frame, 4, as illustrated in Fig. 1, or upon stationary uprights, 20, as indicated in Fig. 2. The feed hopper has a spout section, 21, adapted to enter the feed opening, 9, and is formed with an inclined bottom so that the material delivered thereto may be easily discharged into the mixing drum. A gate, 22, which serves to cut off communication between the hopper and the mixing cylinder, is mounted in suitable ways, and operated by a lever, 23, or other mechanism of any suitable kind. The feed hopper is substantially water-tight and is graduated to indicate the amount of material contained therein when filled to certain levels.

24 represents a bucket conveyer adapted to take material from a boot, 25, and discharge it upon a chute, 26, delivering into the feed hopper, 19.

I prefer that the water which enters into the formation of the concrete should be delivered into the feed hopper,—a pipe, 27, being provided for that purpose,—instead of into the drum, 2, as then I am enabled to very accurately determine the cubical amount of a batch of material that is to be mixed before it is delivered to the drum.

28 is the discharge chute extending into the mixing drum or cylinder through the opening 10. It is supported by uprights, 29, rising from the frame, 4, and delivers to a boot or hopper, 30, having a discharge opening that is controlled by a pivoted gate or door, 31. This gate has an operating handle, 32, that is arranged to be engaged by a catch, 33, when it is desired the door shall be held in open position to allow the hopper, 30, to discharge.

It will be understood that the flights, 15, carried by the section, 13, of the rotating cylinder or drum, when the latter is run at proper working speed, lift the concrete mixture and let it fall upon the inner end of the delivery chute, 28. With the latter I have combined a gate or cut-off arranged within the mixing drum and adapted, when moved to one position, to prevent the material lifted and discharged by the flights, 15, from entering the chute 28, but when adjusted to another position or positions, to allow the material to enter such chute and pass out of the mixing machine. The preferred form of cut-off or gate is that represented in Fig. 3 where 34 represents a pivoted trough, spout, or chute section arranged, when adjusted into one position, to form a practical continuation of the spout or chute, 28, but when adjusted to another position, to lie across the end of the delivery chute, between it and the discharge opening, 10, of the rotating cylinder on the one hand, and it and the mixing chamber of the section 13 on the other,—and when in this last position to prevent any material being discharged from the mixing cylinder. The adjustable section 34 is preferably formed with side flanges, 35, pivotally united with the side flanges of the trough or chute, 28, by a cross rod, 36, or other suitable pivotal means. It is arranged to lie on top of the chute, 28, when turned, as represented in Fig. 4, into a position to cause the mixing cylinder to discharge. In order that it shall swing freely and clear the end of the chute, 28, whenever adjusted, it is of such length that when turned into the cut-off position, as represented in Fig. 3, an open space is left between its lower edge and the upper edge of the chute. To bridge or cover this space I prefer to provide the section 34 with a bridge piece in the form of a supplemental plate, 37, longer than the part 34 to which it is secured and arranged at such distance therefrom that when turned down into discharging position it lies below the chute, 28, while, as stated, the adjustable section, 34, lies above it.

It will be seen, by reference to Figs. 3 and 4, that the free edge of the pivoted section 34 of the delivery spout, which also serves as a gate or cut-off when the section is moved into position to intercept material and turn it back into the mixing drum, lies

close to the edge of that end wall of the drum in which is formed the delivery opening, and that the section extends from the inner end of the stationary section practically to the rear wall above the discharge opening. The rear wall is preferably provided with a flange surrounding the discharge opening which extends outward but flares or expands in an inward direction.

38 is a lever which may be fulcrumed on one of the frame pieces 29 and is connected by link 39 with the pivoted adjustable section or cut-off, 34, and by means of which the positions of the latter are controlled.

Other forms of gates or cut-off devices may be employed. Thus, as represented in Figs. 7 and 8, the delivery chute or spout, 28, has at its inner end a pair of gates, 40, 40, hinged at 41 to its side walls or flanges. The position of the chute is such that the gates normally tend to close by gravity, though springs may be used for this purpose or to supplement the action of gravity, if this be found desirable. For opening the gates, permitting the mixed concrete material to enter the delivery chute, I provide cords, 43, connected with arms, 42, projecting beyond the hinges of the gates, and leading to operating levers, 44. Guiding pulleys, 45, may be employed to support and give direction to the cords or belts, 43.

One of the gates could be dispensed with and the other made sufficiently long to close the delivery chute, if the space within the mixing drum were ample to permit the adjustments of so large a gate. Or the gate might be hinged to one of the horizontal edges of the opening to the delivery chute instead of to a vertical edge.

The operation of the apparatus described may now be stated. The materials from which the concrete is to be made, in suitable proportions, are placed in the boot, 25, from which they are taken by the elevator, 34, and delivered to the feed hopper, 19. Here they are mixed with water which causes the material to settle to an approximate level, enabling the contents of the hopper to be accurately determined by means of the graduation marks placed on the hopper for that purpose. A suitable batch of material having accumulated the gate, 22, is opened and the mixture admitted to the rotating cylinder or drum, 2, where it is thoroughly mixed. During the mixing the cut-off, 34, is adjusted to the position represented in Fig. 3, preventing the material lifted by the flights, 15, from being delivered to the discharge chute, 28, but instead turning it back into the mixing chamber of the revolving drum. The batch being thoroughly mixed, and it being desired to discharge it into the receiving boot or hopper, 30, the section, 34, is adjusted to a position such as represented in Fig. 4, so that the material lifted by the flights, 15, will be discharged upon the delivery spout. By adjusting the section 34 to one or another position intermediate between those illustrated respectively in Figs. 3 and 4, a more or less rapid discharge may be secured. A slow discharge is desirable when the gate, 31, is kept open and the material not allowed to collect in the hopper, 30.

What I claim is:—

1. In a machine for mixing concrete, the combination of a rotatable mixing drum having a feed opening at one end and a discharge opening at the other, a delivery chute, and an adjustable pivoted gate within the drum, arranged when adjusted to one position to set vertically above the inner end of the chute and substantially closing the same, and when in this position having its free edge adjacent to the end wall of the drum above the discharge opening, the gate being then inclined downward and inward, whereby it serves to divert material which is lifted back into the drum toward its feed end for further mixing and prevents it from passing out of the machine, and the pivot of the said gate being so disposed that the free edge of the gate moves into the drum when the gate is adjusted from the aforesaid diverting position.

2. In a machine for mixing concrete, the combination of a rotatable mixing drum having a discharge opening, a delivery chute extending through the said opening into the drum, and a gate pivoted on an axis that is transverse to the axis of rotation of the drum, and is disposed adjacent to the inner end of the delivery chute and arranged when adjusted to one position to set vertically above and substantially closing the inner end of the delivery chute with one of its edges adjacent to the end wall of the drum above the discharge opening, and extending thence downward and inward, whereby it serves to divert material which is lifted back into the drum for further mixing and prevent it from entering the delivery chute.

3. In a machine for mixing concrete, the combination of a rotatable mixing drum having a discharge opening, a delivery chute, and a gate pivotally supported by the chute upon an axis that is transverse to the axis of rotation of the drum, and arranged when adjusted to one position to set vertically above the inner end of the delivery chute and closing it and with one of its edges adjacent to the end wall of the drum above the discharge opening, and extending thence downward and inward, whereby it serves to divert material which is lifted back into the drum for further mixing and prevent it from entering the delivery chute.

4. In a machine for mixing concrete, the combination of a rotatable mixing drum having a discharge opening, a delivery chute

extending into the drum through the said opening, and a gate pivoted on a line intermediate between its ends and transverse to the axis of rotation of the drum and located adjacent to the inner end of the delivery chute, and arranged when adjusted to one position to set vertically above and substantially closing the inner end of the delivery chute and with one of its edges adjacent to the end wall of the drum above the discharge opening and extending thence downward and inward, whereby it serves to divert material which is lifted back into the drum for further mixing and prevent it from entering the delivery chute.

5. In a mixing machine, the combination of a rotatable mixing drum adapted to lift the material being mixed and having a rear end wall in which is formed an axial discharge opening, a delivery chute extending into the drum through the said opening, and an adjustable gate or cut-off arranged entirely within the drum and pivoted upon a line that is transverse to the axis of rotation of the drum, whereby when adjusted to one position to overlie the inner end of the chute and substantially close it, and to incline downward and inward whereby material lifted by the drum is caught by the said gate and directed away from the chute and back into the drum toward the feed end, and when adjusted to another position arranged to uncover the delivery chute and incline downward and outward whereby it serves in effect as an extension of the said chute.

6. In a mixing machine, the combination of a rotatable mixing drum, a relatively stationary delivery chute, and a movable gate or cut-off for the chute arranged when adjusted to one position to intercept the material raised by the drum and turn it back into the drum, and when adjusted to another position to allow the material to be delivered to the chute, the said gate being provided with a bridge piece for covering the space between it and the stationary chute when it is moved into the said intercepting position.

7. In a machine for mixing concrete the combination of a rotatable mixing drum having a feed opening at one end and a discharge opening at the other end, a delivery chute and an adjustable pivoted gate within the drum arranged when adjusted to one position to set vertically above the inner end of the chute and substantially close the same, and when in this position having its free end adjacent to the end wall of the drum above the discharge opening, the gate being then inclined downward and inward.

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Witnesses:

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