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CONCRETE MIXER AND THE LIKE

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3 Sheets-Sheet 1

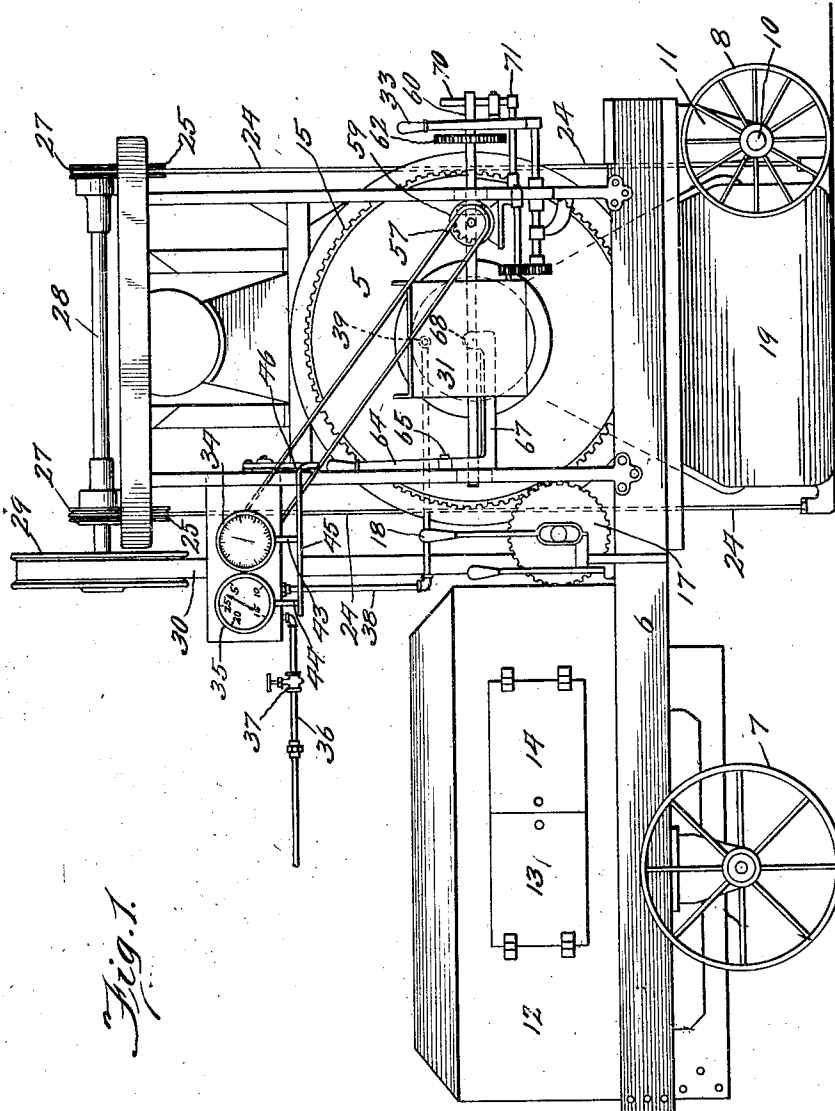


Fig. 1.

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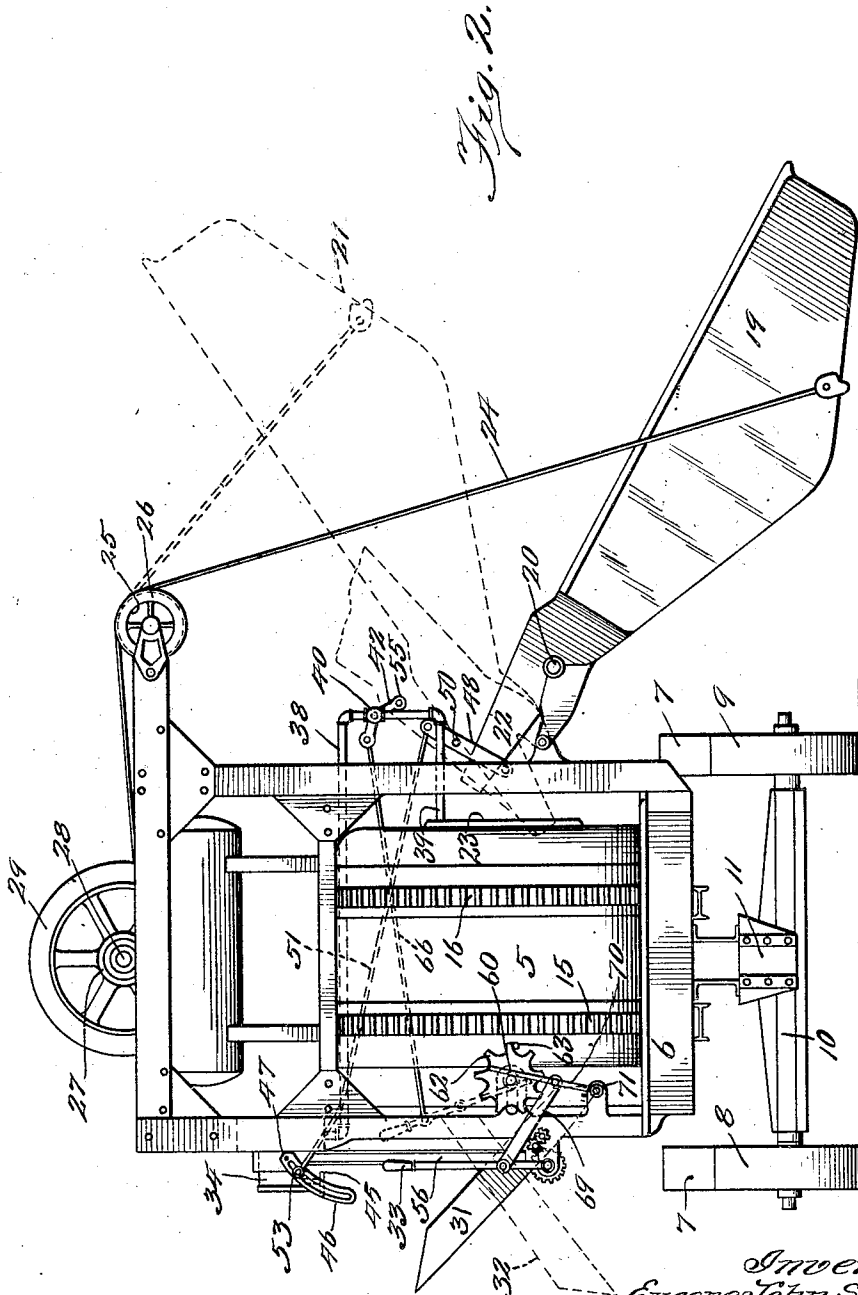
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## UNITED STATES PATENT OFFICE

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CONCRETE MIXER AND THE LIKE

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The present invention has to do with certain improvements in concrete mixers and the like. The features of the invention herein disclosed have reference to improvements by means of which the mixing operations may be more perfectly controlled, both as respects the water contained in and also the duration of the mixing operation.

The physical characteristics of the finished concrete will depend largely on the factors just above referred to. The water content is of course a very important factor in producing the best possible mix since there must be sufficient water to provide for the hydration of the cement and for the water of crystallization, and also the mix must be sufficiently wet to give it the necessary fluidity and flowability for the moulds into which it is to be poured. On the contrary, an excessive amount of water is detrimental in different respects.

The time interval during which the mixing operation is conducted is also of importance. The mixing must proceed for sufficient length of time to insure a complete and thorough intermingling and admixture of all of the materials in a uniform manner; and also to insure a thorough and uniform wetting of the particles of cement and aggregate. On the other hand, an excessive duration of the mixing interval is objectionable since the cement will commence to set and will lose a substantial portion of its vitality before the concrete can be finally placed in the moulds.

In the past the conduct of these operations has been largely on a hit and miss basis. The foreman or other responsible party would in many instances issue instructions as to the amount of water to use in each batch and also as to the duration of the mixing operation. There was no means, however, for checking up to see whether these instructions were being carried out; besides which the operator himself had no means of knowing just how much water was introduced into the mix or whether the mixing operation had proceeded long enough or too long.

The main object of the present invention is to provide a concrete mixer having asso-

ciated and combined with it a suitable water meter or measure for effectively measuring the quantity of water introduced into the batch, and also having combined with it suitable means whereby the duration or the amount of the mixing operation may be exactly measured so that the operator will be at all times completely informed in respect to these factors.

It is a further object to provide automatic means whereby the operation of the water meter or measuring device and also the operation of the time element or counting device will be automatically coordinated with the operations of the mixer itself so that their function will be properly harmonized and synchronized with the operation of the mixer.

More specifically it is an object to provide means whereby the water will be automatically turned on when the dry cement and aggregate are delivered into the mixing drum so that the delivery and metering of the water into the hopper will commence and take place as soon as the dry materials have been delivered into the hopper.

It is a further object of the invention to provide an arrangement whereby the water meter and the revolution counter will be automatically tripped and reset to zero and coincidentally with the operation of introducing the dry cement and aggregate into the drum, but prior to the turning on of the water. This will insure the commencement of a new reading of the water meter at the instant the dry materials are delivered into the drum.

It is a further object of the invention to provide means whereby the flow of water may be manually discontinued by the operator as soon as the water meter indicates that the desired amount of water has been introduced into the drum, and the water meter will then indicate and will continue to indicate the amount of such reading until reset to zero either manually or automatically as presently explained.

It is a further object of the invention to provide means whereby the revolution counter will be automatically brought into opera-

tion when the water is shut off so that the interval or duration of the mix including the water will be measured by the revolution counter.

5 It is a further object to provide an arrangement whereby the operation of the revolution counter will be automatically discontinued as soon as the delivery chute or spout is moved into place to cause the completed concrete to be delivered from the drum. The revolution counter will then indicate and will continue to indicate the number of revolutions of the drum up to that time, which indication will remain visible until the revolution counter is either manually or automatically reset to zero.

10 The structures and arrangements outlined as above will be such as to make it possible for the foreman or supervisor to examine the meters from time to time so as to see whether the operator is carrying out the instructions in regard to the mixing operations. At the same time this device will keep the operator himself fully informed at all times.

15 Other objects and uses of the invention will appear from a detailed description of the same which consists in the features of the construction and combination of parts hereinafter described and claimed.

In the drawings:

20 Figure 1, shows a side view of a machine embodying the features of the present invention looking towards the delivery side of the drum;

25 Figure 2 shows an end view of the machine of Figure 1 with the delivery hopper in raised or non-delivery position, and with the raw materials pan in the lowered or initial position, and also shows the raw materials pan in raised position by means of dotted lines;

30 Figure 3 shows a perspective view of the main operative devices of the present invention on enlarged scale as compared to Figures 1 and 2;

35 Referring to the several figures, I have shown the features of my present invention as being applied to a concrete mixer of the rotary drum type. This concrete mixer includes the drum 5 which is mounted for rotation about a horizontal axis extending transversely of the machine. The drum is suitably carried within a truck or frame 6 in the usual manner. Said truck is conveniently illustrated as being provided with the rear wheels 7 and the front wheels 8 and 9 which are journaled on the front axle 10. Said axle in turn supports the front end of the truck frame 6 by means of the central pivotal support 11 in the usual and well known manner.

40 The truck frame also carries a suitable driving engine. For purposes of convenience the same is located within a housing

12 placed above the wheels 7. Said housing is provided with the usual doors 13 and 14.

The mixing drum 5 is provided with the circular or ring gears 15 and 16 so that said drum can be driven from the engine through the medium of gearing 17 and under control of the operating handle 18 in the usual and well understood manner.

70 The concrete mixer is also provided with a pan 19 which is pivoted to the frame or some other part at the point 20 so that said pan can be raised and lowered about a horizontal axis extending at right angles to the rotation axis of the drum 5. Said pan normally stands in the lowered position shown by full lines in Figs. 1 and 2, but it can be raised into the dotted line position 21. The inner end of the pan is provided with a discharge chute 22 which will enter into an opening 23 at the inlet side of the drum 5 when the pan is raised into the dotted line position. This will deliver the raw materials from the pan into the rotating drum. The pan may then again be lowered into the full line position preparatory to receiving another batch of raw materials in proper proportions.

80 The raising and lowering of the pan 19 is accomplished by means of cables or cords 24 at both sides of the pan. The upper ends of these cords pass over sheaves or pulleys 25 journaled on the shaft 26, and the said cords wind on to other pulleys 27 on the winding shaft 28. Said winding shaft is provided with a pulley 29 over which passes a belt 30. Upon tightening up said belt or upon operating a suitable clutch member the pulley 29 is rotated to rotate the shaft 28 and thus wind up the ropes 24 and raise the pan 19. Upon loosening the belt or disengaging the clutch, a reverse action will take place.

90 At the other side of the drum 5 there is provided a discharge chute 31 which is suitably pivoted so that it can be turned from the full line position of Fig. 2 down into the dotted line position 32 of said figure in order to discharge the mixed batch of concrete. Normally the chute 31 stands in the full line position, but it is turned down into the dotted line position by manipulation of a lever 33 under control of the operator. When the discharging operation has been completed the chute 31 is turned back into the full line position.

100 The structures already referred to and explained are well known and understood in the art, and it is deemed unnecessary for this application to give a more detailed or complete explanation concerning them. It is also deemed unnecessary for a similar reason to give a more detailed explanation of the exact physical construction of these parts since the same will be well known and understood by those skilled in the art.

The mixing drum 5 normally rotates at a given speed in revolutions per minute so by counting revolutions thereof information will be available as to the interval elapsing, that is to say, for a given machine having a specified normal speed of rotation, it is only necessary to allow the mix operation to proceed during a specified number of rotations whereupon, the operator will know that a definite time interval has lapsed. I have availed myself of this fact in order to measure the time interval of the mix since I am thus able to make use of a revolution counter for counting the revolutions of the drum in terms of time.

For this reason I have provided a revolution counter 34 at a convenient point on the machine. Usually the operator stands near the position of the delivery chute 31 and where he can easily manipulate the handle 33. For this reason I prefer to place the instrument 31 where it can be easily seen by the operator standing in that position.

I have also provided a water meter 35 on the machine, and preferably close to the meter 34 so that it also can be easily seen by the operator standing in his regular position. The incoming water is supplied through a pipe 36 which leads into the meter 35. Said pipe is connected during the operations to a suitable source of water supply either in the nature of an elevated tank or the city pressure main or what not. In most cases a cut off valve 37 will be provided in the pipe 36 in advance of the meter 35.

From the meter 35 another water pipe 38 is carried across the machine and is then turned down and inwardly as shown at 39 so that the water will be delivered directly through the opening 23 and into the drum. A control valve 40 is located in the pipe 38. The valve stem 41 of this valve is provided with a rock arm 42 by means of which the valve can be controlled. When the rock arm stands in the full line position of the Figure 3, the valve is closed and shuts off the flow of water. When the arm 42 is turned over into the dotted line position of Figure 3, the water is turned on, and assuming that the valve 37 is left open (as would be the case during normal operations) the turning on and off of the water delivered into the mixer drum will be entirely under control of the valve 40.

Both of the meters 34 and 35 are of such construction that they may be reset to zero by a simple tripping operation. It is deemed unnecessary to give the details of such constructions since meters of this kind are well known and widely used in various arts. I will state, however, that the meters 34 and 35 are shown as being provided with the downwardly extending stems 43 and 44

respectively so that when said stems are pushed momentarily the meters are either caused or are allowed to reset to zero. In any case, however, the operation of raising these stems will result in the meters both being reset to zero.

A finger or plate 45 is located beneath the stems 43 and 44. Said plate is carried by an arm 46 pivoted to stationary part at the point 47. Upon rocking the arm 46 upwardly, both of the stems are moved up so that they reset to zero.

For the above purpose there is an arm 48 pivoted to a stationary part at the point 49. Said arm 48 is provided with a pin 50 which reaches out into the path of the pan 19 or some element moved by said pan, so that as the pan is raised for introducing a new batch of materials into the drum 5, the arm 48 will be rocked towards the left in Figure 3. A link 51 has one end pivoted to the arm 48 at the point 52. Said link extends across to the other side of the machine and is pivotally connected to the arm 46. Such connection is preferably by a pin 53 which can be set to any desired position within a slot 54 in the arm 46, thus making it possible to adjust the parts in order to insure proper swing of the arm 46. The valve arm 42 already referred to is also provided with a pin 55 which will be engaged by the pan 19 or some part connected thereto so that after the pan is raised to deliver the fresh batch into the drum 5 the water valve will be opened. I will state at this point, however, that the pins 50 and 55 together with their connected parts are so positioned and arranged that the meters are tripped back to zero before the water valve is opened so that when the water commences to flow a new reading will be built up on the water meter 35. There should be enough time interval between the operation of tripping back to zero and the operation of turning on the water to allow for a complete resetting operation of the water meter.

The revolution counter 34 is operated by a belt or chain 56 which is driven by a sprocket 57 on a stub shaft 58. This stub shaft carries a friction disk 59 by means of which it may be driven. There is a shaft 60 extending across the delivery side of the machine, which shaft 60 is suitably journaled and is also so carried that it may be bodily moved back and forth a sufficient distance to produce the desired operation. Said shaft 60 has friction wheel 61 which will engage the surface of the disk 59 when the shaft 60 is moved over towards the mixing drum 5. Such engagement is discontinued by moving the shaft 60 away from the mixing drum.

The shaft 60 also carries a toothed wheel 62 having relatively large teeth. These teeth will be successively engaged by the pin

63 on the drum 5 so that each time the mixing drum completes one revolution, the disk 62 will be notched over one notch with corresponding rotation of the shaft 60 and friction disk 61. The arrangement is also such that the engagement of the pin 63 with the disk 62 will continue as long as the shaft 60 and friction disk 61 stand in the driving position.

It is thus evident that as long as the shaft 60 is held over in the full line position of Fig. 3 the revolutions counter 34 will be driven and will count revolutions of the mixing drum 5; but by moving the shaft 60 over towards the machine in Figure 3, this operation will be discontinued.

Adjacent to the operator's stand is a control handle 64 which is pivoted to a stationary part at the point 65. The said handle 64 connects by a link 66 extending across the machine to the valve lever 42 for the water valve 40.

It is thus evident that after the water has been turned on by the raising of the pan 19 it can be shut off by the operator pulling the handle 64 towards him (that is, to the left in Fig. 3). This arrangement is to enable the operator to shut off the water when the meter 35 indicates that the desired amount of water has entered the mixing hopper 5.

The arm or lever 64 also carries a downwardly depending portion 67 which has a finger 68 reaching up in front of the shaft 60. The arrangement is such that when the lever 64 is pulled over to shut off the water, the shaft 60 is simultaneously pushed back towards the right in Figure 3 which causes the friction wheel 61 to engage the friction disk 59 and also causes the toothed wheel 62 to stand in position to be engaged by the pin 63. The result is that the operation of turning off the water results in bringing the revolutions counter into the operation so that the same will begin to count revolutions as soon as the proper amount of water has been introduced into the batch.

The handle 33 by means of which discharge chute 31 is operated is connected by a link 69 with an arm 70 which is pivoted to a stationary part at the point 71. Said arm 70 when drawn over towards the left in Figure 3 by movement of the handle 33 into the concrete discharging position will engage the shaft 60 and move it to the left so as to disengage the friction disk 61 from the disk 59. Consequently the revolutions counter will cease counting when the discharge of concrete through the chute 31 commences.

It will be observed that the meters 34 and 35 will retain their respective indications until they are reset by the next raising of the pan 19. Consequently the foreman or supervisor can examine said meters during the interval prior to the next raising of the

pan 19, in order to check the correctness of the amount of water introduced, as well as to the correctness of the time interval of the mix. Thus the foreman or supervisor has a check on the operations to see whether the instructions are being carried out, and also the operator himself is able to follow the operations in order to make sure that he is complying with such instructions.

While I have herein shown and described only a single embodiment of the features of my present invention, still I do not intend to limit myself thereto except as I may do so in the claims.

I claim:

1. The combination with a concrete mixer having a rotary drum, and also having a pan for raw materials located adjacent to one side of said drum and movable towards and from the drum at that side for the introduction of raw materials into the drum, and a delivery chute at the other side of the drum movable towards and from the drum for controlling delivery of mixed batches from the drum, of a water meter and a revolution counter located adjacent to the drum, both of said devices being provided with resetting stems for resetting to zero, suitable water conduits for delivery of water to the water meter and for delivery of water from the water meter to the interior of the drum, and control valve in said conduits, operative connections between the drum and the revolution counter, operative effectively to count in terms of revolutions of the drum and including a disengaging element, connections between the pan and the meter stems for actuating both of the meter stems effectively to reset the meters to zero when the pan is raised, connections between the pan and the water valve for thereafter opening the valve in the water conduit after the pan is raised, manual means for thereafter closing the valve aforesaid and simultaneously making effective the connections to the revolutions counter to count revolutions, and means for again making ineffective said connections when the delivery chute is moved into position to deliver the batch of concrete, substantially as described.

2. The combination with a concrete mixer having a rotary mixing drum together with a pan for raw materials, said pan being movable towards the drum for introduction of raw materials therein, and a delivery chute for delivery of the completed batch from the drum, said chute being movable towards the drum for such purpose, of a water meter and a revolution counter located at a position for convenient inspection by the operator, both of said meters including a resetting device for resetting to zero, conduits for delivery of water to the meter and from the meter into the drum, a control valve in said conduits, connections

between the pan and the zero resetting devices for resetting the devices when the pan is moved for introduction of raw materials into the drum, to thereby reset the meters to zero, connections between the pan and the valve for thereafter opening the valve aforesaid to turn on the supply of water into the drum, means for driving the revolution counter by rotation of the drum and including connections to make such driving means ineffective, manual means for closing the water valve and simultaneously make effective the connections between the drum and the revolutions counter, and means for making said connections ineffective when the delivery chute is moved to the delivery position, substantially as described.

3. The combination with a concrete mixer including a rotary drum and means for delivering raw materials therinto and means for delivering mixed batches therefrom, of a water meter, and a revolution counter, conduits for the delivery of water to the meter and from the meter into the drum, both of said meters including devices for resetting to zero, a valve in said conduits for control of delivery of water into the drum, a connection between the raw materials delivering means and the zero resetting devices for actuating the zero resetting devices when raw materials are delivered into the drum, means for thereafter opening the valve aforesaid after said materials are delivered into the drum, means for driving the revolution counter from the drum effectively to actuate the revolution counter and register in terms of revolutions, manual means for closing said valve and simultaneously make said revolution counting connections effective, and means for making said connections ineffective when materials are being delivered from the drum substantially as described.

4. The combination with a concrete mixer having a rotary drum, a means for introducing raw materials into said drum and means for removing batches of completed concrete from said drum, of a water meter, a revolutions counter, both of said devices including means for resetting to zero, conduits for delivering water to the water meter, and from the water meter into the drum, a valve in said conduits, connections between the raw materials introducing means and the zero resetting devices and the valve aforesaid for automatically actuating the resetting devices to reset to zero and for thereafter opening said valve when raw materials are delivered into the drum, connections between the drum and the revolution counter for counting in terms of revolutions of the drum, said connections including means for rendering them ineffective, manual means for closing the water valve after it has been opened and simultaneously mak-

ing effective the connections between the drum and the revolution counter, and automatic means for making ineffective the connections between the revolution counter and the drum when the completed batch is delivered from the drum, substantially as described.

5. The combination with a concrete mixer including a rotary drum, a means for delivering raw materials into said drum and means for delivering completed concrete from the drum, of a water meter and a revolution counter, conduits for the delivery of water to the meter and from the meter into the drum, both said water meter and said revolution counter being provided with devices for resetting to zero, a valve in said conduits, operative connections between the drum and the revolutions counter, a connection between the raw materials delivering means and the zero resetting devices and the water valve for actuating the resetting to zero devices and for thereafter opening the water valve when raw materials are delivered into the drum, manual means for closing said valve and for commencing the operation of the revolution counter and automatic means for discontinuing the operation of the revolution counter when the completed batch is delivered, substantially as described.

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