

March 1, 1927.

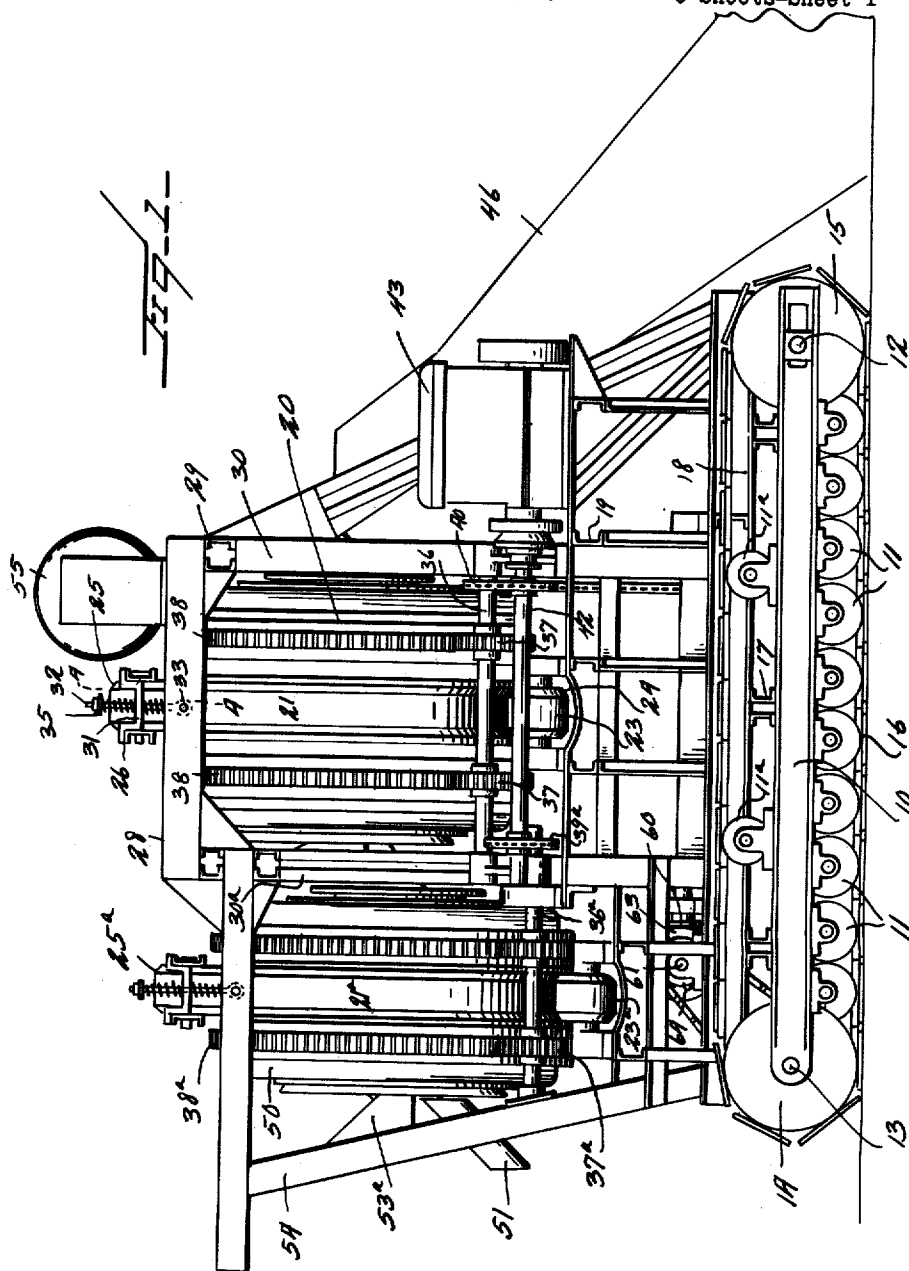
E. H. McMILLAN

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COMBINATION TANDEM CONCRETE MIXING MACHINE

Filed July 13, 1926

3 Sheets-Sheet 1



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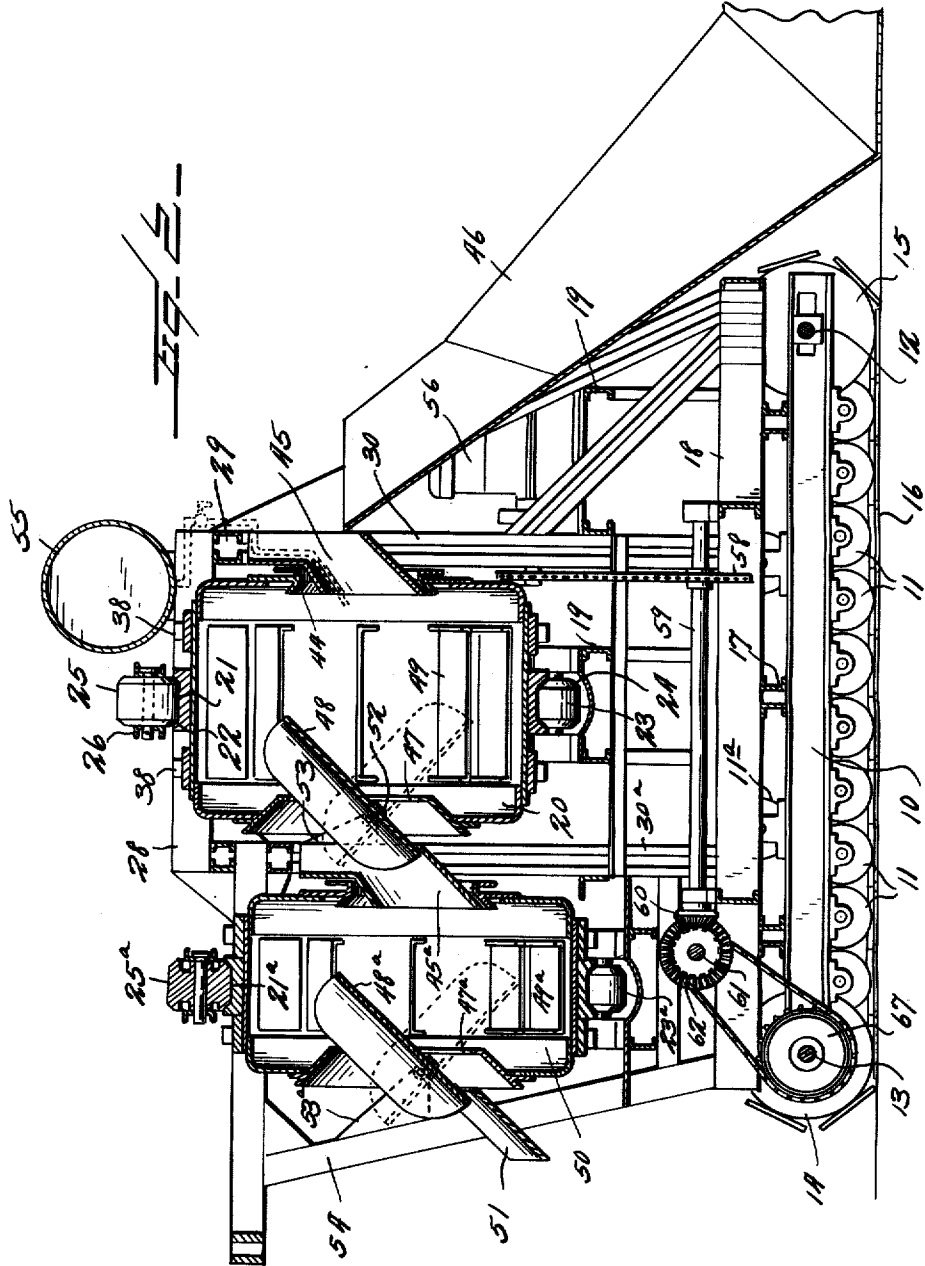
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Inventor

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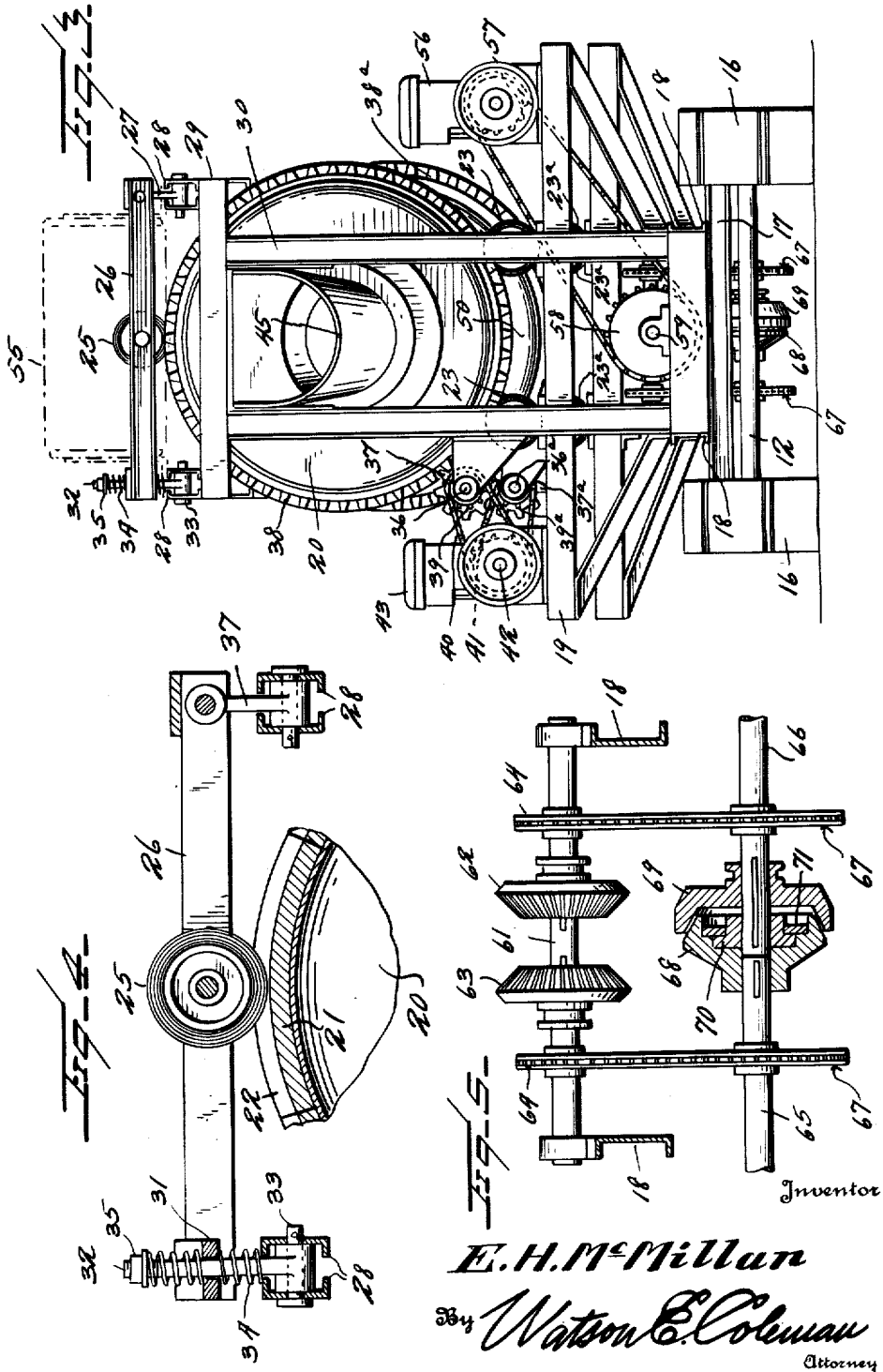
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COMBINATION TANDEM CONCRETE MIXING MACHINE

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

EDWARD H. McMILLAN, OF OAKLAND, CALIFORNIA.

COMBINATION TANDEM CONCRETE-MIXING MACHINE.

Application filed July 13, 1926. Serial No. 122,257.

This invention relates to concrete mixers and particularly to mixers having a rotatable drum into which the materials are placed and tumbled about until thoroughly mixed.

5 The general object of the present invention is to provide a concrete mixing machine which is particularly adapted for mixing concrete for pavements or highways and which is so constructed that it will mix thoroughly and cut down the time of delivering the product.

10 A further object is to provide a construction of this character which will thoroughly mix the sand, concrete, and aggregate for the required length of time and yet which will cut down the time of delivering the product, my improved concrete mixer using two drums and the mixture being in each drum one-half the required time.

20 Another object is to provide a construction of this kind having two drums in tandem, the raw or unmixed material being placed in the first drum and revolved therein for one-half minute, then transferred to the second drum and revolved therein for one-half minute so that while the material is being mixed in the second drum, the first drum is receiving a new batch of raw material and so that there is at all times a batch of raw material in one or the other of the drums and almost a continuous deliver-
30 ance of concrete from the mixing machine to the work, thus eliminating loss of time in waiting for the material to be thoroughly mixed, and eliminating any necessity of cutting down the mixing time to increase the quantity of yardage at the expense of quality.

40 A further object is to provide a construction of this kind wherein the drums are mounted upon a tractor frame (preferably of the caterpillar type) so that the concrete mixer may be shifted from time to time to suit the progress of work.

45 A still further object is to provide a concrete mixer with a drum mounted upon three rollers so as to secure a three point roller contact and a further object is to provide the rollers and the track with beveled faces complementary to each other which
50 will take up side thrust when traveling up or down grades or on inclines and which will further enable the drums to have more adhesion and secure a constant rolling motion without slippage.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings wherein:—

Figure 1 is a side elevation of a mixing machine constructed in accordance with my invention;

Figure 2 is a vertical longitudinal section thereof;

Figure 3 is a front elevation thereof;

Figure 4 is a fragmentary section on the line 4—4 of Figure 1;

Figure 5 is a detailed elevation of the means for driving the rearward shaft sections, the clutch being in section.

Referring to these drawings it will be seen that generally speaking, I have provided a tractor supported frame and that mounted upon this frame are two drums arranged in tandem relation, the first drum of the series receiving the raw materials from a skip or other feeding means, and discharging into the second drum which, in turn, discharges into any suitable chute, skip, bucket, hoist, or other delivering means. It will be seen that the base frame of the machine includes longitudinally extending beams 10, upon which are mounted a plurality of supporting wheels 11 and that these beams 10 also support at their ends, the transverse shafts 12 and 13, the shaft 13 being a two-part shaft, as will be later explained. The shaft 13 supports at its ends the bull wheels 14 and the shaft 12 supports the bull wheels 15. Over these wheels pass the endless chain of grouser plates 16. The lower flight of the track or chain passes beneath the wheels 11 and over wheels 11^a.

The shaft 13 is preferably formed in two sections, each of these shaft sections being independently driven, as will be later explained. The beams 10 support the transverse beams 17 and mounted upon these transverse beams are the longitudinal beams 18 which support, by any suitable braces, the relatively long transverse beams 19, upon which the front drum 20 is mounted. The drum may be constructed in any suitable manner and has surrounding it the circumferentially extending sectional track 21. This track has outwardly inclined faces 22.

Mounted in bearings upon the beams 19 are two rollers 23 which engage this track, these rollers having beveled end faces 24

which engage the beveled faces 22. For the purpose of holding the drum in place upon the rollers 23 I provide a top roller 25, which is formed in the same manner as the rollers 23 and also has beveled end faces to engage the beveled walls of the track 21. This upper roller 25 is mounted upon transverse channel irons or beams 26. These beams on one side are pivotally connected to a downwardly extending hanger 27 which is pivotally mounted between the longitudinally extending beams or channel irons 28, these beams being in turn mounted upon transverse beams 29, in turn carried by uprights 30 extending down to the base frame of the machine. The outer ends of the pair of beams 26 are provided with a transversely extending yoke 31, and extending upward through this yoke is a pin or rod 32 which is pivotally engaged with the channel irons 28 on that side of the machine by means of a detachable pin 33. Coiled springs 34 are disposed around this pin or rod 32 and bear against the yoke 31 and thus act to hold the beams 26 in a middle position and yielding against either upward or downward movement. A nut 35 engages the upper end of the screw pin 32 and by adjusting this nut the tension of the springs 34 may be adjusted. Thus, it will be seen that the upper roller 25 is yieldingly forced downward against the track, and that the two lower rollers 23 and the upper roller 25 are disposed in approximately triangular relation and have three points of contact with the drum track.

The drum is rotated by means of the shaft 36 carrying two gear wheels 37 which engage with annular racks 38 or gear teeth in turn carried upon the drum. The shaft 36 is driven by means of a sprocket wheel 39 driven by a sprocket chain 40 extending over a sprocket wheel 41 mounted upon the shaft 42 of the motor or engine 43, which in turn is mounted upon a suitable supporting structure extending upwardly from the base frame and supporting the engine to one side but in advance of the front drum.

The drum 20 is formed with a central receiving opening 44 having therein one end of a discharge chute 45 and adapted to receive material from a skip 46 of any suitable character and which forms no part of my invention. This skip is designed to receive the raw material of the concrete when the skip is lowered and when hoisted by means not necessary to state, the raw material is discharged through the chute 45 into the interior of the drum. The opposite end of the drum is formed with a discharge mouth 47 and pivotally mounted within the discharge mouth is a transferring chute or gate 48 which is adapted to swing from the full line position in Figure 2 to the dotted line position. When it is in its full line posi-

tion it will receive material from within the drum 20 and discharge this material downwardly and rearwardly to the second drum. The drum 20 is also provided with a plurality of transversely extending pickup buckets or blades 49 which may be of any suitable character and may be slightly inclined centrally or towards the discharge opening or, on the other hand, may extend horizontally across the drum 20. The discharge mouth 47, as shown in Figure 2, has its annular wall extending inward and centrally beyond the side wall of the drum in both directions so as to prevent material being mixed within the drum from being discharged through the discharge opening except by the use of the chute 48.

Mounted upon the supporting frame behind the drum 20 is the drum 50 which is constructed in exactly the same manner as the drum 20 and is supported in the same manner but is of slightly different dimensions, the drum being preferably narrower than the drum 20. This drum 50 is also provided with a receiving chute 45^a of the same character as the receiving chute 45, and with a discharge mouth 47^a, and with a discharge gate or chute 48^a mounted in the same manner as the chute 48 but discharging into a receiving chute, trough, or other equivalent element 51. The drum 50 is also provided with transversely extending blades 49^a and operates in precisely the same manner as the drum heretofore described. This drum is also supported by a three point roller contact consisting of the rollers 23^a and the single roller 25^a at the top of the drum. These rollers engage with the track 21^a, of the same character as heretofore described, having beveled faced side walls with which the beveled edges of the rollers engage.

It will be noted that the gates or chutes 48 and 48^a are mounted upon transverse trunnions 52 mounted in brackets 53 and 53^a, the brackets 53 being operatively connected to uprights 30^a and the brackets 53^a being connected to upwardly and rearwardly extending supporting beams 54. The rear drum is also driven by means of pinions 37^a carried by a shaft 36^a, which in turn carries a sprocket wheel 39^a driven by a sprocket chain from a sprocket wheel on shaft 42. Obviously, I do not wish to be limited to this manner of driving the drums as the gearing for this purpose might be changed in many ways without departing from the spirit of the invention. The gear wheels 37^a, of course, engage the annular gear rings 38^a. Manually operable means is provided engageable with the shafts or trunnions 52 whereby the gates 48 and 48^a may be turned from a discharge position to the position shown in dotted lines, or means may be provided whereby these gates are

automatically turned to their discharge positions periodically. Water tanks 55 are mounted upon the supporting frame of the mechanism and are provided with suitable pipes discharging water into the mixing drums in a manner which will be obvious.

For the purpose of driving the tractor I provide an engine 56 supported upon the frame of the machine opposite to the engine 43, the shaft of which carries upon it the sprocket wheel 57. This is engaged with the sprocket wheel 58 mounted upon a longitudinal shaft 59 which carries upon it a beveled gear wheel 60.

Slidably mounted upon the transverse shaft 61 are the two beveled gear wheels 62 and 63, either of which may be shifted by suitable shipper levers into engagement with the beveled gear wheel 60. Thus, the shaft 61 may be driven in opposite directions. The shaft 61 carries upon it the sprocket wheels 64. Mounted in suitable bearings upon the frame of the machine are the two shaft sections 65 and 66 which carry the bull wheels 14. Each shaft section carries upon it the sprocket wheel 67 driven from one of the sprocket wheels 64 by means of a sprocket chain. These two shaft sections 65 and 66 may be independently operated if desired or both operated together. To this end I have shown a male clutch member 68 mounted upon the shaft section 65, which clutch member is recessed at its center to receive the extremity of the shaft section 66. Keyed upon this shaft section 66 is the shiftable female clutch member 69 shifted into or out of engagement with the clutch member 68 by any suitable shifting means. Also keyed upon the shaft section 66 is a circular supporting block 70 which is concentric to the shaft and fits within a recess in the clutch member 68 and is held in place by a collar 71 disposed within the recess of the clutch member 68. By this means one of these shafts may turn independently of the other shaft if such a condition be desired and if it be required that both sections shall operate together as a unit, the two clutch members are engaged with each other. The engine 56 may also be used to hoist the skip 46 or operate any other desirable feed means. Obviously, by driving one of the shaft sections 65 or 66 and letting the other run idle, the machine may be steered and shifted laterally. Thus, not only may this machine follow up its work but it may travel from one job to another under its own power.

While I have illustrated a crawler or caterpillar tractor for supporting and causing the movement of the mixing machine, I do not wish to be limited to this as ordinary motor truck or tractor mechanism might be used in place of the caterpillar tractor.

It will be seen that with this construc-

tion, concrete instead of being mixed in a single drum for a specified time of, for instance, one minute, is mixed in two drums for the same length of time that is, a half minute in each drum which secures not only a more thorough mixture of the material by reason of the transfer of the material from one drum to the other but eliminates the time lost where a single drum is used, in receiving material and in discharging it as in my construction the first drum may receive its raw material while the other drum is discharging it. Thus, the raw or unmixed material is placed in the first or front drum and is revolved therein for a half minute, then it is transferred to the second drum and revolved within this drum a half minute at about the same time the first or front drum has received another batch of raw material and after the first batch at the commencement of the work has been delivered to the second or rear drum from the first drum, there is almost continually a batch in each drum and at about the same time there is almost a continuous stream of concrete being delivered from the mixing machine to the work. Thus there is no loss of time due to waiting for the material to be thoroughly mixed and there is no necessity of cutting down the time of mixing in order to increase the quantity or "yardage" at the expense of quality. A concrete mixer constructed in accordance with my invention will turn out more cubic yards of thoroughly mixed concrete per hour than any other concrete mixing machine known to me and the mixed concrete so turned out will be of better quality than other concrete mixing machines known to me.

The roller support which I have provided for the drums secures greater adhesion between the drums and the driving mechanism, thus eliminating slippage and the three point roller contact steadies the frame at all times. The beveled faces of the rollers operating against the beveled track tend to take side thrust when the machine is operating on an inclined plane or traveling up or down grades.

I claim:—

1. A separate and independent mixing machine comprising two mixing drums mounted in tandem and each having a centrally disposed receiving opening and a centrally disposed discharge opening in its opposite ends, a gate having the form of a chute pivotally supported in connection with the discharge opening of the first drum and adapted to be shifted into a downwardly inclined position to receive material from the first drum and discharge it into the second, and a gate pivotally mounted in connection with the discharge opening of the second drum and shiftable from an inoperative position to a downwardly and outward-

ly inclined position, each of said gates having portions extending into its corresponding drum, each drum having separate driving means.

2. A mixing machine of the character described comprising a supporting frame having wheels, means for driving the frame forward or backward, a pair of separate and independent mixing drums mounted upon the frame, the forward mixing drum being disposed with its axis higher than the rear mixing drum, each of said mixing drums having a centrally disposed receiving opening and a centrally disposed discharge opening, a chute-like gate pivotally mounted in connection with the discharge opening of the first named drum and when shifted into one position discharging material from the first named to the second named drum, a pivoted chute-like discharge gate mounted in connection with the discharge opening of the second named drum and adapted to be turned into a downwardly inclined position to discharge material therefrom, each of said gates having a portion extending into the corresponding drum and each of said drums having transversely extending baffles to cause the elevation of material as the drum is rotated and separate power driven means for operating each drum.

3. A mixing machine of the character described comprising a wheeled supporting frame, means for propelling the frame either forward or rearward, a plurality of separate and independent rotatable drums mounted upon the frame and one discharging into the other, and independent power operated means for operating said drums.

4. In a mixing machine of the character

described, a supporting frame, a drum having a plurality of gear rings, a circular track mounted upon each drum, and rollers mounted upon the frame and coacting with the circular track, said rollers being arranged to engage the drum at three separated points, one of said rollers being yieldingly urged toward the drum.

5. In a mixing machine of the character described, a supporting frame, a drum having a plurality of gear rings, a circular track mounted upon each drum, and rollers mounted upon the frame and coacting with the circular track, said rollers being arranged to engage the drum at three separated points, one of said rollers being yieldingly held in contact with the track and against inward or outward movement from a normal position.

6. A mixing machine comprising a supporting frame, a rotatable drum thereon, means for supporting the drum including a circular track on the frame and three rollers engaging said track, two of said rollers being mounted upon the supporting frame beneath the frame, a transversely extending beam pivotally mounted upon the supporting frame and extending above the frame and carrying the uppermost roller, a vertical bolt operatively engaging the frame on the other side thereof from said pivotal support for the beam, and upper and lower springs carried by said bolt and operatively engaging the free end of said transverse beam and yieldingly holding the transverse beam in a normal position bearing against the track.

In testimony whereof I hereunto affix my signature.

EDWARD H. McMILLAN.

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CERTIFICATE OF CORRECTION.

Patent No. 1,619,145.

Granted March 1, 1927, to

EDWARD H. McMILLAN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, line 116, claim 1, strike out the words "separate and independent" and insert the same after the word "two" in line 117; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of December, A. D. 1930.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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