

May 27, 1930.

P. P. YOHE

1,760,101

MIXING MACHINE

Filed April 9, 1927

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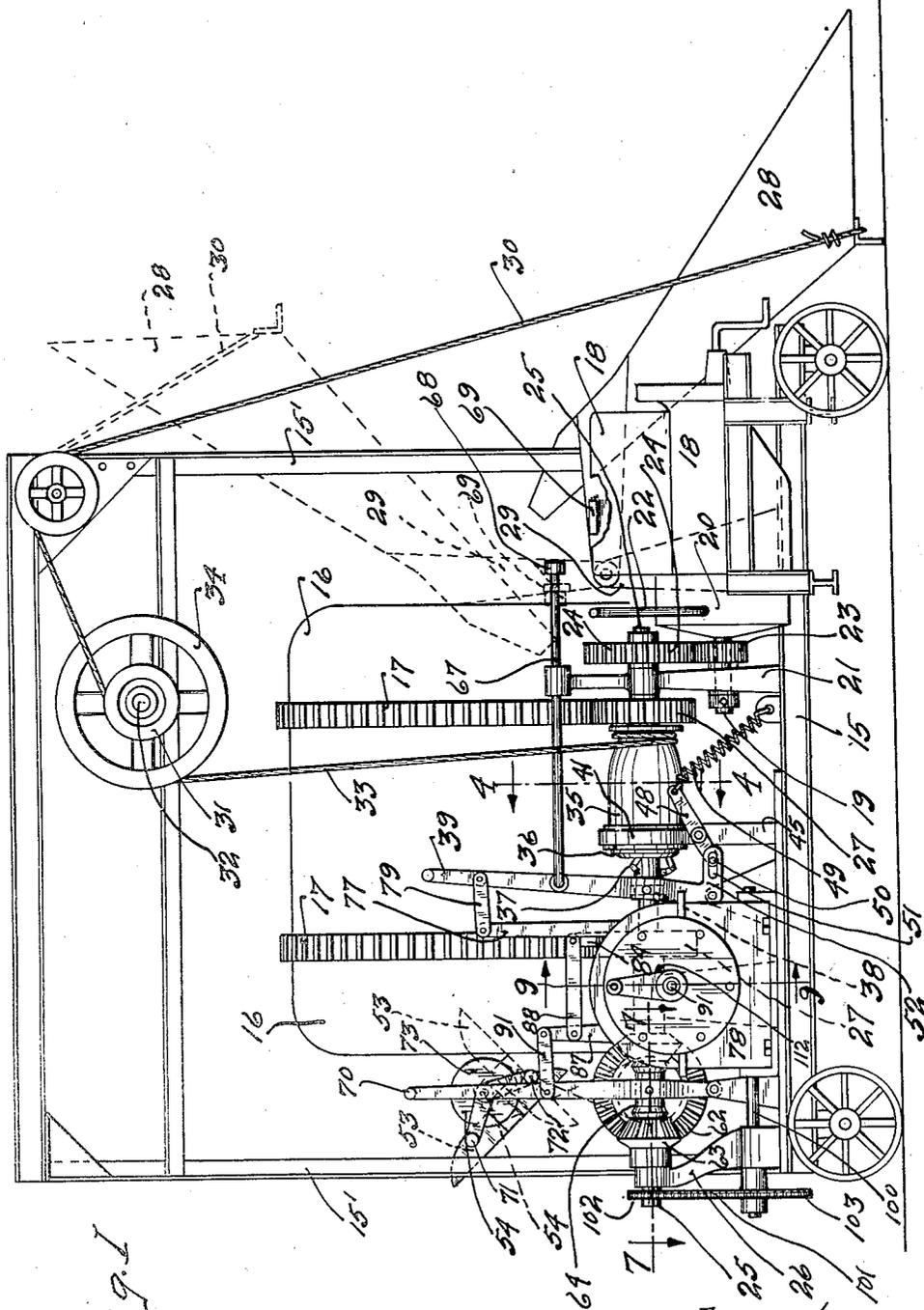


Fig. 1

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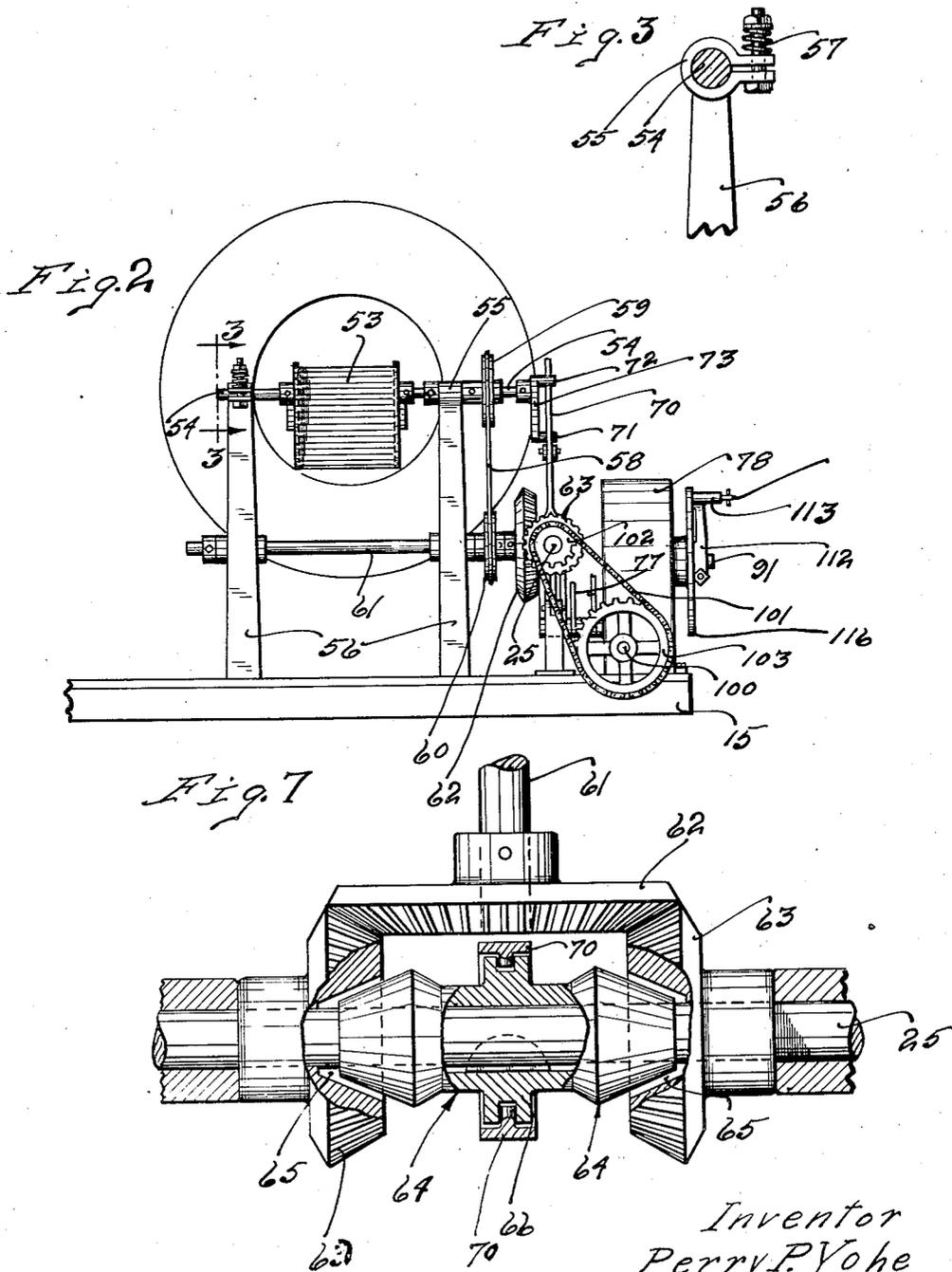
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7 Sheets-Sheet 2



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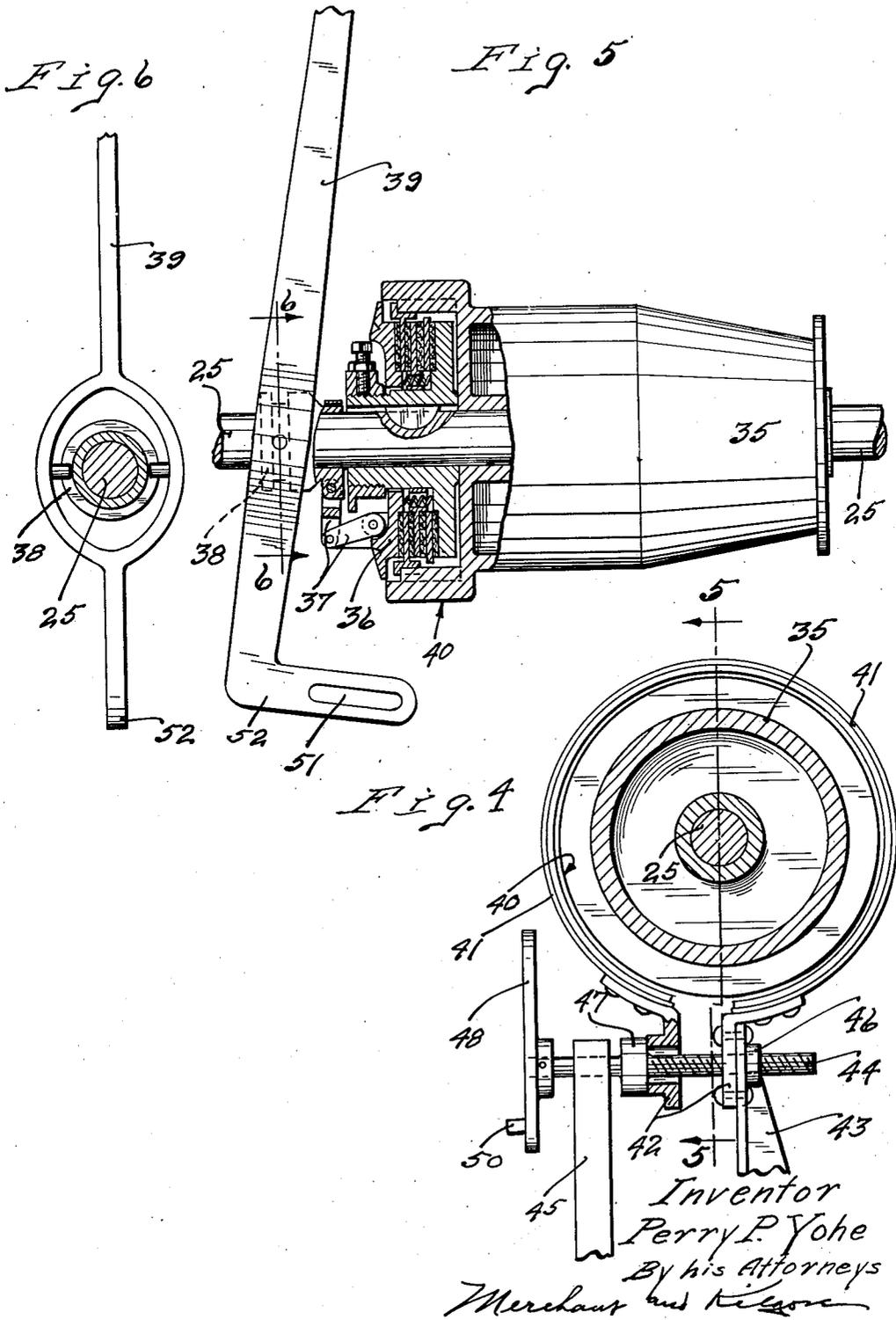
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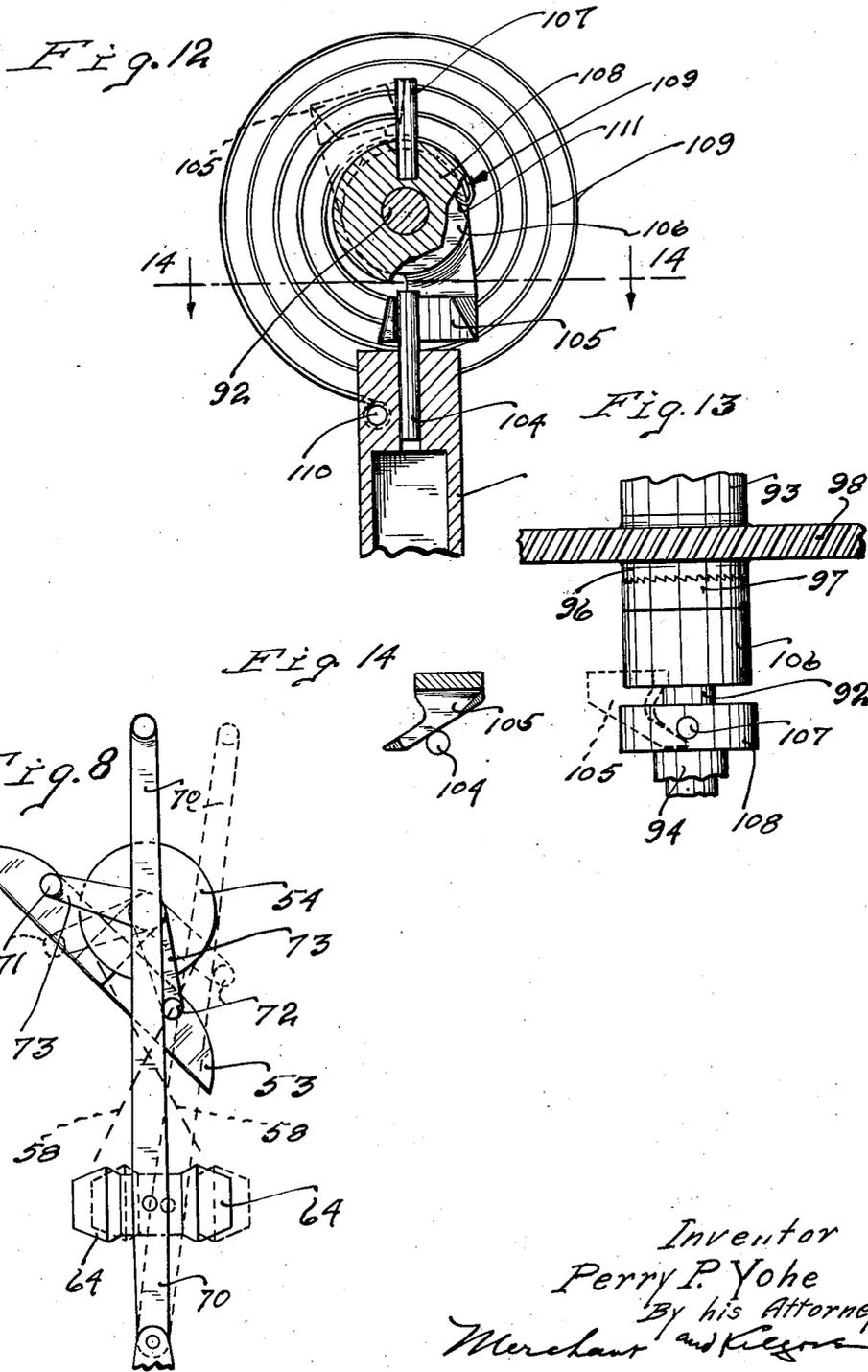
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7 Sheets-Sheet 4



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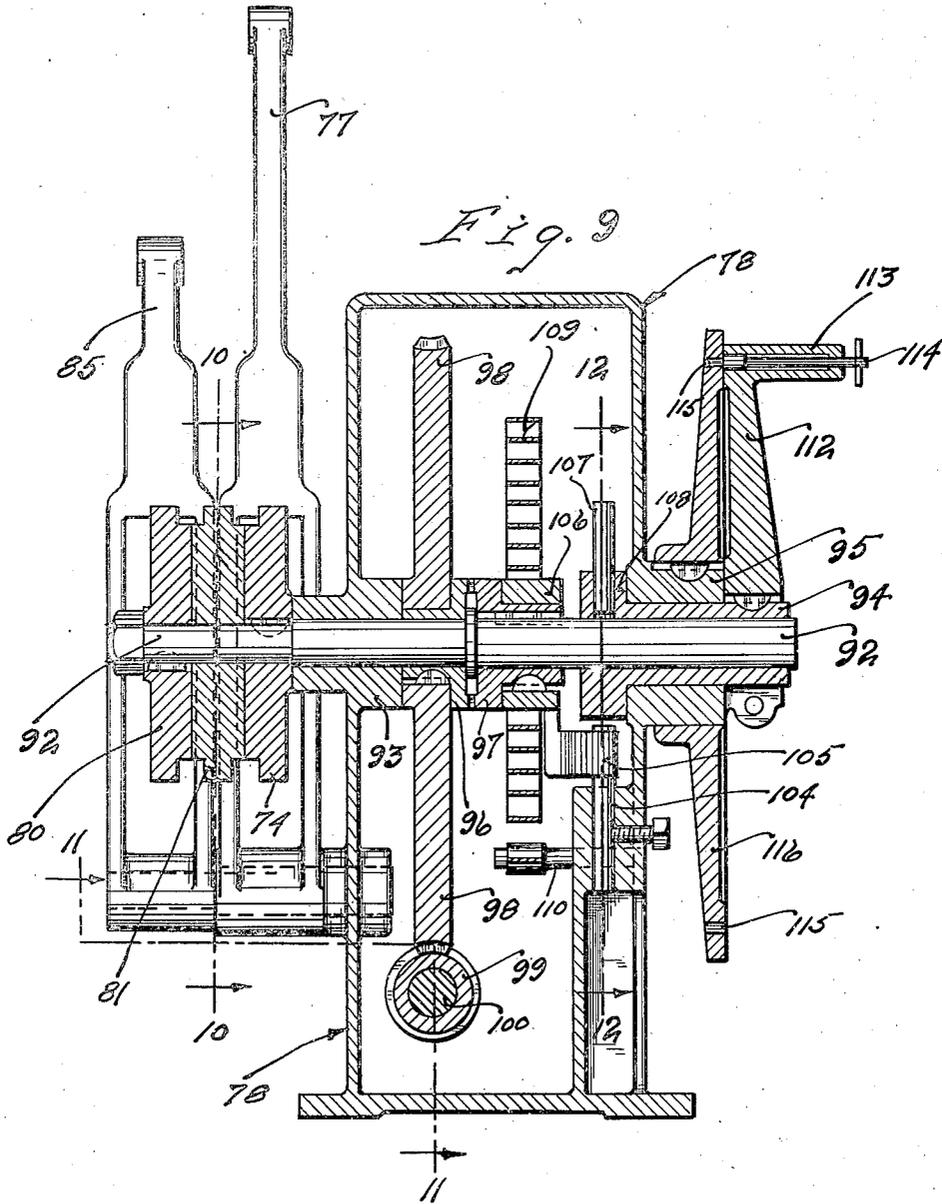
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MIXING MACHINE

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7 Sheets-Sheet 5



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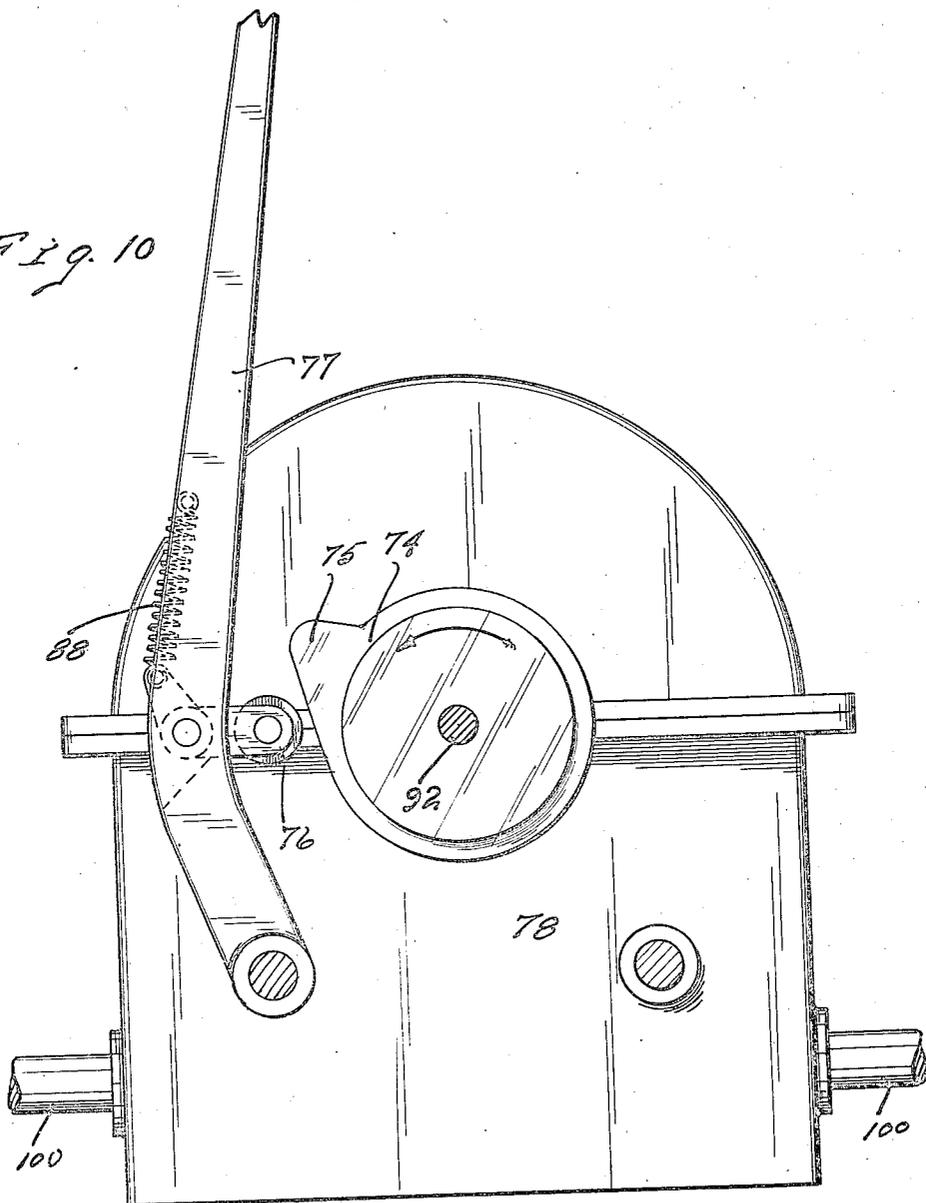
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MIXING MACHINE

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7 Sheets-Sheet 6

Fig. 10



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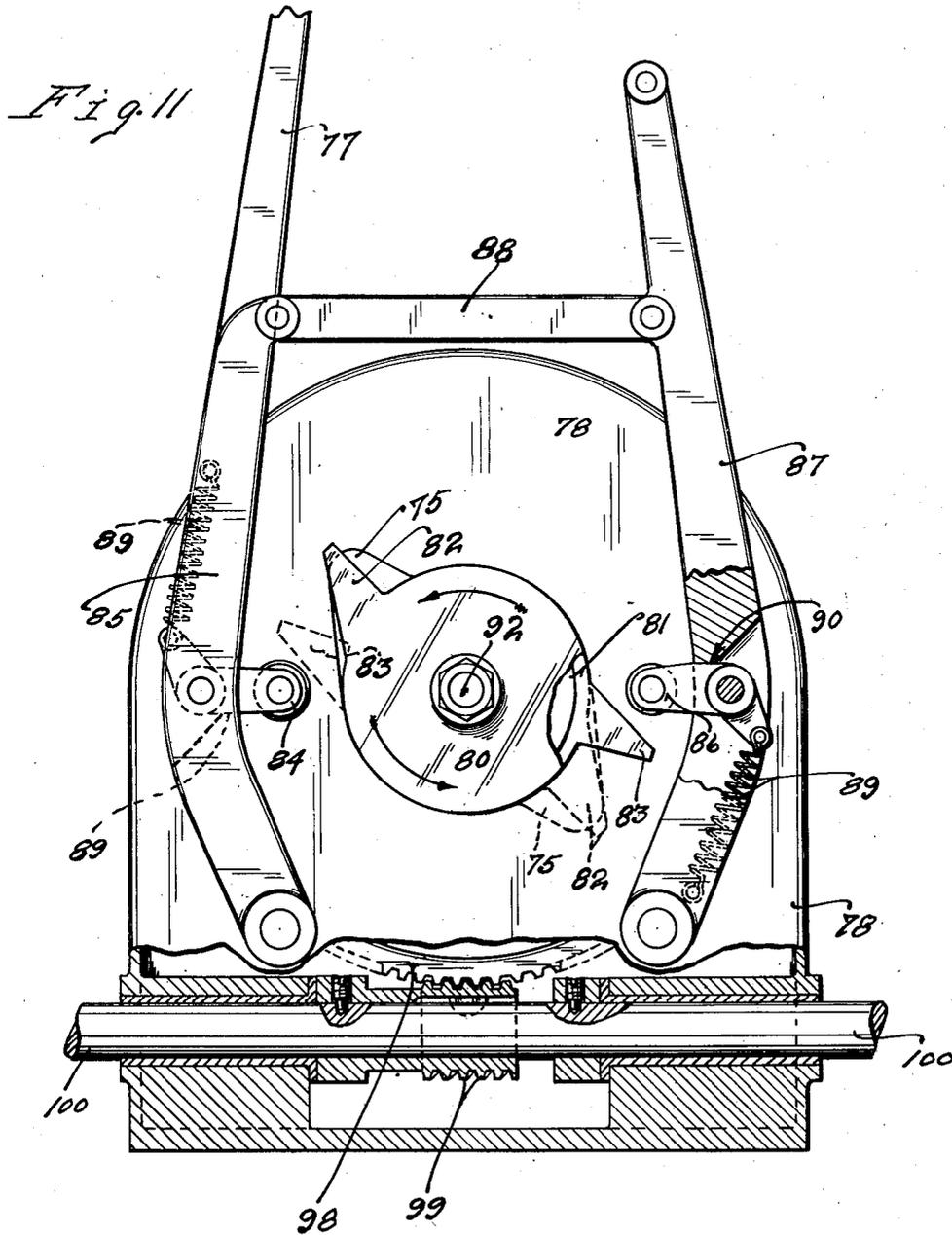
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7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

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MIXING MACHINE

Application filed April 9, 1927. Serial No. 132,515.

My present invention has for its object to provide an automatic concrete mixer or the like and timing mechanism therefor.

To the above end, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

As is well known, the strength of concrete depends a great deal on the proper mixing of the materials and that all batches or charges in a given job should be alike in order to secure uniform strength, and the timing required in making a mixture of a given strength is also well known. In order to speed up the pouring of concrete, there is a tendency to slight the time required for mixing.

The embodiment of the invention in a concrete mixer converts the same into an automatic mixer in which all of the actions thereof are in timed relation from the placing of the materials into the machine until the discharge thereof. Complete operations of the machine for mixing a batch are successively and automatically repeated in timed relation. The timing of the mixing of a batch of concrete may be varied, at will, but when the mixer is once set for a predetermined time, each successive batch will be timed alike until the timing is again changed, and when the concrete has set, will have a uniform strength.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a right side elevation of a concrete mixing machine having the invention embodied therein, some parts being shown in different positions by means of broken lines;

Fig. 2 is a rear end elevation of the machine with some parts removed and other parts broken away;

Fig. 3 is a detail view with some parts sectioned on the line 3—3 of Fig. 2;

Fig. 4 is a detail view with some parts sectioned on the line 4—4 of Fig. 1, on an enlarged scale;

Fig. 5 is a detail view partly in side eleva-

tion and partly in section taken on the line 5—5 of Fig. 4;

Fig. 6 is a fragmentary detail view with some parts sectioned on the line 6—6 of Fig. 5;

Fig. 7 is a fragmentary detail view with some parts sectioned on the line 7—7 of Fig. 1, on an enlarged scale;

Fig. 8 is a side elevation of the delivery spout and parts associated therewith, some parts being shown in different positions by means of broken lines;

Fig. 9 is a view principally in section taken on the line 9—9 of Fig. 1, on an enlarged scale;

Fig. 10 is a view principally in elevation with some parts sectioned on the line 10—10 of Fig. 9, and with the intermediate head removed;

Fig. 11 is a view principally in side elevation with some parts sectioned on the irregular line 11—11 of Fig. 9;

Fig. 12 is a detail view with some parts sectioned on the line 12—12 of Fig. 9;

Fig. 13 is a fragmentary view showing the timing clutch; and

Fig. 14 is a detail view in section taken on the line 14—14 of Fig. 12.

The numeral 15 indicates a truck on which a mixing drum 16 is mounted on rollers, not shown, to rotate about a horizontal axis which extends longitudinally of said truck at the transverse center thereof, and having a pair of external axially spaced ring gears 17. An internal combustion engine 18 is mounted on the truck 15 at the front and right side of the mixing drum 16. A stub shaft 19, axially aligned with the crank shaft of the engine 18, is journaled in a clutch housing 20 on said engine and a bearing in a standard 21 on the truck 15. The stub shaft 19 is connected to the crank shaft of the engine 18, at will, by a manually-operated clutch, only the operating lever 22 of which is shown. Keyed to the stub shaft 19 is a pinion 23 which meshes with a gear 24 keyed to the front end of a drum drive shaft 25, journaled in a bearing on the standard 21, and a bearing in a standard 26 on the rear end of the truck 15. Pinions 27 on the shaft 25 mesh with the ring gears 17 and complete the

driving connections from the engine 19 to the mixing drum 16.

A charging skip 28 for loading the mixing drum 16 is pivoted to bearing members 29 on the truck 15 for raising and lowering movement at the front of the mixing drum 16, as indicated by full and broken lines in Fig. 1. The charging skip 28 is raised and lowered by means of a pair of cables 30 having one of their ends attached to said skip and their other ends attached to winding drums 31 on a hoist shaft 32 journaled in bearings on a frame 15' carried by the truck 15. The hoist shaft 32 is operated by a cable 33, one end of which is attached to a hoist sheave 34 on said shaft and a winding drum 35 loose on the drum drive shaft 25. Co-operating with the winding drum 27 for securing the same to the shaft 25, at will, is a friction clutch 36 having co-operating toggles 37 attached to a shipper collar 38 on said shaft. A clutch shipper lever 39, fulcrumed on a bearing on the truck 15, is provided for operating the shipper collar 38 to set and release the clutch 36.

For controlling the unwinding movement of the drum 27 when the clutch 36 is released, said drum is provided with a braking surface 40 to which is applied a brake band 41 having at its ends outturned apertured ears 42, one of which is rigidly secured to a standard 43 on the truck 15. The brake band 41 is operated by a screw 44 that is journaled in a standard 45 on the truck 15 and extends loosely through the apertured ears 42, and has screw-threaded engagement with a nut-acting member 46 on the standard 43. A collar 47, on the screw 44, engages the loose ear 42 for moving the same toward the fixed ear 42 under the action of the screw 44 to frictionally clamp the brake band 41 onto the braking surface 40. An operating lever 48 is intermediately secured to the screw 44. A coiled spring 49, anchored to the truck 15, is attached to the long end of the lever 48 and under strain to move said lever, and thereby rotate the screw 44 to set the brake band 41 on the braking surface 40. On the short end of the lever 48 is a cam pin 50 which works in a cam slot 51 on a bell-crank extension 52 on the hand lever 39 for operating the lever 48 and thereby releasing the brake band 41, as will hereinafter appear.

A discharge spout 53 is intermediately secured to a transverse rock shaft 54 journaled in bearings 55 on standards 56 on the truck 15 at the rear of the mixing drum 16 for movement to and from an inoperative position, as shown by full lines in Figs. 1 and 8. The receiving end of the discharge spout 53, when in an operative position, extends into the rear or discharge end of the mixing drum 16, as shown by broken lines in Fig. 1. For frictionally holding the discharge spout 53 where set, one of its bearings 55 is split and

the ends thereof connected by a spring-held compression bolt 57.

For moving the discharge spout 53 to and from its operative position, there is provided a crossed belt 58 which runs over a pair of aligned grooved pulleys 59 and 60, the former of which is on the rock shaft 54 and the latter of which is on a counter-shaft 61 journaled in bearings in the standards 56. The counter-shaft 61 may be reversely driven from the drum drive shaft 25 by a gear 62 on said shaft 61, with which meshes a pair of diametrically opposite opposing front and rear pinions 63 loose on the shaft 25. Keyed to the shaft 25, between the pinions 63, is a double-acting friction cone clutch 64 arranged to be set in a neutral position or in contact with either one of the internal friction surfaces 65 in the pinions 63. The clutch 64 is provided with a shipper collar 66.

To automatically release the winding drum 27 when the charging skip 28 reaches its uppermost position, as indicated by broken lines in Fig. 1, the lever 39 is provided with a forwardly-projecting plunger 67, the rear end of which is intermediately pivoted thereto and arranged for endwise sliding movement in a bearing on the standard 21, and is provided at its outer or free end with a head 68 arranged to be engaged by a lug 69 on said skip.

For operating the shipper collar 66 and hence the clutch 64 there is provided a shipper lever 70 pivoted to the truck 15 and extending between a pair of tripping lugs 71 and 72 on a pair of radial arms 73 in bell-crank arrangement on the shaft 54. Normally, the clutch 64 is in neutral position. By moving the lever 70 to the left in respect to Fig. 8 the clutch 64 will engage the rear pinion 63 and thereby operate the rock shaft 54 from the shaft 25 through the gear 62, shaft 61, and belt 58. This movement of the rock shaft 54 will swing the discharge spout 53 into the mixing drum 16, as shown by broken lines in Fig. 1, and thereby cause the discharge of the contents of said drum. At the completion of the movement of the discharge spout 53 into the mixing drum 16, the tripping lug 71 will engage the lever 70 and move the same to the right and thereby position the clutch 64 in neutral position and stop further movement of the rock shaft 54 and hence the discharge spout 53.

To move the discharge spout 53 into an inoperative position, as shown by full lines in Figs. 1 and 8, the lever 70 is moved to the right to cause the clutch 64 to engage the front pinion 63 and thereby operate the rock shaft 54 through the connection just referred to. At the completion of the movement of the discharge spout 53 into an inoperative position, the tripping lug 72 will engage the lever 70 and move the same to the left and thereby position the clutch 64 in neutral position and

stop further movement of the rock shaft 54 and hence the discharge spout 53.

The parts thus far described are of standard and well known construction.

Referring now in detail to the invention which, in the form illustrated, is applied as a unit to a standard concrete mixer for automatically operating the same, to raise and lower the charging skip 28, rotate the mixing drum 16, and move the discharge spout to and from operative positions, all in timed relation and for a predetermined period of time, and for causing the machine to successively repeat its complete operations in timed relation.

Said unit includes a rotatable head 74 having a peripheral tripping lug 75 arranged to engage a roller-equipped abutment 76 on an upright lever 77 pivoted to the back of a housing 78 on the truck 15 for swinging movement in substantially the same plane as the lever 39 and having its upper end connected by a link 79 to said lever 39. The action of the tripping lug 75 on the abutment 76 is to operate the lever 39, by means of the lever 77 and link 79, to set the clutch 36, release the brake band 41, and reset the plunger 67 for the charging skip 28.

The unit also includes a pair of rotatable heads 80 and 81 having diametrically opposite peripheral tripping lugs 82 and 83, respectively, the former of which is arranged to engage a roller-equipped abutment 84 on a lever 85, and the latter of which is arranged to engage a roller-equipped abutment 86 on a lever 87. The lever 85 is located forward of the head 80 and the lever 87 is located rearward of the head 81, and which levers 85 and 87 are mounted for movement in the plane of rotation of the heads 80 and 81, respectively. The lever 85 is mounted on the same pivot pin as the lever 77, and the lever 87 is pivoted to the housing 78. A link 88 connects the two levers 85 and 87 for common movement.

The abutments 76, 84 and 86 are in the form of bell-cranks pivoted to the levers 77, 85 and 87, respectively, and yieldingly held by coil springs 89 against stop shoulders 90 on said levers to rigidly hold said abutments when engaged by the respective tripping lugs 75, 82 and 83 during the rotation of the heads 74, 80 and 81 in the direction of the arrows marked thereon in Figs. 10 and 11. When the heads 74, 80 and 81 are rotated in reverse directions from the arrows marked thereon in Figs. 10 and 11, the abutments 76, 84 and 86 will yield to permit the tripping lugs 75, 82 and 83 to pass the same. The levers 77, 85 and 87, as shown in Figs. 10 and 11, are in neutral position. A link 91 connects the levers 77 and 87 for common movement. As shown in Fig. 1, the levers 77, 85 and 87 are in neutral position as well as the clutch 64.

The following connections are provided for rotating the heads 74, 80 and 81 from the

drum drive shaft 25 at the proper speed, to wit: a rock shaft 92, to the inner end portion of which said heads are keyed at the back of the housing 78. The shaft 92 extends transversely through the housing 78 and is journaled in a bearing 93 formed with the inner wall of said housing, and a short tubular shaft 94 journaled in a hub-like bearing 95 in the front wall of said housing. Loosely journaled on the shaft 92, within the housing 78, is a clutch member 96, and co-operating with said clutch member is a clutch member 97 keyed to the shaft 92 for rotation therewith, but with freedom for axial movement into and out of interlocking engagement with the clutch member 96. A large worm gear 98 is keyed to the hub of the clutch member 96 and meshes with a worm 99 keyed to a shaft 100 which extends parallel to the drum drive shaft 25 and is journaled in bearings on the standard 26 and rear wall of the housing 78. The shaft 92 is driven from the shaft 25 by a sprocket chain 101 which runs over a relatively small sprocket wheel 102 on the rear end of the shaft 25 and a relatively large sprocket wheel 103 on the shaft 100.

Normally the clutch member 97 is held interlocked with the clutch member 96 by a fixed clutch-setting cam pin 104 in the front wall of the housing 78 and a co-operating cam-acting finger 105 having a hub 106 mounted on the hub of the clutch member 97 and keyed for rotation therewith, (see Figs. 12 and 14). During the forward rotation of the rock shaft 92, the finger 105 is moved therewith out of engagement with the cam pin 104 in the arc of a circle, the center of which is at the axis of said shaft. During this movement of the finger 105, the same engages an adjustable clutch-releasing cam pin 107 which extends radially from a hub 108 on the inner end of the tubular shaft 94 with a cam action which moves the clutch member 97 axially out of engagement with the clutch member 96 and thereby stops further rotation of the shaft 92. At the time the clutch member 97 is released from the clutch member 96, it is given a backward rotation by a flat coil spring 109 to cause the finger 105 to again engage the pin 104 and move the clutch member 97 into interlocking engagement with the clutch member 96. This spring 109 is anchored to a pin 110 secured to the housing 78 and attached at 111 to the hub 108 which extends within said spring. During the initial rotation of the rock shaft 92, the spring 109 is placed under tension.

To rigidly hold the tubular shaft 94 and hence the clutch-releasing cam pin 107 and to set said pin different circumferential distances from the clutch-setting pin 104, the tubular shaft 94, outward of the housing 78, is provided with a hand crank 112 having in its hand-piece 113 a spring-projected bolt 114

arranged to enter any one of a plurality of circumferentially spaced bores 115 in a face plate 116 mounted on the hub-like bearing 95 and keyed thereto.

5 The bores 115 represent different periods of time for one complete operation of the machine which includes the mixing of a batch in the mixing drum 116, and for the purpose of this case it may be assumed that each bore
10 115 represents one minute, with zero at the bottom of the face plate 116. As shown, the hand crank 112 is so set that it will take three minutes for one complete operation of the machine in which a batch of concrete has
15 been mixed: By adjusting the hand crank 112 either to the right or the left, the clutch-releasing cam pin 107 may be set different distances from the clutch-setting cam pin 104.

20 The operation of the concrete mixer just described may be briefly described as follows: After the engine 18 has been started, the operator sets the clutch connecting the engine shaft to the stub shaft 19 by means of the hand lever 22 to operate the drum drive shaft
25 25. At this time, the skip 28 is in a loading position, as shown by full lines in Fig. 1, and it may be assumed that it contains the necessary materials for a batch of concrete to be mixed, the clutch 36 and clutch member 97
30 are set, the clutch 64 is neutral, the discharge spout 53 is in an inoperative position, as shown by full lines in Figs. 1 and 8, and the tripping lugs 75, 82 and 83 are positioned as shown in Figs. 10 and 11.

35 Under the initial rotation of the shaft 25, the tripping lug 83 engages the abutment 86, moves the lever 87 rearward, and through the connections 91 and 70, moves the clutch 64 into engagement with the rear pinion 63, and
40 thereby operates the connections to the rock shaft 54, which moves the discharge spout 53 into the mixing drum 16. The drum 16 is, of course, empty at the time the machine is started and hence there will be no discharge
45 therefrom the first time the discharge spout 53 is moved into an operative position. During the final movement of the discharge spout 53 into the mixing drum 16, the tripping lug 71 operates the lever 70 which returns the
50 clutch 64 to neutral position and stops further movement of said spout with the same set in an operative position. After the tripping lug 83 is moved out of engagement with the abutment 86 and under further rotation of the shaft 92, the tripping lug 75 engages the abutment 76, operates the lever 77 which sets the clutch 36, and positions the plunger 67 to be engaged by the lug 69 on the charging skip 28.

60 At substantially the same time that the tripping lug 75 engages the abutment 76, the tripping lug 82 engages the abutment 84, operates the lever 85 which through the connections 88, 87 and 91 operates the lever 70 which
65 moves the clutch 64 into engagement with the

front pinion 63, and thereby operates the rock shaft 54 which moves the discharge spout 53 out of the mixing drum 16. During the final movement of the discharge spout 53 to an inoperative position, the lug 72 operates the lever 70 and returns the clutch 64 to neutral position and thereby stops further movement of said discharge spout.

70 At the time the clutch 36 is set by the action of the tripping lug 75 on the abutment 76, the brake band 41 is released and the winding drum 35 starts to rotate. Under the rotation of the drum 35, which has been started by the setting of the clutch 36, the cable 33 is wound thereon, which lifts the skip 28 into a position, as indicated by means of broken lines in Fig. 1, and causes its load to be discharged into the rotating mixing drum 16. During the final lifting movement of the charging skip 28, its lug 69 engages the plunger head 68 and moves the plunger 67 rearward, and thereby operates the lever 39 to release the clutch 46 and stop further lifting movement of said skip, and allows the same to return to its loading position under the action of gravity. At the time the clutch 36 is released by the lever 39 under the action of the plunger 67 produced by the charging skip 28, said lever sets the brake band 41 onto the braking surface 40 and thereby controls the unwinding of the cable 33 from the drum 35 to prevent the charging skip 28 from moving too fast during its return movement. The movement of the lever 39 by the plunger 67 also operates the lever 77 by the link connection 79 and thereby positions its abutment 76 to be engaged by the tripping lug 75, as indicated in Fig. 10, during the next operation of the machine. During the forward rotation of the rock shaft 92, the spring 109 is placed under tension and the cam finger 105 is moved from the clutch-setting pin 104 to the clutch-releasing pin 107. The tripping lugs 75, 82 and 83 have also acted in their proper order on the tripping abutments 76, 84 and 86, respectively. At the completion of the allotted period of time for the mixing of the concrete in the drum 16, the cam finger 105 engages the clutch-releasing pin 107 and is moved thereby away from the worm gear 98 which releases the clutch member 97 from the driven clutch member 96. When the clutch member 97 is released from the clutch member 96, the spring 109 becomes active and returns the cam finger 105 to the cam-setting pin 104 which again, acting on said finger, moves the clutch member 97 into interlocking engagement with the clutch member 96. This action of the spring 109 also turns the shaft 92 backwards and resets the tripping lugs 75, 82 and 83. With the resetting of the clutch member 97, the initial forward movement of the shaft 92 brings the tripping lug 83 into engagement with the abutment 86, operates the lever 87, which, in turn, by the link 91 operates the
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lever 70, and moves the clutch 64 into engagement with rear pinion 63. This setting of the clutch 64 operates the connections to the rock shaft 54 and moves the discharge spout 53 into an operative position, as shown by broken lines in Fig. 1, and thereby causes the discharge of the mixed batch of concrete from the drum 16. Successive operations of the machine are identical with the one just described.

After the hand crank 112 has been set for a predetermined time for the operation of the machine, the same in actual usage, will be locked or covered with a casing to prevent any one from changing the time of the machine without authority.

The housing 78 together with the mechanisms contained therein, and the heads 74, 80 and 81, constitute in effect a timing mechanism or batchmeter, so known in the art, inasmuch as they determine the mixing period of a batch of concrete in the mixing drum.

What I claim is:

1. The combination with a mixing drum, a main drive shaft therefor, a loading skip, a hoisting drum for the skip, and clutch mechanism for operatively connecting the hoist drum with the main drive shaft for the mixing drum, of timing mechanism for automatically controlling the operation of the skip, said mechanism being directly connected with the main drive shaft of the drum and including cam means for automatically operating the clutch to initiate upward movement of the skip, and means adapted for operation by the skip upon its reaching its uppermost position, to move the clutch into neutral position, whereby hoisting action is discontinued.

2. Concrete mixing apparatus of the class described, comprising, in combination, a mixing drum, a loading skip, a discharge chute, a main drive shaft for operating the hereinbefore described parts, a timing shaft driven by the main drive shaft, cam heads on said timing shaft, and means for causing movement of the discharge chute and loading skip adapted to be engaged by the cams on the heads and automatically brought into operation by said engagement.

3. Mixing apparatus of the class described, comprising, in combination, a mixing drum, loading and discharging means for the drum, a main drive shaft for rotating said drum, a timing shaft driven by the drum drive shaft and instrumentalities operated by said timing shaft for automatically causing operation of the discharge and loading means in timed relation to determine the mixing period of aggregates in the drum.

4. In concrete mixing apparatus of the class described, the combination, with a mixing drum, discharge chute, loading skip, and main drive shaft for these parts, of a timing mechanism including a timing shaft operatively connected with the main drive shaft, a

cammed head on the timing shaft for moving the discharge chute into discharging position, another cammed head on the timing shaft for moving the discharge chute into non-discharging position, and disposed with relation to the first mentioned cam so that this movement takes place subsequent to movement into discharging position and after the elapse of a predetermined period of time, and a third cammed head also mounted on the timing shaft for automatically initiating upward movement of the loading skip.

5. Timing mechanism for concrete mixing apparatus comprising, in combination, a main timing shaft, clutch mechanism for operatively connecting said timing shaft with a drive shaft of a mixer, discharging chute and loading skip, controlling means mounted on said timing shaft and operated thereby, and means for automatically causing disengagement of said clutch means after the elapse of a predetermined period of time.

6. Timing mechanism for concrete mixing apparatus comprising, in combination, a timing shaft, clutch mechanism for drivably connecting said timing shaft with a prime mover in the mixing apparatus, means for automatically causing movement of said clutch into operative position, and means for automatically disengaging said clutch and means for varying the relative positions of said disengaging means with respect to the engaging means.

7. Timing mechanism for a concrete mixer comprising, in combination, cammed heads for controlling the operation of the loading and discharge instrumentalities of the mixer, means for rotating said cammed heads, clutch means for setting up a driving connection between said head turning means and the mixing apparatus, said clutch means including a movable part, means for said movable part into and out of operative engagement with the remainder of the clutch mechanism, and a spring affixed to said movable clutch member and adapted to cause its return to original position after said clutch member has been disengaged from the remainder of the said clutch mechanism.

8. An attachment for concrete mixing machines having a driving member, charging and discharging devices and charging and discharging control levers to cause actuation of the charging and discharging devices from the driving member, comprising a shaft, connections for operating the shaft from the driving member including a clutch, connections from the shaft for operating the levers in timed relation, and means for automatically releasing the clutch and resetting the same, said means being adjustable for different periods of time from the resetting of the clutch to the releasing of the same.

9. An attachment for mixing machines of the kind described having a driving member,

a charging control lever and a discharging control lever, comprising a drive shaft, connections for operating the shaft from the driving member including a clutch, connections from the shaft for operating the levers in timed relation, automatic means for setting the clutch, automatic means for releasing the clutch, and a spring arranged to be placed under tension by the clutch during the rotation of the shaft to return the clutch when released to its initial position and cause re clutching of the same by the automatic clutch resetting means.

10. An attachment for concrete mixing machines having a driving member, a charging control lever and a discharging control lever, comprising a shaft and connections for operating the shaft from the driving member including a clutch, connections from the shaft for operating said levers in timed relation, automatic means for setting the clutch, automatic means for releasing the clutch, and a spring arranged to be placed under tension during the rotation of the shaft to return the released clutch to its resetting position, said automatic means for releasing the clutch being adapted to be adjusted with respect to the automatic clutch setting means for resetting the clutch to vary the period of time between clutch setting and releasing operations.

11. An attachment for concrete mixing machines having a mixing drum, a charging device and a discharging device, a driving member for operating the drum charging and discharging devices, and control levers for causing actuation of the charging and discharging devices, said attachment comprising a shaft, connections for operating the shaft from the driving member including a shiftable clutch, connections from the shaft for operating the levers of the mixing machine in timed relation, a clutch setting member, a clutch releasing member, and a spring arranged to be placed under tension by the clutch during the actuation of the levers to return the clutch from its released position to its resetting position when released by the clutch releasing member.

12. An attachment for mixing machines of the character described provided with a driving member, a mixing drum, charging and discharging devices therefor, a charging control lever and a discharging control lever, said attachment comprising a shaft, connections for operating the shaft from the driving member including a clutch, connections from the shaft for operating the levers in timed relation, a clutch setting member, a clutch releasing member and a spring arranged to be placed under tension to return the clutch when released from its releasing position to its resetting position and cause resetting by the clutch setting member, said clutch releasing member being adapted to be shifted with

respect to the clutch setting member to vary the distance between the clutch setting and clutch releasing members to vary the period between clutch setting and clutch releasing operations.

13. An attachment for concrete mixing machines of the kind described having a driving member, a charging control lever and a discharging control lever, said attachment including a shaft, connections for operating the shaft from the driving member of the mixer including a clutch, levers attachable to the control levers of the mixer and having abutments, devices on the shaft of the attachment arranged to engage said abutments for operating the respective levers in timed relation, means for automatically releasing the clutch, automatic means for reversing the shaft to return the clutch to resetting position, and automatic means for resetting the clutch.

14. An attachment for concrete mixing machines of the kind described having a driving member, a charging control lever and a discharging control lever, said attachment comprising a shaft, a connection for operating the shaft from the driving member of the mixer including a clutch, levers attachable to the control levers of the mixer and having abutments, devices on the shaft of the attachment arranged to engage said abutments for operating the respective levers in timed relation, means for automatically releasing the clutch, means for reversing the shaft to return the clutch to resetting position and reset the clutch, said means for releasing the clutch being adjustable with respect to the means for resetting the clutch to vary the period between charging and discharging lever actuations by the attachment.

15. In attachment for concrete mixing machines of the kind described having a driving member, a charging control lever and a discharging control lever, said attachment comprising a shaft, connections for operating the shaft from the driving member of the mixer including a clutch, levers attachable to the control levers of the mixer and having yieldable abutments, devices on the shaft of the attachment arranged to engage said abutments for operating the respective levers in timed relation, means for automatically releasing the clutch and for reversing the shaft to return the clutch to resetting position for resetting the clutch, said means for automatically releasing the clutch being adjustable with respect to the means for resetting the clutch to vary the period between charging and discharging lever actuations, said yieldable abutments being arranged to permit the devices on the shaft to move past the levers without actuation thereof during the reverse rotation of the shaft.

16. In a concrete mixing machine, a mixing drum and driving means therefor, means

whereby to discharge said drum of the mixed concrete, means for charging the drum with aggregates to be mixed therein, and a combined unit for automatically controlling the mixing period, the discharging means and charging means, said unit compelling continuous synchronized operation of the discharging and charging means and controlling the mixing cycle of the drum, said means being entirely operative by the driving means.

17. A concrete mixing machine cycle timing unit comprising a casing, a shaft therein, cams on the shaft, levers adapted to be actuated by the cams for controlling the charging and discharging actions of the machine, clutch means on the shaft, and knock out means for the clutch means to control the mixing period, said means being operative by the shaft.

18. In an automatic concrete mixing machine cycle controlling unit, a shaft adapted to be rotated in one direction from the engine of a standard concrete mixing machine, supports for said shaft, means for rotating the shaft in the opposite direction, means for alternately effecting oscillation of the shaft in opposite directions, means to vary the degree of oscillation of said shaft to control the mixing period, and actuating members on the shaft adapted to actuate the charging and discharging devices of the standard mixing machine during the rotation of the shaft in one direction and non-engageable with the charging and discharging devices during rotation in the other direction.

19. In combination with a concrete mixing machine, a mixing drum, charging and discharging instrumentalities therefor, an engine for operating said charging and discharging instrumentalities and the mixing drum, of an automatic control unit driven by the engine for compelling synchronized operation of the charging and discharging instrumentalities, said unit comprising a casing, a cam shaft therein, means for rotating the shaft in one direction from the engine, spring means for rotating the shaft in the opposite direction when released from the engine, adjustable declutching means for varying the degree of oscillation of said shaft, and cams carried by the shaft for operating the discharging and charging instrumentalities when the shaft is actuated by the engine.

20. In combination with a concrete mixing machine, a mixing drum, a charging skip for introducing aggregates into the drum, a discharging device for emptying the drum of the mixed aggregates, and a power shaft for actuating the drum, of a unitary control device for automatically effecting operation in synchronized relation by the power shaft of the charging and discharging devices and permitting a predetermined lapse of time between the charging and discharging of the

mixing drum, said unitary control device including an actuating shaft adapted to be driven in one direction by the power shaft for rotation therewith to actuate the charging skip and discharging device incident to its rotation, and automatic means to cause said shaft to be disengaged from said power shaft after a predetermined period of time, returned to its initial position and again clutched to said power shaft, said automatic means being adjustable to vary the period of time between the actuation of the charging device and re clutching action with the main shaft.

In testimony whereof I affix my signature.
PERRY P. YOHE.