Today, in the art of concrete mixing, it is quite common practice to employ mechanisms known as batchmeters in conjunction with mixing apparatus to determine the mixing period of aggregates handled by the latter, and this invention is directed to a novel type of instrument as above mentioned wherein novel features lend beneficial properties to the batchmeter.

The particular manner in which a batchmeter is associated and interrelated with the other parts of a mixing machine is clearly set forth in the patent to Lichtenberg, No. 1,321,460, and will not herein be gone into in detail. It suffices to say that one of these mechanisms has a connection with the charging means (usually a skip) of the mixer, and in some way controls or governs the discharge of the prepared aggregates. This controlling action may take in either singly or collectively, any one of the following functions. The batchmeter positively moves the discharge chute into discharging position, releases locking instrumentalities preventing the discharge chute from assuming a discharging position, or operates suitable signal apparatus to indicate that the mixing period has terminated. In the present invention the batchmeter is designed primarily to merely unlock or release the discharge lock, and at the same time operate signal apparatus in the form of a gong or bell to call attention to the fact that the machine is in proper condition for discharge action.

For obvious reasons, it is highly desirable to have a batchmeter as small and compact in size as is feasible because mixing machines are not susceptible to incorporation therein of large and unwieldy instruments. Among the important objects of this invention, therefore, is to provide a batchmeter that is characterized by the feature of compactness and at the same time does not sacrifice any of its properties relating to efficient and effective operation.

In carrying out a practical embodiment of the invention, charging actions of the skip are availed of as means for energizing not only the motive source that drives the timing instrumentalities of the mechanism, but also the prime mover that releases the discharge lock and operates the signal. Furthermore, charging actions of the skip are employed to operate appropriate instrumentalities to lock the discharge chute in nondischarging position wherein it is positively held pending the termination of the mixing period.

Considerable novelty resides in a main driving member and associated mechanisms that are employed in the invention. A main pivotal shaft is appropriately mounted in a casing and has at one end a sleeve drive connection with the skip structure and at the other end is in operative relation with both the discharge lock and signal apparatus. A coil spring encircles this shaft and is energized upon charging actions of the skip so that it later causes rotation of the shaft to release the discharge chute and operate the signal. An arrangement of pawls, lugs, and similar mechanical expedients are employed in connection with this main driving shaft to effect the proper operation thereof.

Another feature of my invention is the specific construction of the timing mechanism itself. This mechanism includes a main timing wheel which has adjustably mounted thereon a strike-off pin, the position of which may be adjusted to vary the time controlled by the devices. This main timing wheel is driven by a pinion mounted on the driving shaft previously referred to, and through the medium of appropriate escapement means, consumes a certain amount of time in unwinding after it has been energized by charging actions of the skip to cause the rotation of the main shaft to unlock the discharge chute, and announces the fact upon the elapse of the determined mixing period.

Various other more detailed objects and advantages will in part become apparent and in part be hereinafter stated as a detailed description of one specific embodiment of the invention is described. For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, in which:

Figure 1 is a view from the side of an instrument made in accordance with this
invention, the casing and certain parts being broken away and shown in section, while the remaining parts are seen in elevation.

Figure 2 is a front view of the batchometer, certain of the interior parts being indicated by dotted lines, while portions are broken away to more clearly bring out details of others. Figure 3 is a view from the front with the casing shown in section, and parts broken away to more clearly bring out details. Figure 4 is a detailed view in perspective of the main rotating shaft. Figure 5 is a detailed showing in perspective of the main driving quadrant and associated pawl constructions. Figure 6 is a detailed view in perspective of one of the paws. Figure 7 is a detailed showing in elevation of the operating mechanism for the signal apparatus, and Figure 8 is a fragmentary showing in perspective of the main rotating shaft. Figure 9 is a side view bringing out the arrangement of the signal operating instrumentalities.

While a preferred specific embodiment of the invention is herein set forth, I do not wish to be limited to the exact constructions illustrated and described, because various modifications in these details might be made in putting the invention into practice within the purview of the appended claims.

A casing is designated by the reference character A, and may include at its lower end an oil sump B. Access to the interior of the casing A may be provided by including in the structure thereof a door indicated at C. Any appropriate mounting for the door may be availed of such as the hinge construction shown at D. In the practical construction of my device the door should be of such dimensions as to leave a sufficient amount of space thereunder to provide mountings for certain of the carrying and operating shafts. A bell E is preferably affixed to the exterior of the door C by a screw and sleeve construction shown at F.

Any conventional skip connecting link (not shown) is pivoted in an opening 1 in a driving disc 2. This driving disc has preferably integral therewith a hub-like member or sleeve portion 3 that encircles a sleeve 4. A non-rotative relationship between the sleeve 4 and hub 3 is created by the presence of a pin 5. Sleeve 4 extends through a flange 6 surrounding an opening 7 in casing A and has at its end a flange 8 larger in dimensions than the opening 7 and which bears against the inner wall of the casing; and in conjunction with the hub 3 which bears against flange 6, positively holds these parts in their proper operative positions. A main rotating shaft 9 has a bearing at one end in the sleeve 4 while the other end is journaled in flange 10 surrounding opening 11 in the casing wall. The shaft 9 has substantially three diametric dimensions, and a smaller portion of this shaft projects through the opening 11 at the exterior of the casing. An opening 12 in this portion of the shaft receives a screw bolt 13 that passes through aligned openings in hub 14 of a crank arm 15. The crank arm 15 is provided with means for operatively connecting it with a discharge chute lock in the form of an opening 16.

Referring now more particularly to Figures 4 and 8, the shaft 9 is cut away adjacent to the flange 8 on the sleeve 4 to provide a shoulder 17. The shaft is also recessed at the shoulder separating the portions having the larger and intermediate diameters of this member to provide a shoulder 18. Adjacent to the shoulder defining the smaller intermediate dimensioned portion of the shaft, the latter is cut away to provide still another shoulder 19. A gear sector 20 is mounted for free rotation on the shaft 9. Gear sector 20 has pivotally mounted thereon a pawl 28 pivoted at 24 and actuated by spring 25 for a purpose to be hereinafter more fully set out. One end of the pawl 28 engages the cut away portion of the shaft 9 at 19. A lug 26 projects from the gear sector and is adapted for engagement with a pawl as will be later set forth. Gear sector 20 meshes with a pinion 27 that has preferably integral therewith a main timing wheel 28. All of the wheel 28, pinion 27 and a sleeve 29 form substantially a one-piece structure which is mounted for free rotation, on a shaft 30 suitably affixed to a wall of the casing A. The wheel 28 is provided at its periphery with gear teeth and has arranged spirally thereon timing openings 31, the particular purpose and operation of which will be later described. A main spring 32 constituting the prime mover of the timing device has its live end affixed to the sleeve 29 while its dead end is made fast to the casing A.

A gear wheel 33, a sleeve 34, and a ratchet 35, are, for purposes of operation, a one-piece unit, the gear wheel 33 being in mesh with the gear teeth of the timing wheel 28. All these last named parts are mounted on a shaft 36 supported by the casing A. A pinion 37 is mounted for rotation on the shaft 36 and carries on one of its flanges a pawls 38 which dimensionally engage the ratchet 35. It is apparent that rotation of the ratchet 35 in one direction may be accomplished without entailing a corresponding rotation of the pinion 37. However, rotation of the member 35 in the opposite direction causes a corresponding turning of the pinion 37.

A gear 39, operatively integral with a second gear 40, is in mesh with the pinion 37. These two gears 39 and 40 are carried by a pivotal member having suitable bearing in the wall of the casing as shown at 41. The

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gear 40 engages a pinion 42 that is mounted for rotation on the shaft 30. An escapement wheel 43 carrying projections 44, is drivenly connected with the gear 42 and therefore operated thereby. Projections 44 upon rotation engage with pins 45 outstanding from a shaft 46. Shaft 46 has appropriate bearing by means of lugs in the casing, the lower lug being indicated at 47. Arms 48 constituting a cross bar with respect to the shaft 46, carry at their extremities weights 49. The wheel 43, shaft 46, weighted arms 48 and associated instrumentalities, constitute escapement mechanism that governs unwinding action of the main spring 32, but which play no part in the energizing or winding up of the latter.

A locking pawl 50 engages the shoulder 17 on the shaft 9 and is held in position by a spring 51, one end of the spring 51 engaging the flange 8, while the other end engages the pawl 50. This pawl functions to set up a driving connection between the sleeve 4 and shaft 9 when the former is rotated in one direction, but which affords no operative connection when rotation is in the opposite direction. Another pawl 52 is mounted on a pivot member 53 which is affixed to the wall of the casing A as shown at 54. A spring 55 is appropriately mounted to create tension on the pawl 52 for a purpose to be hereinafter described. The pawl 52 is cut away to provide a shoulder 56 and has projecting from one side a lug 57. The lug 57 is adapted for engagement with the shoulder 28 on the gear sector 20 while the shoulder 56 operatively engages the shoulder 18 for the purpose of holding the shaft 9 in position in a manner to be hereinafter set forth. A coil spring 58 encircles the shaft 9 adjacent to the wall of the casing and tends to oppose rotation of the shaft 9 in one direction by charging action of the skip so that the last named action results in an energizing of the spring 58. The spring 58, at a subsequent time, operates to cause rotation of the shaft 9 in the opposite direction to release the discharge lock and operate the signal.

A cam lug 59 projects from the hub 14 and has an abrupt face as shown at 60 and a longer inclined face designated 61. This cam lug 59 is adapted for engagement with a cam 62 projecting downwardly from the member 63. A spring 64 is coiled around a pin 65, which acts as a fulcrum for member 63, and said pin 65 is mounted on the door C interiorly of the bell E. The spring 64 has one extremity affixed to the door at 66, while the other end of the spring terminates in an arm which carries a gong tapping member or hammer 67. Any suitable connection between the member 63 and spring 64 may be provided so that rotation of this member 63 causes a movement of the gong hammer 67 against the tension of the spring 64 which later causes this hammer to strike sharply against the bell.

The operation of the device is substantially as follows:—

A pin 68 is inserted in the proper timing opening 51 in the wheel 28 so that the batch meter will operate for the requisite period of time.

Charging action of the leading means of the mixer causes rotation of the sleeve 4, which movement because of the pawl 50 and shoulder 17, sets up a corresponding movement of the shaft 9. Rotation of the shaft 9 causes the gear sector 20, because of the driving connection between these two parts created by the pawl 23 and shoulder 19, to turn the timing wheel 28. This rotation of the timing wheel energizes the spring 32 to later cause the same to rotate the wheel 28 in the opposite direction. At the same time this action takes place, the shaft 9, through its connection at 13 with the discharge lock with crank arm 15, causes the discharge chute (not shown) to be locked so that it cannot be moved into discharging position. Simultaneously the energizing of the spring, the cam lug 59 wipes across the cam 62, but due to the engagement of the latter with the inclined surface 61, the hammer 67 does not move against the bell E with sufficient impact to make a noise. Charging action of the skip causing rotation of the shaft 9 also energizes the spring 58. After the shaft 9 has been rotated a sufficient distance, the timing pin 68 strikes against the pawl 23, which causes a disengagement of the other end of the pawl from the shoulder 19, thereby discontinuing the driving connection between shaft 9 and gear sector 20. Upon return of the charging means to its normal position, the shoulder 56 engages with the shoulder 18 of the shaft 9 to prevent the latter from returning, which it tends to do under the action of the spring 58.

The main spring 32 has been energized as described, and now under its own power causes retrograde rotation of the timing wheel 28. The speed of this movement is governed by the escapement mechanism which, because of the ratchet connecting instrumentalities, is now brought into operation. Upon rotation of the timing wheel 28 for a certain distance, the gear sector 20 will have necessarily been rotated a corresponding distance which causes the projection 26 to bear against the lug 67 carried by the pawl 52 which operates the last named part to disengage the shoulder 56 from the shoulder 18. Shaft 9 is now quickly rotated under tension of the spring 58 to release the crank arm 15 from discharge chute locking position. Simultaneously with this last action, the hub 14 is rotated which causes the cam lug 59 to wipe across cam 62, and due to the latter slipping off the abrupt face 60, gong taper 67 strikes against the bell E providing the desired signal.

Obviously the timing pin 68 may be placed...
in any one of the openings 31 so that the spring 32 may be energized to any desired degree.

Having thus described my invention, what
I claim as new and desire to secure by Letters Patent in the United States, is—

1. A batchmeter of the class described, comprising, in combination, a shaft adapted to have operative connections with the charging and discharging mechanisms of a mixing machine, a gear on said shaft, a pawl for causing a driving relationship between the shaft and gear upon rotation in one direction, timing instrumentalities operated by the gear, a coil spring around the shaft adapted to rotate the latter, a pawl for preventing rotation of the shaft in one direction, having a projection thereon, and a lug on said gear adapted to engage the projection on the pawl to cause the latter to release the shaft so that it may move under power of the spring to actuate the discharge connection.

2. In a batchmeter of the class described, a shaft adapted to be operatively connected with a skip and a discharge chute, timing instrumentalities operatively connected with the shaft, means to cause discontinuation of the last named connection after said shaft has been rotated through a predetermined angle, and means controlled by the timing instrumentalities for rotating the shaft to control operation of the discharge chute.

3. In a batchmeter of the class described, a member adapted for operation by a skip, a member for locking a discharge chute in inoperative position, a shaft drivably connected with the locking member, means drivably connecting the shaft and skip member only upon charging action of said skip member, timing instrumentalities including a main gear wheel, means operatively connecting the main gear wheel and the shaft only upon rotation of said shaft in one direction, means for discontinuing said operative connection, and means controlled by the timing instrumentalities for actuating the shaft, upon the lapse of a predetermined period, to release the locking member.

4. In a batchmeter of the class described, a shaft adapted to have operative connection with discharging apparatus of a mixer, a gear connected to the shaft by a one-way clutch, timing instrumentalities operatively connected with the gear, said timing instrumentalities including a spring which is energized by the gear upon rotation of the shaft in one direction, releasable means for preventing inadvertent retrograde rotation of the shaft under the influence of said spring, escape mechanism governing the unwinding of the spring, means for releasing said releasable means to permit retrograde rotation of the shaft by said spring after the lapse of a predetermined period, which period is controlled by the timing instrumentalities, said