

July 5, 1932.

S. SHAFER, JR., ET AL

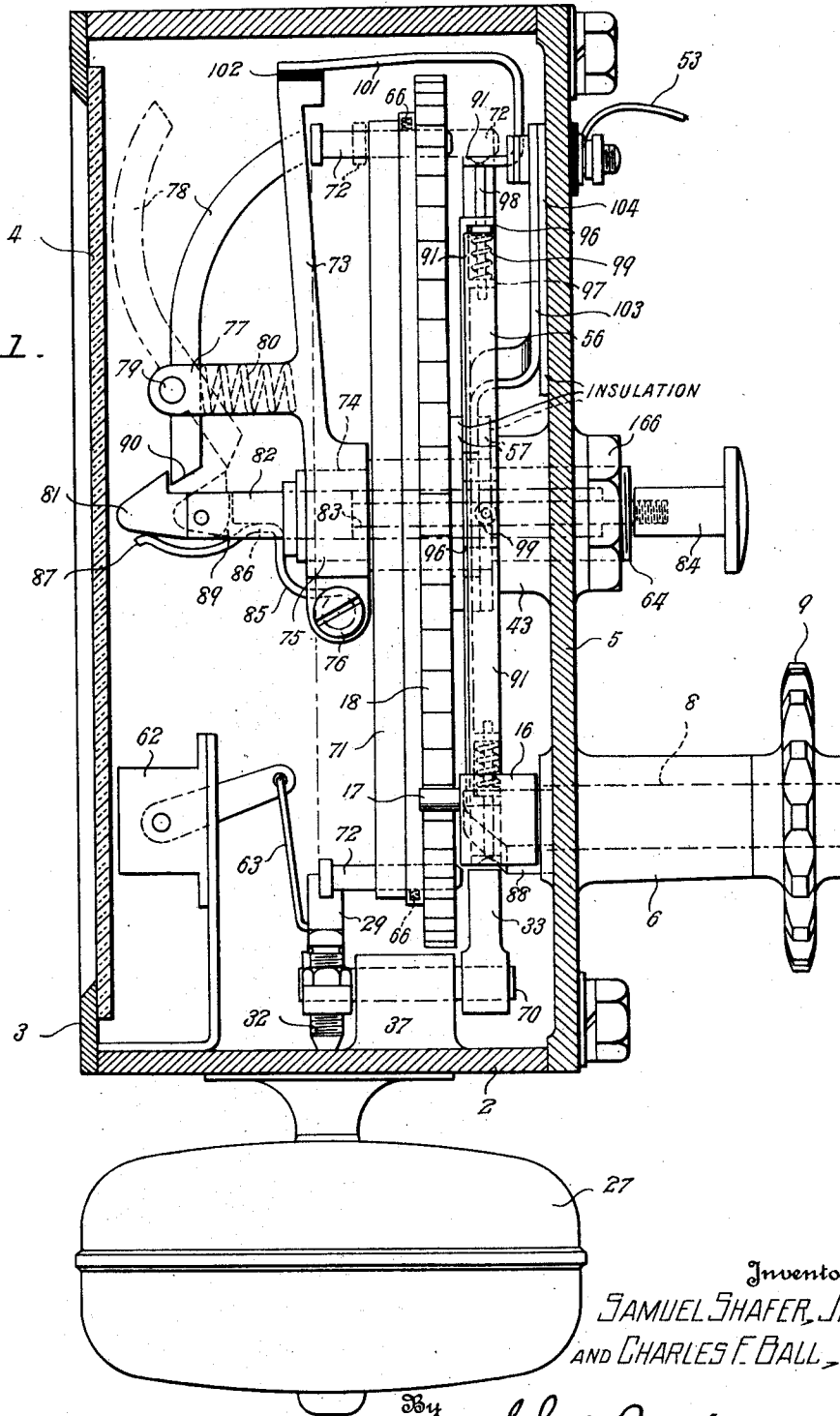
1,865,592

BATCH METER

Filed Feb. 23, 1928

3 Sheets-Sheet 1

FIG. 1.



Inventor:
SAMUEL SHAFER, JR.,
AND CHARLES F. BALL,

By *John S. Barker*
Attorney

July 5, 1932.

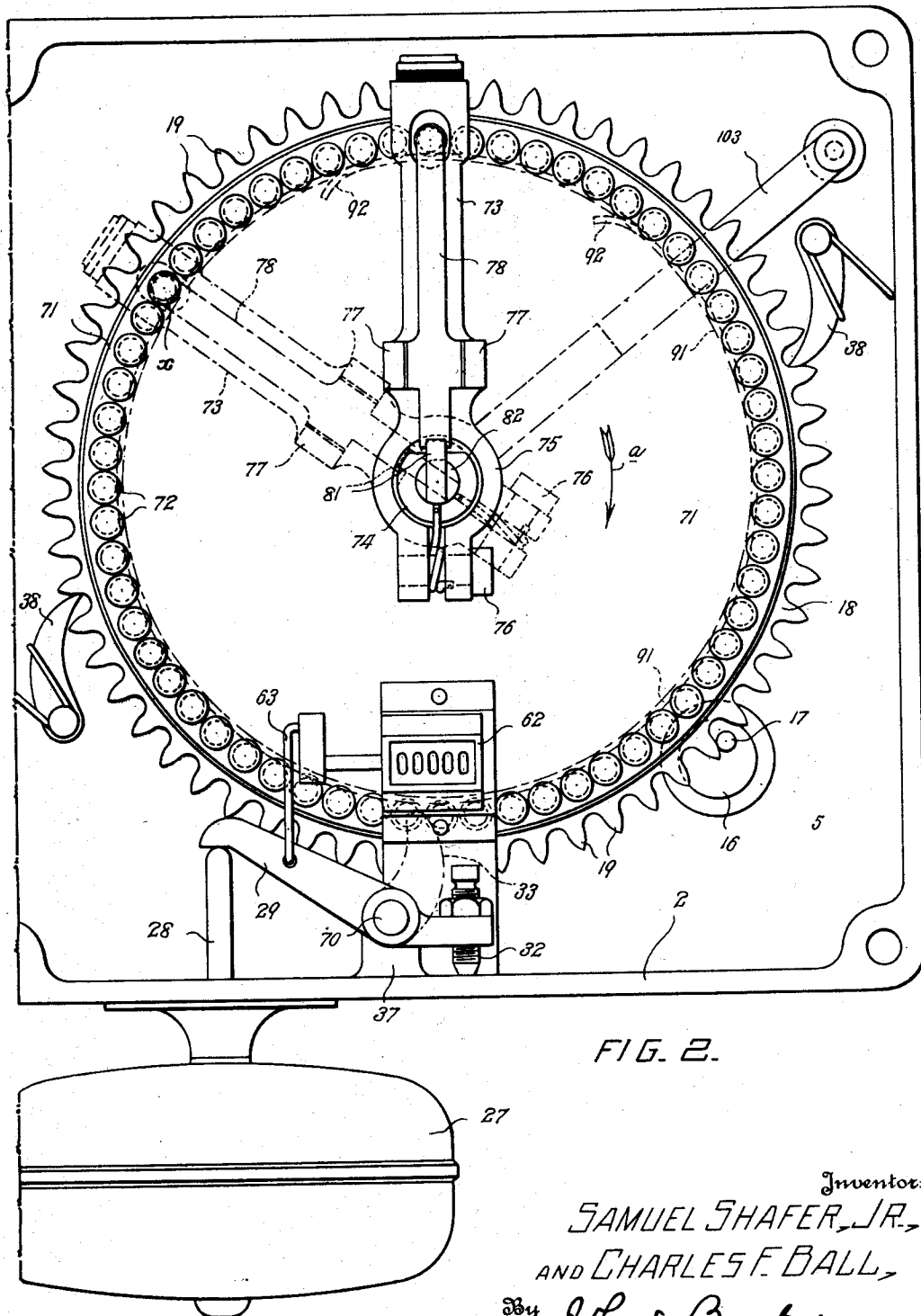
S. SHAFER, JR., ET AL

1,865,592

BATCH METER

Filed Feb. 23, 1928

3 Sheets-Sheet 2



Inventor=

SAMUEL SHAFER, JR.,

AND CHARLES F. BALL,

By John S. Barker

Attorney-

July 5, 1932.

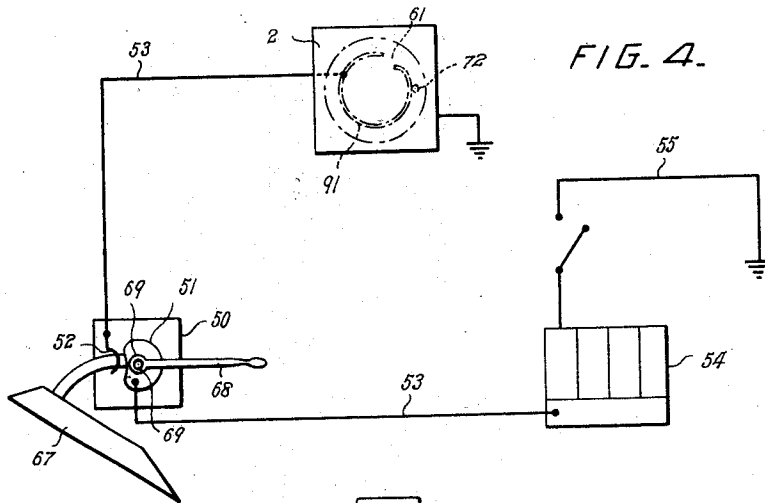
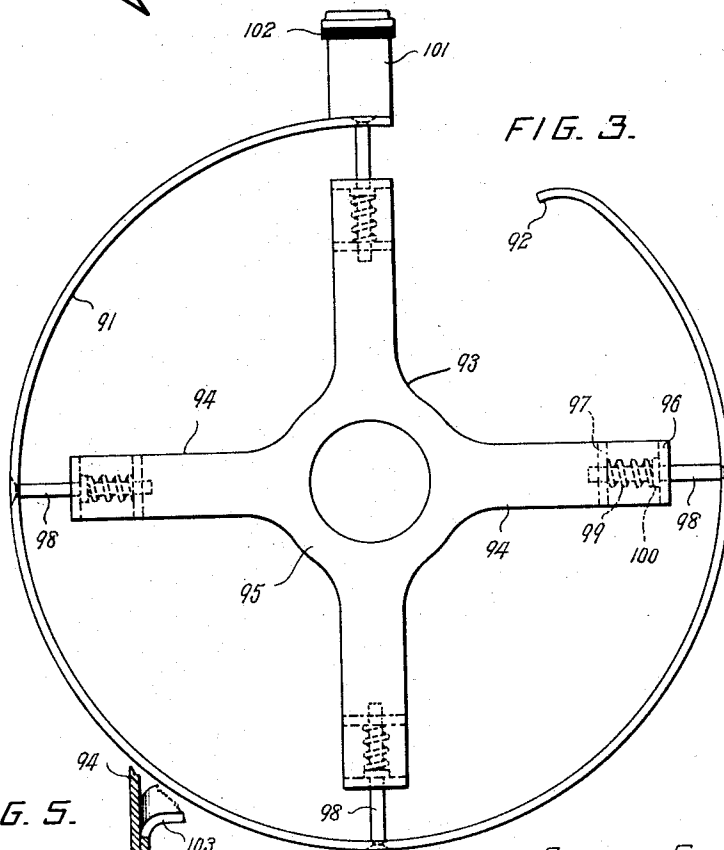
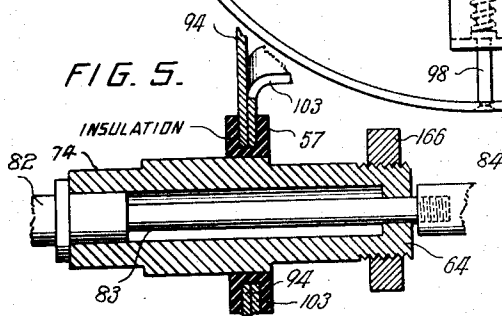
S. SHAFER, JR., ET AL

1,865,592

BATCH METER

Filed Feb. 23, 1928

3 Sheets-Sheet 3



Inventor
SAMUEL SHAFER, JR.,
AND CHARLES F. BALL,

By

John S. Barker
Attorney.

UNITED STATES PATENT OFFICE

SAMUEL SHAFER, JR., AND CHARLES F. BALL, OF MILWAUKEE, WISCONSIN, ASSIGNORS
TO CHAIN BELT COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WIS-
CONSIN

BATCH METER

Application filed February 23, 1928. Serial No. 256,459.

Our invention relates to mechanism that is employed for timing industrial operations being adapted to a wide variety of uses.

We have illustrated it as embodied in a device adapted to be used in connection with concrete mixing machines. Such devices have come to be known to the trade as batchmeters, and when we employ that term herein it is intended to be used in a broad or generic sense applying to all mechanisms for timing mechanical or industrial operations to which our invention is applicable.

In the accompanying drawings, Figure 1 is a sectional elevation of an apparatus embodying our invention with, for the sake of clearness, all but two of the pins 72 being removed.

Fig. 2 is a face view of the mechanism shown in Fig. 1, the front plate of the casing thereof being removed and parts being broken away.

Fig. 3 is a detailed elevation of part of the mechanism to be described.

Fig. 4 is a diagrammatic view illustrating the batchmeter designed to operate as an element in means for the automatic control of the machine to which it may be applied and whose operations are to be timed thereby.

Fig. 5 is a detailed sectional view through the bearing piece 64.

In the accompanying drawings, 2 designates a casing in which the mechanism of the batchmeter is supported and enclosed. The front plate 3 of the casing is removable, and preferably has formed in it an opening of relatively large size into which is set a transparent plate 4 permitting the mechanism within to be seen without necessitating the opening of the casing. The back plate 5 is likewise removable and to it are secured the principal parts of the apparatus. This plate is formed with a hollow projection 6 preferably integral therewith, in which is supported a bearing for the main drive shaft 8, and with a second projection 43 in which is non-rotatively mounted a hollow bearing or supporting member 64, the first-named projection preferably extending outwardly and the latter inwardly. The supporting member 64 has its outer end screw threaded to receive a secur-

ing nut 166 and its inner end formed into a bearing 74 to support the hub of the radial arm 73 as will be presently described.

The shaft 8 is the main power shaft of the meter apparatus and carries at its outer end, and outside the casing 2, a driving element such as a sprocket wheel 9, with which may engage a chain by which the batchmeter is connected with a source of power, not represented in the drawings. This source of power may be any suitable shaft of the apparatus to which the meter is applied that is in constant revolution whenever the apparatus or machine whose movements are being timed is operated. The shaft 8 carries at its inner end a cylindrical part 16, either integral therewith or secured thereto, from which projects an eccentric pin 17.

18 indicates a counting wheel that is loosely supported upon a bearing formed on the member 64, and is formed with a series of peripheral teeth 19 with which the eccentric pin 17 is adapted to engage.

It will be seen from the foregoing description taken in connection with the drawings that whenever the shaft 8 is driven the counting wheel 18 of the batchmeter is turned, its revolution being relatively slow, the pin 17 being in effect a one-tooth driving wheel that engages successively with the teeth 19 of the counting wheel. In order to prevent retrograde turning of the wheel 18 we may employ a pair of pivoted spring actuated locking dogs 38 engaging with the teeth 19.

27 indicates a bell that is employed to signal the completion of a timed operation. Other indicating means might be employed in place of the bell, but since the latter is the device commonly used for giving signals upon batchmeters for concrete mixing machines, we have chosen it as typical of any indicating or signaling means that might be employed.

28 is a spring-operated plunger extending from the bell and into the casing 2. When moved outwardly it serves to cause the bell to be rung. A lever 29 supported upon a shaft 70 that is suitably mounted in a bearing 37 projecting from a wall of the casing, bears upon the bell-striking plunger and serves to

operate it. An adjustable stop 32 serves to maintain the lever 29 in engagement with the bell-striking plunger when the latter is in normal position, as represented in Fig. 1. A contact arm 33 is secured fast to the shaft 70 and arranged to be moved from the wheel 18, in a manner that will be presently described, and when moved operates the lever 29.

71 designates a circular plate mounted upon the supporting member 64 adjacent to one, preferably the inner, face of the wheel 18. It may be in facial engagement with this wheel or spaced therefrom as represented in the drawings, and either integral therewith or separate therefrom, and it and the wheel turn together. Mounted in the plate 71, and adapted to extend through the body of the wheel 18, are plungers or sliding pins 72, arranged in a circular series and preferably corresponding in number to the number of teeth 19 on the wheel 18. These pins are so mounted that they will be maintained, in the positions to which they may be moved by friction, due to springs 66 bearing on the pins, but are yet free to be easily moved longitudinally within their seats when force is applied to them, tending to move them in either direction. Their normal positions are toward the rear, as represented in full lines in Fig. 1, but any one of them may be moved outwardly to occupy the position indicated by dotted lines in the upper portion of Fig. 1, and when this is done the pin so moved becomes an active element of the batchmeter. When the pins occupy the full line, normal, positions they are inactive. When a pin is moved into the dotted line position, its outer end projects beyond the outer face of the wheel 18 and into a position to engage with the contact arm 33 when the pin is moved by the rotation of the parts 18 and 71 in the direction of the arrow *a*, Fig. 2, past such arm. As a pin moves past and engages with the arm 33, it causes the lever 29 to be rocked and to act upon the striker plunger 28 of the bell, thus giving a signal.

Any one of the pins 72 may be at any time moved into operative position, and the distance, in the circle of revolution of the pin, between the position of the pin when so moved and the position where it engages with the arm 33, will determine the relative time elapsing between the setting of the pin to operative position and the giving of the signal. It will thus be seen that, if at the beginning of an operation that is to be timed a pin 72 is set, the period of time elapsing between such setting and the giving of the signal may be determined by knowing the distance the pin has to travel after being set and before operating the striker plunger 28, and the speed of revolution of the wheel 18, which is assumed to be constant.

In order to restore a pin which may have

been set into active position to its normal inactive position, immediately or very shortly after it has passed the arm 33 and has given the signal, we have arranged a restoring cam 88 in the path of the end of the pin. As this pin, being moved by the wheel 18, comes into engagement with this cam it is pushed inwardly into normal position where it remains.

We have devised the following means for setting the pins 72; 73 indicates a radial arm formed with a split hub 75 supported upon the stationary hollow support 64 just inside the plate 71. The hub 75 is split, permitting it to be easily slipped over its individual bearing 74, on the supporting member 64, and to be adjusted about the same, so the arm 73 may occupy one or another position as may be desired, as represented in Fig. 2. In order to secure the arm in the position to which it may be set we employ a clamping bolt 76 engaging with the two parts of the split bearing 75 for drawing them into clamping engagement with the bearing 74.

The arm 73 is provided near its hub with a pair of outwardly extending standards 77 in which is mounted a striking lever 78 fulcrumed upon a bearing 79 mounted in the said standards. A spring 80 bears upon the lever 78 holding it in its normal position, indicated by full lines in Fig. 1.

81 indicates a latch adapted to engage with the inner end of the lever 78. This latch is pivotally supported in a plunger or sliding head 82 seated in the central opening through the hollow supporting member 64, in which it is movable. A rod 83 is connected with the plunger or head 82 and extends longitudinally through the supporting member 64 to the outside of the casing where it is secured to an operating attachment 84 of suitable construction. 85 indicates a spring preferably supported by being coiled about the bolt 76 between the two separated parts of the hub 75. It extends thence and has bearing as at 86 against the plunger or latch-carrying head 82, which it restrains from too free movement. It also engages at 87 near its free end with the latch 81, holding the latter yieldingly in position to engage with the end of the striking lever 78.

The parts just described operate as follows: suppose that it be desired to have the timing mechanism indicate a period of time that it takes for a pin to move from the position *x* in Fig. 2 to the position where it operates the arm 33 to give a signal. The arm 73 is adjusted to the dotted line position and there set. At the beginning of the operation to be timed by the meter the plunger head 82 is moved toward the right in Fig. 1, by moving outwardly the part 84, either manually or through automatically operating mechanism. This movement causes the latch 81 to engage with the inner end of the lever 78

moving it into the position represented by dotted lines in Fig. 1 and compressing the spring 80. As soon as the latch passes the end or toe of the lever, releasing the same, the spring 80 forces the lever to normal position, which it somewhat overruns, striking the head of the pin which at the moment lies thereunder, and forcing it into the position indicated in dotted lines where it remains.

The spring 80 at once restores the lever to normal position, so that it does not interfere with the movements of the pins succeeding the one it has moved as they pass in succession the end of the striking lever. The pin that has been set is now in position to engage with the arm 33, which it does at the end of the period for which the meter has been set. When it comes into engagement with this lever the latter is moved, causing the signal to be given, and it then passes on, to be immediately restored to its normal position by the cam 88. As the plunger 82 is moved, carrying the latch into operative engagement with the lever 78, the rounded heel 89 of the latch comes into engagement with the spring near the part 86 thereof, and puts it under additional tension. The portion of the spring that is now in engagement with the latch is so much nearer the fulcrum or support of the spring than is its end 87, that the spring acts with much greater force upon the latch than it did when its outer end 87 was in engagement therewith, and we are thus enabled, by properly proportioning and adjusting the spring, to hold the latch in proper working engagement with the lever 78, notwithstanding it is placing the spring 80 under increasing tension as the lever is moved. The latch will usually be restored to its normal position after the lever 78 has come to rest in its normal position. This is permitted by bevelling the end of the lever as indicated at 90 and causing the beveled end of the latch to engage therewith on its return movement. While the spring 85 resists the movement of the latch past the end of the lever, its resistance is slight, owing to the fact that the extreme outer end 87 of the spring is in engagement with the latch at the moment the latter passes the end of the lever.

It will be seen that the batchmeter which has thus far been described may be set and start its timing operation at any moment—that is to say, the wheel 18 does not have to be in any particular position at the setting and starting of the apparatus. Further it is possible to adjust the time that the meter will measure from a very short period to one measured only by the capacity of the machine, for the arm 73 may be shifted to any position within nearly the entire circumference of the circle that includes the pins 72.

In U. S. Patent 1,608,831 to Charles F. Ball assignor to Chain Belt Company there is described and claimed a method of control-

ling the power employed to drive a concrete mixing machine, from or through a batchmeter, for instance, the principle of operation therein described being to control an electric circuit so as to cut off the source of power operating the mixing apparatus should attempt be made to discharge the batch of concrete being mixed during the timing operation. The batchmeter herein described and illustrated is adapted to operate according to the principle or method of operation described in the said Ball patent and we will now set forth the means by which this may be accomplished, reference being made particularly to Fig. 4 taken in connection with the other views. In said Fig. 4, 50 designates a casing in which is mounted the mechanism through which are controlled the movements of the discharge chute 67 and also certain circuit-controlling means that are associated therewith. 69 indicates a shaft to which is secured a handle 68 for the manual control of the discharge chute or the mechanism through which it is moved, and on the same shaft is mounted a circuit-closing part 51.

54 indicates a magneto constituting part of the ignition system of an internal combustion engine employed to operate the apparatus being timed. Such magneto is connected into an electric circuit 53, of which 55 indicates a ground connection for the magneto, this connection having incorporated in it a manually operated switch. The circuit thus far described may be traced as follows: from the magneto to the contact 51 within the box 50, to brush 52 adapted to bear upon the contact, and over the line 53 to the batchmeter where the circuit is grounded. The parts of the electric circuit located within the casing 2 of the batchmeter will now be described; 91 is a band of conducting material bent into an incomplete circular form there being an open space between the ends of the band and one of its ends being curved as indicated at 92. This band is supported upon a spider 93, see Fig. 3, mounted upon the supporting member 64 so that it may be adjusted thereon, and insulated as at 57, so as to have no electric-conducting connection with the metallic parts of the casing or the mechanism mounted therein. The spider 93 is formed with a series of radiating arms or spokes 94 and a hub section 95. The ends of the spokes are shaped to form flanges 96 that stand parallel to brackets 97 carried by the arms, and through these two parts extend the inner portions of rods 98 secured to the conducting band. The rods have secured to them collars 100 against which bear springs 99 surrounding the rods and bearing at their inner ends upon the brackets 97. This mounting for the band 91 provides a resilient mounting therefore and has been found to insure good electrical connection between it and the

pins 72, which act as brushes or movable electric-conducting elements that cooperate therewith.

The band 91 is connected with the adjustable arm 73 by means of a bar 101 there being electric insulation as at 102 between these connected parts. The conductor of the circuit 53 that leads into the casing 2 of the batchmeter is connected with a conductor 103 that bears upon and has electric connection with the spider 93, this conductor being insulated from the casing as at 104.

Referring now again to Fig. 4 it will be observed that the circuit 53 has in it two breaks, both of which must be closed in order to ground the magneto 54, but which when the apparatus is functioning properly will not both be closed at the same time. One of these breaks is at the batchmeter, being in the band 91, which is the terminal of the circuit at this point and is insulated as described; the other break is within the box or casing 50 and occurs when the circuit closing parts 51, 52 are in the position indicated in the drawings.

Considering the invention as applied to a concrete mixer the operation is as follows: Whenever the discharge chute 67 is in the position indicated in Fig. 4—that is in its non-discharging position—the circuit is broken at 51, 52, and this is the condition that should be maintained during the mixing period, that is during the period being timed by the batchmeter. As soon as the batchmeter has started in its cycle of movements—that is to say as soon as one of the pins 72 has been moved into the dotted line position represented in the upper portion of Fig. 1 and into engagement with the band 91, this taking place when the operating attachment 84 is moved—the electric circuit is closed at the batchmeter. The circuit at this point is as follows: from the incoming conductor of the circuit 53, over the conductor 103 to the spider 93 and the conducting band 91 carried thereby, to the pin 72 that has been moved into engagement with the band and from the pin to ground through the metallic parts of the apparatus and the casing 2. This closed portion of the circuit maintains during the entire period timed by the batchmeter and until the pin 72 is restored to its normal position by the cam 88, which is when or immediately after the signal has been given by the bell 27. Proper operation of the apparatus requires that the discharge chute shall remain in non-delivery position, as represented in Fig. 4, during the entire period of operation being timed. Should, however, through inadvertence or with fraudulent intent to discharge a batch of concrete before it has been mixed for the full time, an operator shift the handle 68 to cause the discharge chute to be moved to delivery position, the electric circuit will be closed at 51, 52, and since the circuit is now

closed at the batchmeter the magneto will be grounded and the operation of the motor driving the apparatus will at once be arrested. Thus, while there is no mechanical device for preventing the operation of the discharge chute at any time, the penalty which will be automatically and instantly inflicted, by the stopping of the entire apparatus, will make it the part of wisdom for an operator to wait until the signal has been given before moving the lever 68 to deliver the product of the machine.

The batchmeter here illustrated is represented as being provided with a counting device 62 for registering the operations of the apparatus to which the meter is applied. Such device may be operated from any suitable moving part of the apparatus, as for instance from the signal-controlling lever 29 to which it is connected by a link 63.

The wheel 18 is herein called a "counting wheel", since it is a device, in wheel form, by which units of time may be determined and counted; and it is described as being continuously driven or moved, by which is to be understood that it is in motion whenever the batchmeter of which it is a part is in use,—although at other times, it, with the other parts of the apparatus, may be at rest,—the term "continuously" being used to distinguish the said counting wheel or device from parts that have intermittent motion during the use of the apparatus.

What we claim is:

1. In a batchmeter the combination of a rotary counting device arranged to be continuously moved, a plurality of movable means carried by the said counting device, any one of which may be set into position to be moved by the counting device to operate a signal, and means occupying a determined position and operable while the counting device is moving for selectively setting a signal-operating means that at the moment occupies a determined position in the path of movement of the signal-operating means.

2. A device such as described in claim 1 wherein the means for selectively setting the signal-operating means is adjustable from one position to another.

3. In a batchmeter, the combination of a continuously moving counting wheel, gearing for driving it arranged in turn to be driven from a part of the apparatus to which the batchmeter may be applied, means for operating a signal including independent members carried by the counting wheel and arranged in a circle concentric therewith, and means operable while said wheel is moving for setting the signal-operating means, said setting means being arranged to move whichever of the said operating members may be at the moment in position to be set by reason of the rotation of the counting wheel.

4. In a batchmeter the combination of a

continuously moving counting wheel, gearing for driving it arranged in turn to be driven from a part of the apparatus to which the batchmeter may be applied, means for operating a signal consisting of a series of independent members carried by the counting wheel and arranged in a circle concentric therewith, and means operable while said wheel is moving for setting the operating means to move whichever thereof may at the moment be in position to be set by reason of the rotation of the counting wheel, the said means being adjustable, so the position for setting the signal-operating means may be changed at will.

5. In a batchmeter the combination of a continuously moving counting wheel, gearing for driving it, a series of sliding members carried by the counting wheel arranged when set to operate a signal as they pass a given point in their course, the said members when not set being inactive as to signal-operating functions, and means operable while said wheel is moving and when it is in any position for moving an individual signal-operating member into set position, the setting means being arranged to move whichever of the signal-operating members may be at the moment in position to be set by reason of the rotation of the counting wheel.

6. In a batchmeter, the combination of a counting wheel, gearing for driving it, sliding pins arranged in a circular series that is concentric with the counting wheel and movable therewith, means for moving any one of the pins of the series into operative position, the pins moving in succession past the setting means, which sets them when operated as the counting wheel is turned, means for operating the pin-moving means at the beginning of an operation to be timed, means operated by the pin which may be set to cause a signal to be given at the end of the period being timed, and means for restoring the set pin to normal inactive position after the signal has been given.

7. The combination stated in claim 6, wherein the pin-setting means is adjustable so as to operate at one position or another in the path of movement of the series of pins.

8. The combination stated in claim 6 wherein the pin-setting mechanism is mounted upon a support co-axial with that of the counting wheel, and is adjustable angularly about its support.

9. In a batchmeter, the combination of a counting wheel, gearing for driving it, sliding pins arranged in a circular series that is concentric with the counting wheel and movable therewith, means for setting any one of the pins of the series into operative position consisting of a lever adapted to engage with a pin and move it longitudinally, the lever being mounted in an angularly adjustable support that is co-axial with the counting

wheel, and means for moving the said lever also co-axially supported relative to the counting wheel, means operated by the pin that may be set to cause a signal to be given, and means for restoring the set pin to normal inactive position after the signal has been operated.

10. In a batchmeter, the combination of a counting wheel, gearing for driving it, sliding pins arranged in a circular series that is concentric with the counting wheel, a support for the pins in which they are free to move longitudinally and independently, such support turning with the counting wheel, the pins being arranged to normally occupy inactive positions, but any one thereof when moved from its inactive position being arranged to operate a signal when it comes to a certain position in its course of travel, a lever for engaging with and moving into set position any pin that may be opposite thereto, a support for the lever mounted on a stationary bearing that is co-axial with the counting wheel and the series of pins, the lever support being angularly adjustable, and means for moving the lever to cause it to set a pin at will.

11. The combination stated in claim 10 in which the means for moving the lever to cause it to set a pin consist of a spring for holding the lever in normal position and which is put under tension when the lever is moved, and a sliding rod passing through the stationary bearing on which the lever support is mounted provided with a pivoted latch that engages with the lever when the rod is moved, first moving the lever to compress the spring and then disengaging the lever to allow the spring to act to restore the lever and engage with and move a pin.

SAMUEL SHAFER, Jr.
CHARLES F. BALL.

110

115

120

125

130