

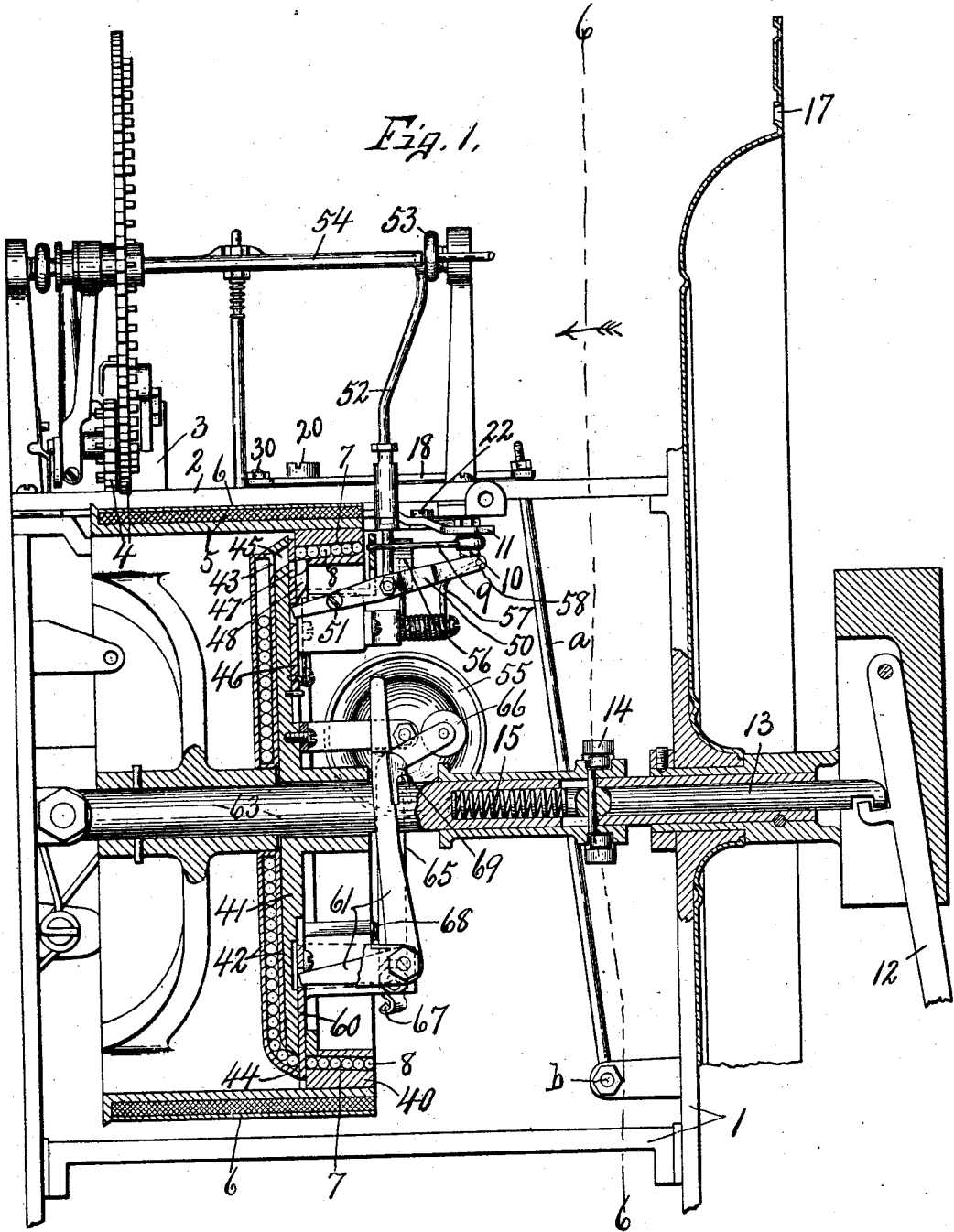
J. F. KIELY.
TIME RECORDER.

APPLICATION FILED JULY 17, 1906.

929,228.

Patented July 27, 1909.

3 SHEETS—SHEET 1.



WITNESSES.

A. Thomas
K. E. Kane

INVENTOR,

James F. Kiely,

BY,

Howard P. Denison

ATTORNEY.

929,228.

Fig. 2.

Fig. 3.

Fig. 5,

25
20
27
26
11
19
1

WITNESSES:

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Fig. 4.

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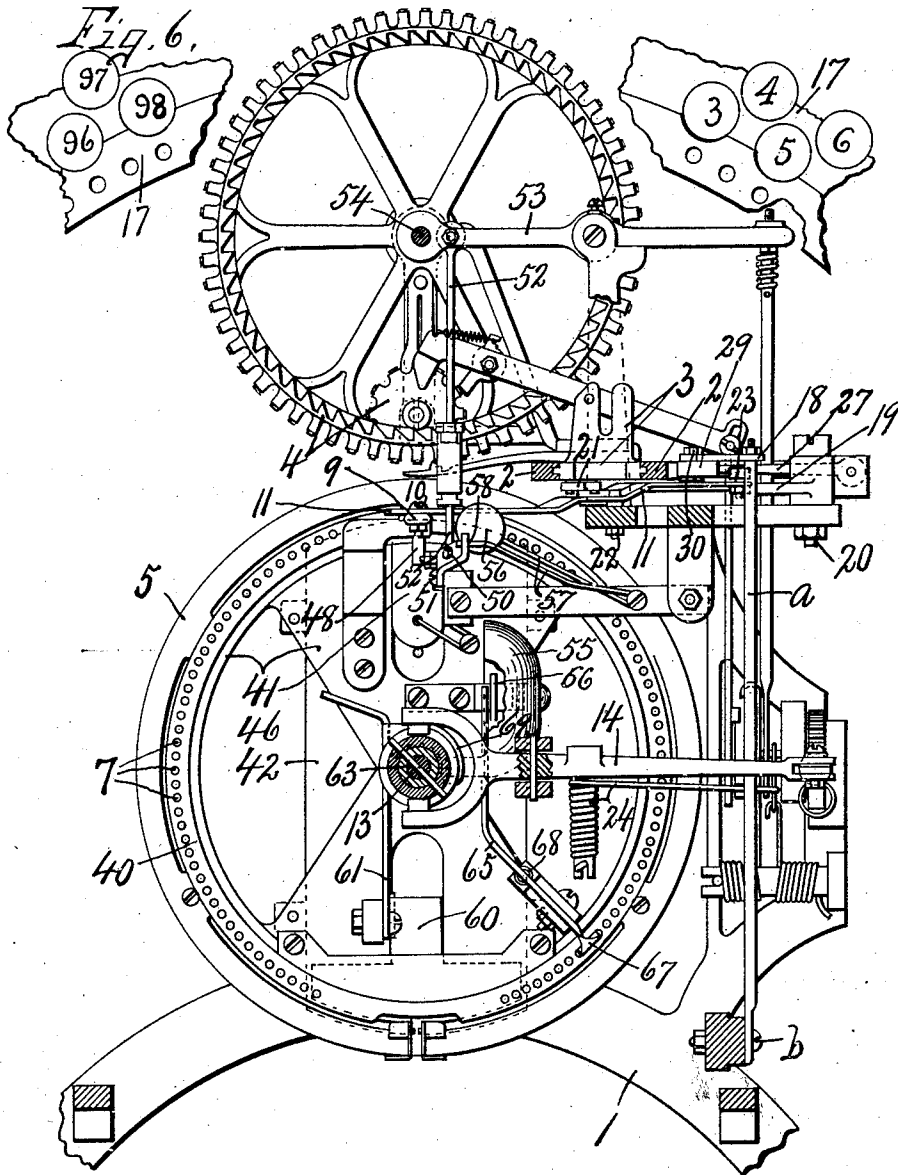
TIME RECORDER.

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3 SHEETS—SHEET 3.



WITNESSES

W. E. Chan
A. C. Thomas

INVENTOR
James F. Kiely
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UNITED STATES PATENT OFFICE.

JAMES F. KIELY, OF SYRACUSE, NEW YORK.

TIME-RECORDER.

No. 929,228.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed July 17, 1906. Serial No. 326,620.

To all whom it may concern:

Be it known that I, JAMES F. KIELY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Time-Recorders, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in workmen's time recorders of the class set forth in my pending application No. 207,258, filed May 10, 1904, in which one of the impression making elements is automatically shifted at each printing operation by the same workman to record the beginning and ending of any period or periods of time side by side in close proximity upon a record sheet. This record sheet is provided with a column or circular row of numerals each designating a workman and is wrapped around a rotary drum having a corresponding number of apertures or guides each containing a plurality of movable spacing members which are successively displaced by a suitable plunger brought into action at each printing operation to determine the amount of movement of the impression making element.

Owing to the large number of guides or raceways in the revoluble record sheet support, the plunger which enters the race ways is necessarily small in diameter and I have discovered that after a period of time it becomes battered on the end by reason of its forcible impact against the adjacent spacing member.

The essential object of my present invention is to relieve, as far as practicable, the excessive pressure and consequent impairment of this plunger by associating with the shifting mechanism a toothed rack and a suitable pawl which is brought into holding engagement with the successive teeth of the rack at each printing operation.

Other and more specific objects and uses will be brought out in the following description.

In the drawings,—Figure 1 is a transverse vertical sectional view of a portion of a time recorder shown in my pending application above referred to and in which my improvement is incorporated. Fig. 2 is a top plan partly in section of a portion of a workman's time recorder embodying the various features of my invention. Figs. 3, 4, 5, and 6 are sectional views taken re-

spectively on lines 3—3, 4—4, 5—5 of Fig. 2, and 6—6 Fig. 1.

In demonstrating the practicability of my invention I have shown a portion of the main supporting frame —1— of a workman's time recorder as provided with transverse ways or guides —2— for receiving and guiding a sliding carriage —3— shown by full lines in Fig. 1, for shifting the clock-rotated type-wheels, as —4—, across the face of a revoluble record sheet supporting drum —5—.

The record sheet as —6— is provided with a circumferential row or column of consecutively arranged numerals each indicating an individual workman, while the drum —5— is provided with a corresponding number of axially extending apertures or raceways —7— each corresponding to one of the numbers on the record sheet and adapted to receive a series of, in this instance six, spacing members, as balls —8—, the number depending somewhat upon the work required of the machine or rather upon the probable number of times that the same workman may be required to register during the course of an ordinary working day of ten or twelve hours. Each of these apertures is adapted to be brought into registration or alinement with a plunger —9— which is pivoted at —10— to one end of a lever —11— and is adapted to be brought into engagement with the adjacent spacing member of ball —8— of the raceway which may be registered there- with just before the printing operation.

The end of the plunger —9— normally lies close to the adjacent ball or spacing member which constitutes a limiting stop to determine the amount of the movement of the lever —11— which in turn determines the amount of movement of the carriage —3— to which it is connected in a manner hereinafter described. It therefore follows, that when the raceways are filled with the spacing members or balls —8—, the plunger —9— will engage the adjacent ball and prevent the movement of the carriage —3— during the first printing operation which is effected through the medium of a hand-lever —12— operating upon a plunger —13— to actuate a lever —14— against the action of a spring —15—, the plunger —13— and spring —15— being concentric with the axis of the drum —5— and the lever —12— is rotatable on said axis and around a suitable dial —17— having a circular row of em-

ployee designating characters, as numerals corresponding to those on the record sheet.

The lever —14— may be connected in any desired manner, not necessary to herein illustrate or describe, to cause the movement of the type-wheels —4— into and out of engagement with the record sheet upon the drum —5—.

An upright lever —a— is pivoted at —b— and extends upwardly in the path of and above the lever —14— and has its upper end connected by a link —18— to a rock-arm —19—. This rock-arm —19— has one end pivoted at —20— to a portion of the frame —1— and its other end is flexibly connected by a link —21— to the carriage —3— to reciprocate the latter back and forth along the ways —2— as the lever —19— is rocked in opposite directions.

The lever —11— is centrally pivoted at —22— to the frame —1— and has one end provided with the plunger —9—, while its other end is connected by a link —23— to the intermediate portion of the rock-arm —19— so that as the rock-arm —19— is oscillated horizontally by the link —18— and its connections with the lever —14— of the type-wheel operating mechanism, similar motion is transmitted to the lever —11— and plunger —9—.

The intermediate portion of the lever —a— is interposed between the lever —14— and a spring arm —24— mounted thereon and tensioned to hold the upright lever —a— against the rear side or edge of the lever —14—, as best seen in Fig. 1, so that the carriage —3— is drawn from its normal position under the yielding tension of the spring —24— and therefore the plunger —9— is forced into engagement with the adjacent spacing member or ball —8— under the same yielding tension owing to the fact that the lever —11— is connected to the same rock-arm —19— which is actuated by the spring —24—.

The link —23— is connected to the rock arm —19— with a loss motion, it being provided with a lengthwise slot —25— through which is passed a pivotal screw or stud —26— so that the link —23—, lever —11— and plunger —9— have a limited movement independently of the rock arm —19— against the action of a spring —27— which is secured at one end to the rock arm —19— and has its other end bearing against the adjacent end of the link —23— and seated in a recess —28— in the heel of a pawl —29—, the latter being pivoted at —30— to the rock arm —19—.

A toothed rack —31— is rigidly secured by suitable fastening means, as screws —32— to the frame —1— with its teeth arranged in a circular arc concentric with the axis of the pivot —20— and adapted to be successively engaged by the pawl —29— at each

successive printing operation by the same workman, as determined by the number of spacing members or balls in the recess corresponding to the number by which such workman is designated.

The pawl —29— is normally held out of the path of the teeth of the rack —31— by the spring —27— and is carried forwardly in this position by the rock arm —19— until the plunger —9— encounters or abuts against the adjacent ball or spacing number —8— whereby the further rocking movement of the lever —11— is prevented, causing the link —23— to slide endwise against the action of the spring —27— which in turns acts upon the heel of the pawl —29— to throw its toothed end into engagement with one of the teeth of the rack —31— thereby checking further movement of the link —18— and rock arm —19— by continued movement of the lever —14— through the medium of the plunger —12—, and at the same time preventing excessive pressure of the end of the plunger —9— against the adjacent spacing member or ball —8—. In other words, as soon as the movement of the lever —11— is stopped by the impact of the plunger —9— with the adjacent spacing member —8—, the pawl —29— is immediately thrown into engagement with one of the teeth of the rack —31— the exact tooth which the pawl engages depending upon the amount of movement of the lever —11— and plunger —9— as determined by the number of balls or spacing members —8— in the particular raceway which may be registered with the plunger, and this interlocking engagement of the pawl —29— with the rack —31— prevents further movement of the rock arm —19— and other operating parts attached thereto, although the lever —14— is free to be operated to the limit of its movement by the plunger —13— to effect the operation of the printing mechanism, as the type-wheels —4—, to make an impression upon the record sheet. For example, assuming that the drum —5— carrying the record sheet is rotated by the hand lever —12— to bring one of the ball races —7— corresponding to a certain employee designating number into registration with the plunger —9—, then by pressing the lever —12— and plunger —13— connected thereto inwardly against the action of the spring —15—, the lever —14— will be rocked in the direction indicated by the arrow —X— thereby transmitting similar motion to the upright lever —a— under the yielding tension of the spring —24—.

The primary function of the lever —14— is to cause the operation of the printing wheels —4— to make an impression upon the record sheet, but in this instance it also serves to operate the upright lever —a— to shift the carriage —3— and type-wheels

—4— transversely of the record sheet in the following manner: When the raceway —7— in registration with the plunger —9— is filled with a predetermined number of balls or spacing members —8—, and the carriage —3— is at its starting position at the extreme left of the ways or guides —2—, then the rocking action of the lever —14— to effect the printing operation will cause the spring —24— to rock the lever —a— thereby producing a yielding pull upon the link —18—, tending to rock the lever —19— upon its pivot —20— and thereby draw the carriage toward the right, and at the same time tending to rock the lever —11—, but this is immediately prevented by the engagement of the plunger —9— with the adjacent ball or spacing member —8—, but allows the lever —19— to be rocked toward the adjacent end of the lever —11— a slight distance or until the screw —26— reaches the opposite end of the slot —25—. This loss motion between the rock arm —19— and link —23— brings the spring —27— into engagement with the adjacent end face of the link —23— thereby rocking the pawl —29— upon its pivot —30— and causing it to engage the first tooth, as —m— of the rack —31—. This interlocking engagement of the pawl —29— with the first tooth of the rack —31— relieves any further strain upon the lever —11— and plunger —9— during the continued operation of the lever —14— by the plunger —13— and in view of the fact that the engagement of the pawl with the teeth of the rack —31— is substantially instantaneous and simultaneous with the engagement of the plunger —9— and adjacent ball or spacing member, it is evident that the force of the impact of said plunger upon the ball is reduced to a minimum and is always uniform no matter what the pressure may be upon the plunger —13— or lever —14—. In fact, the pull upon the upright lever —a— and link —18— is under the tension of the spring —24— and therefore cannot be of sufficient force to unduly strain any of the parts of the shifting mechanism connected to the lever —a—.

I provide suitable mechanism, not necessary to herein illustrate or describe, for holding the spacing members —8— in their respective raceways against displacement during the operation of the plunger —9— and additional mechanism for allowing said balls to escape one at a time at each operation of the printing mechanism, but such devices form no part of my present invention and are claimed in my pending application previously referred to.

It is now obvious that if the same ball race is brought into registration with the plunger a second time after one of the balls have been displaced and the printing mechanism again operated in the manner previ-

ously described, the plunger will be allowed to enter the ball race a distance of one ball space, thereby allowing the rock arm —19— to be actuated to move the carriage —3— and type-wheels attached thereto one type-space to the right when the further movement will be limited by contact with the plunger of the adjacent ball of the aligned race-way and the pawl —29— will be simultaneously brought into registration with the second tooth as —n—, the carriage —3— being returned to its starting position after each printing operation by the spring —15— and connections between the plunger —13— and rock arm —19—. In like manner, as the second ball is displaced from the same race-way the plunger —9— is allowed to enter a distance equal to two ball spaces thereby permitting the carriage —3— and printing mechanism to be shifted laterally a distance of two type-spaces before the pawl —29— is locked to the third tooth of the rack —31—, and as each successive ball is displaced from the same race way during each printing operation the plunger is allowed to advance a corresponding distance into said race way and the carriage —3— is advanced a corresponding distance at which time the pawl —29— immediately interlocks with the next succeeding tooth of the rack —31— the operation being repeated until all of the balls are exhausted from that particular race-way, thereby enabling the carriage —3— and printing mechanism to be shifted laterally across the entire face of the record sheet so that successive impressions will be made close together side by side in the same transverse line upon said record sheet, it being understood that the carriage —3— and its operating mechanism are returned to their normal positions by the spring —15—, after each printing operation.

The front ends of the ball races —7— adjacent to the plunger —9— are constricted to less than the diameter of the balls which they contain to prevent said balls from rolling out of the front ends of the races, but are sufficiently large to admit the plunger —9—. These ball-races are formed in an annulus or metal ring —40— which is secured within and to the drum —5—, and, therefore, rotates with said drum.

At the back of the annulus —40— and within the drum is a fixed or non-rotatable disk or plate —41— having an annular bearing, covering the inner ends of the ball-races —7— to prevent inward displacement of said balls during the rotation of the drum except during the operation of the displacing mechanism in entering the plunger, and also during the operation of refilling as herein-after described. Secured to this disk or plate is a ball receptacle —42— having a capacity sufficient to receive all of the balls from all of the races —7—, said receptacle

having an inlet —43— at the top and an outlet —44— at the bottom, the inlet —43— registering with a passage —45— in the upper portion of the disk —41— while the outlet —44— registers with a similar passage in the lower part of said disk.

An inlet gate —46— is movable vertically in the front side of the plate or disk —41— between the passage —45— and inner end of the ball-race which may be alined therewith, said gate normally closing the inner end of said ball-race and is provided with an opening —47— movable into and out of registration with the passage —45— and alined ball-race —7—, said gate being also provided with a finger —48— which enters between the innermost ball and the one next to it when the opening —47— is registered with the inner end of the ball-race which may be in registration with the passage —45— for forcibly ejecting the innermost ball through the opening —47— and passages —45— and —43— into the receptacle —42—. This operation of the gate —46— is effected at each printing operation of the printing wheels through the medium of a lever —50— which is fulcrumed at —51— to a projecting portion of the disk or plate —41—, said lever being connected by a link —52— to an oscillatory frame —53— upon which the minute spindle —54—, for the minute wheel —4—, is mounted, so that as the printing wheels are moved radially against the record-sheet —6— on the drum —5— the lever —50— is simultaneously rocked upon its fulcrum —51— to elevate the gate —46— to discharge the innermost ball —8— into the receptacle —42— as previously described. It is now obvious that the gate —46— cannot be opened except as an impression is being made by the printing wheels upon the record sheet.

It is desirable, in this class of machines, to sound an alarm at each printing operation and in order that the sound of the alarm may be simultaneous with the making of the impression and discharge of the innermost spacing member or ball —8—, it is made dependent upon the operation of the lever —50—. For this purpose, I provide a bell —55— and hammer —56—, which latter is mounted upon one arm of a coil spring —57—, the other arm being attached at —58— to the front end of the lever —50— so that when the lever is depressed by the rocking of the frame —53—, the hammer —56— is thrown into engagement with the bell, said rocking frame —53— and parts connected thereto for operating the gate —46— and bell —55—, being returned to their normal positions by the spring —15— as soon as pressure upon the lever —12— is relieved. It is, of course, necessary to remove the record sheet at regular intervals, as for instance, at the close of each day, and

to replace it with a new one, and at the same time it is necessary to refill the several ball-races with the balls or spacing members —8—, and for this purpose I provide the outlet —44— with a vertical movable gate —60— which is guided in the disk —41— and is actuated by means of a bell crank lever —61— as best seen in Figs. 1 and 6. The outlet —44— and gate —60— are of sufficient size to cover the inner ends of a number of apertures or race-ways —7— so that when the gate is open these several race-ways may be filled simultaneously by the balls which gravitate therein.

The bell crank lever —61— is fulcrumed on a forwardly projecting portion of the disk —41— and has one arm engaged with the gate, and its other arm extended upwardly in close proximity to and at one side of the supporting shaft as —63— for the drum —5— where it is accessible to the attendant to be rocked by hand upon its fulcrum to open and close the gate —60—.

When the gate —60— is opened the spacing members as the balls —8— readily gravitate in the race-ways —7— which may be alined therewith and by rotating the drum and its annulus —40— by means of the lever —12— and connecting shaft —63— all of the race-ways may be brought into registration with the discharge opening —44— to allow the spacing members to enter and fill all the ball-races. These ball-races are, of course, inaccessible to the attendant and it would, therefore, be difficult to tell whether all were filled with balls by mere visual inspection, and in order that this may be accurately determined, I provide suitable alarm mechanism co-acting with the ball-race and their spacing members whereby the absence of one or more balls from said race will be audibly indicated. This latter function is carried out by means of a lever —65— and bell hammer —66—.

The lever —65— is fulcrumed upon a projecting portion of the disk or plate —41— and has its lower end provided with a finger —67— movable into and out of contact with the front face of the annulus —40—, in alinement with the upper ends of the race-ways —7— but at one side of the gate —60— and outlet —44— where the annular bearing on the disk —41— at the inner ends of the race ways is rigid.

The end of the finger —67— adjacent to the front face of the annulus is pointed and adapted to enter a slight distance into the ends of the race-ways —7— when the gate —60— is open so as to detect the absence of one or more balls from any of the race-ways. This finger —67— is forced into operative position by a spring —68— Fig. 6, and is forced out of operative position by an extension —69— on the lever —61—, when the latter is rocked to close the gate —60—.

That is when the lever —61— is operated to open the gate —60—, the spring —68— acts upon the lever —65— to throw the pointed end of the finger —67— against the front face of the annulus —40— in position to enter any one of the race-ways in which one or more balls may be absent, but if each race way is filled with the spacing members —8— the finger —67— is prevented from entering said race-ways.

The hammer —66— is mounted upon the upper end of the lever —65— in close proximity to the rim of the bell —55— so that when the finger —67— enters a race-way in which one or more balls are absent the lever —65— is instantly rocked by the spring —68— to throw the hammer —66— against the rim of the bell —55— thereby audibly indicating the absence of said ball and warning the attendant to again revolve this part of the annulus into registration with the outlet —44— of the receptacle —42— until the race-way for the absent ball or balls is filled.

When the bell ceases to ring while the gate is open during the rotation of the drum —5— and its annulus —40— it indicates that the race-ways are all filled with the proper number of balls, whereupon the lever —61— is rocked inwardly to close the gate —60— and thereby cut off further communication between the receptacle —42— and race-ways.

The machine is now ready for operation in the manner previously described.

What I claim is:

1. In a workman's time recorder of the class described, the combination with a rotary printing element and a clock rotated support for the record sheet, one of the parts being movable axially, of a rotatable manual for rotating said support, said manual having an independent movement, and connections between said manual and one of the parts whereby the independent movement of the manual shifts said movable part axially, mechanism for stopping the axially movable part at different distances from its starting position by each successive printing operation by the same workman, and additional stop mechanism brought into action by the first named stop mechanism to relieve the strain upon the latter.

2. In a workman's time recorder, a clock rotated type wheel movable axially, mechanism for moving the type wheel axially different distances from its starting position by each successive operation by the same workman, and means brought into action by said mechanism for positively stopping the axial movement of the type wheels at such distances.

3. In a workman's time recorder of the class described, a time printing mechanism and its actuating means including a manual,

connections between said manual and printing mechanism for shifting the latter just before each printing operation, spacing mechanism brought into action by said manual to shift the printing mechanism step by step by each successive operation by the same workman, additional means brought into action by the spacing mechanism for stopping the printing mechanism at predetermined distances from its starting position by such printing operation, and means for returning said printing mechanism to its starting position after such printing operation.

4. In a workman's time recorder, a combination with an annulus having a series of movable spacing members therein, a manual and mechanisms actuated thereby for displacing one of said members by each successive operation of the manual by the same workman, and additional mechanism brought into action by such operation of the manual for positively locking the member-displacing element against further movement as each member is displaced.

5. In a workman's time recorder, a printing mechanism and its actuating means, means brought into action by the first named means for shifting the printing mechanism different distances from its starting position by each successive printing operation by the same workman, automatic stop mechanism for limiting the shift of the printing mechanism and separate means for returning said printing mechanism to its starting position after such printing operation.

6. In a workman's time recorder, a printing mechanism and its actuating means, means brought into action by the first named means for shifting the printing mechanism different distances from its starting position by each successive printing operation by the same workman, an alarm mechanism brought into action by the first named means during the printing operation, and separate means for returning the printing mechanism to its starting position after such printing operation.

7. In a workman's time recorder, a printing mechanism and its actuating means, means brought into action by the first named means for shifting the printing mechanism different distances from its starting position by each successive printing operation by the same workman, a toothed rack, a pawl brought into action by the operation of the first named means to engage one of the teeth of said rack to limit the shifting movement of the printing mechanism, separate means for returning the printing mechanism to its starting position after such printing operation.

8. In a workman's time recorder, a printing mechanism and its actuating means, means brought into action by the first named

means for shifting the printing mechanism different distances from its starting position by each successive printing operation by the same workman, movable spacing members and means actuated by the first named means for moving said spacing members and displacing them one by one by such successive operation of the printing mechanism, additional means brought into action by the spacing members for stopping the shifting movement of the printing mechanism at different distances from its starting position as each spacing member is displaced, and separate means for returning the printing mechanism to its starting position.

9. In a workman's time recorder, a sliding carriage and its actuating means, a drum having a series of ball-races and movable spacing members, means brought into action by the first named means for displacing said members, one at a time by each successive operation by the same workman, further means brought into action by the spacing members for stopping the carriage at different distances from its starting position by such operation, and separate means for returning said carriage to its starting position after such operation.

10. In a workman's time recorder, a reciprocating plunger, a rotary element having a series of ball-races each containing a series of movable balls adapted to be brought into registration with said plunger, means for actuating said plunger into the ball-race aligned therewith to engage the adjacent ball, a toothed rack and a pawl actuated by said means to engage one of the teeth of the rack by each successive operation of the plunger by the same workman.

11. In a workman's time recorder, a sliding carriage and means to move it from its starting position, additional means to return it to its starting position, further means brought into action by the first named means to stop the carriage at different distances from its starting position after each successive operation by the same workman.

12. In a workman's time recorder, a rotary drum carrying a record sheet thereon having a plurality of employee designating characters, said drum having a plurality of ball-races one for each employee, each ball-race containing a plurality of balls, a plunger adapted to enter one of the ball-races and to engage the ball nearest thereto, a dial having a series of employee designating characters, a lever connected to the drum and movable around the dial to bring each of the ball-races into registration with the said plunger, said lever having an independent movement, connections for transmitting motion from the lever to the plunger, a printing mechanism actuated by said independent movement of the lever transversely of the record sheet, spacing members for controlling the amount of shifting movement of the printing mechanism, and additional means to stop the printing mechanism at different shifting positions by each successive printing operation by the same workman.

In witness whereof I have hereunto set my hand this 23 day of May 1906.

JAMES F. KIELY.

Witnesses:

H. E. CHASE,
HOWARD P. DENISON.