No. 639,110. Patented Dec. 12, 1899.

J. J. STOCKALL, JR.

TIME CHECK MECHANISM.

(Application filed May 16, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 6.

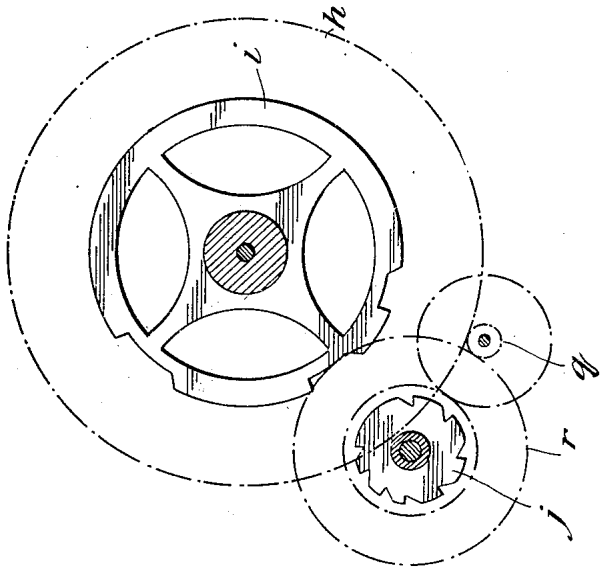


Fig. 2.

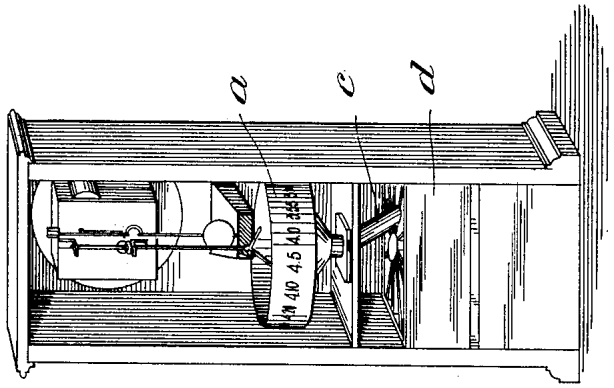
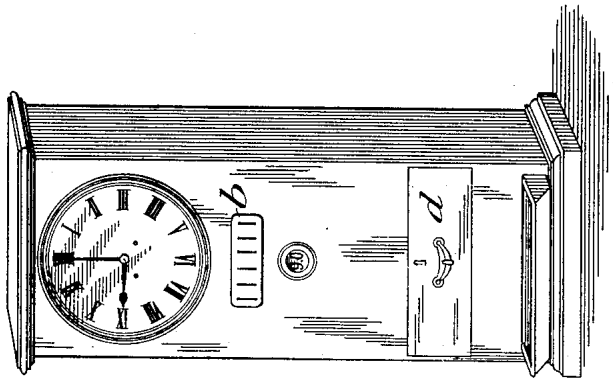


Fig. 1.



Witnesses

Inventor

James J. Stockall Jr.

By James L. Norris.

Atty

No. 639,110. Patented Dec. 12, 1899.

J. J. STOCKALL, JR.

TIME CHECK MECHANISM.

(Application filed May 16, 1899.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 5.

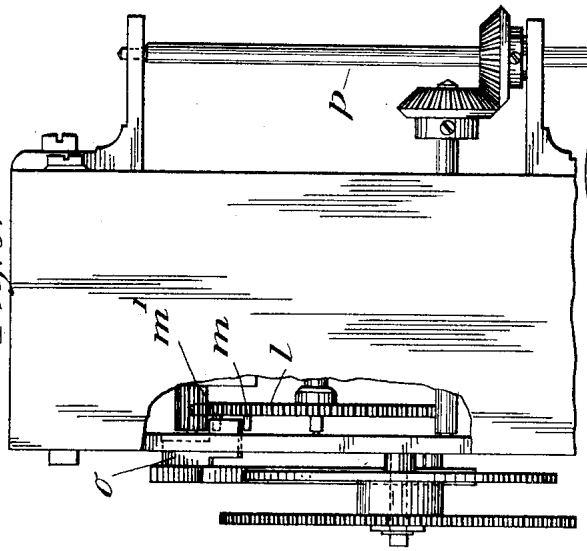


Fig. 4.

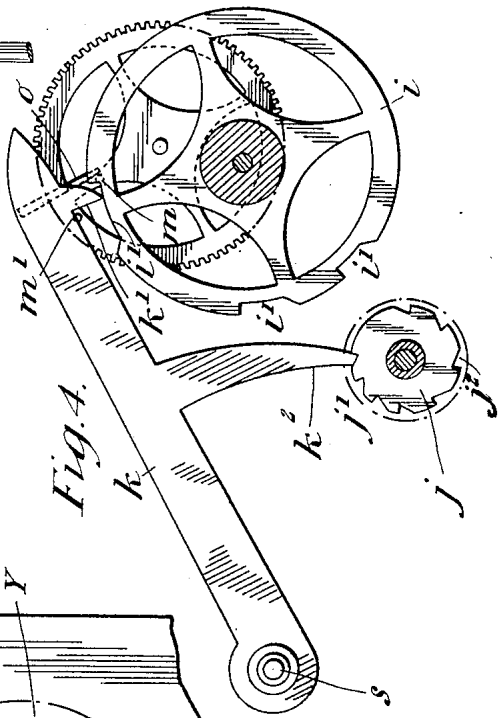
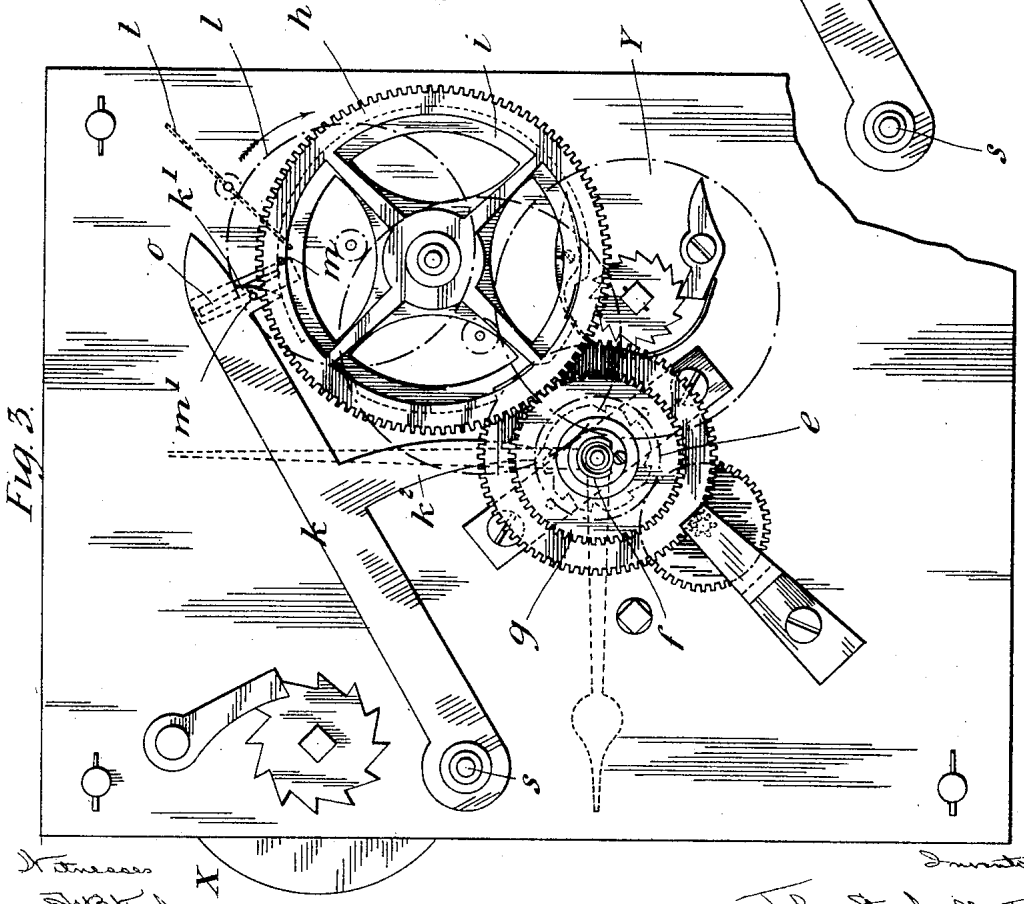


Fig. 3.



Witnesses

Inventor

John Stockall Jr.

by James L. Norris.

Atty

No. 639,110. Patented Dec. 12, 1899.

J. J. STOCKALL, JR.

TIME CHECK MECHANISM.

(Application filed May 16, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 9.

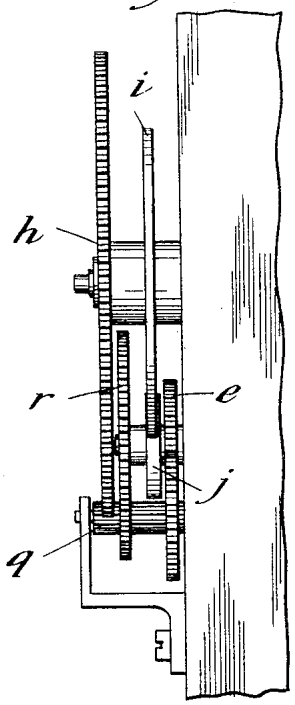


Fig. 7.

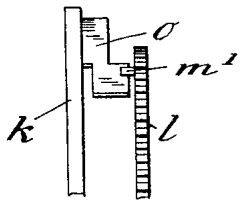
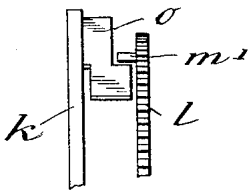


Fig. 8.



Witnesses.
W. B. Kerr
Robt Everett

Inventor.
James J. Stockall Jr.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

JAMES J. STOCKALL, JR., OF LONDON, ENGLAND.

TIME-CHECK MECHANISM.

SPECIFICATION forming part of Letters Patent No. 639,110, dated December 12, 1899.

Application filed May 16, 1899. Serial No. 717,077. (No model.)

To all whom it may concern:

Be it known that I, JAMES JOHN STOCKALL, Jr., watchmaker, a citizen of England, residing at No. 8 Clerkenwell road, London, England, have invented a certain new and useful Automatic Time-Checking Machine, (for which I have made provisional application for a patent in Great Britain, No. 17,795, dated August 18, 1898,) of which the following is a specification.

This invention relates to an improved construction of that kind of apparatus for automatically checking the time at which workmen, watchmen, or the like arrive or depart in which there is combined with an ordinary timepiece an auxiliary clockwork mechanism that rotates a spout over a circular tray divided into compartments, the timepiece being made at definite intervals of time to set the auxiliary clockwork in motion, so as to bring the chute over a different compartment of the tray, so that on a workman dropping a check into the chute this will be delivered into the said compartment, which is marked with the corresponding time.

In such apparatus as heretofore constructed the setting in motion of the auxiliary clockwork has always been effected by means of a cam-disk or "snail" revolved once in twelve or twenty-four hours by the timepiece and having a series of notches in its periphery, which are successively made to act upon a detent-lever, so as to cause this to liberate the auxiliary clockwork at the required times for effecting the shifting of the spout. With this arrangement inaccuracies of action are liable to occur when the times at which the workmen or watchmen have to insert their checks are required to be exact to a minute, because the slightest looseness in the gearing which rotates the cam-disk that revolves once in twenty-four hours may cause inaccuracies in the position of this which may amount to several minutes.

My present invention has for its object to effectually prevent such inaccuracies; and it consists in providing, in combination with the cam-disk that revolves once in twenty-four hours or other long interval of time, a second cam-disk that is made to revolve once every hour, the said detent-lever that controls the auxiliary clockwork being acted upon by both the cam-disks in such manner that while the slowly-revolving cam-disk controls the lever, so as to prevent the liberation of the auxiliary clockwork during the longer intervals of time that may elapse between the periods when the workmen are required to deposit their checks, the hour cam-disk determines the fractional intervals of an hour at which the auxiliary clockwork is to be set in motion.

I will describe my said invention with reference to the accompanying drawings, in which—

Figure 1 shows a front view, and Fig. 2 shows a back elevation, of a time-checking machine with my invention applied thereto. Fig. 3 shows an enlarged front elevation of the clockwork mechanism with the dial and hands removed. Fig. 4 shows part of the same view with the wheels of the minute and hour motion, &c., removed, so as to show the cam-disks. Fig. 5 shows a sectional side view of the mechanism. Fig. 6 shows a modified arrangement of the driving-gear; and Figs. 7, 8, and 9 are detail views of parts hereinafter explained.

The machine is mainly of known construction. The clockwork consists of an ordinary clock-train, preferably that of an eight-day clock, of which the spring-barrel is shown at X, and an auxiliary clockwork mechanism, of which the spring-barrel is shown at Y, by means of which at determined intervals of time a cylindrical spout *a*, Fig. 2, is rotated through a certain angle, into which spout the workmen or watchmen deliver their checks through a slot in the casing at *b* and which terminates below in an angular tube *c*, which by the said rotation is brought successively over the different compartments of a tray *d*, these compartments being marked with the different times at which workmen are required to deliver their checks. As before stated, the motion of the spout *a c* has heretofore been controlled by a single cam-disk actuated by the ordinary clock-train, so as to revolve once in twenty-four hours. According to my invention I effect such motion by the combined action of two cam-disks arranged as shown, by way of example, at Figs. 3 and 4. Here *e* is the cannon-pinion of the minute-hand, and *f* is the

arbor of the hour-hand, and g is a wheel fixed thereto, that consequently revolves once in twelve hours. With this wheel gears a wheel h of double the circumference of g, and consequently revolving once in twenty-four hours. On the arbor of this wheel is fixed the cam-disk i, Fig. 4, on the periphery of which are formed notches i' i' in positions corresponding to the different times during the twenty-four hours when workmen, &c., are required to deposit their checks. k is a detent-lever pivoted at s, which serves to control the action of the auxiliary clockwork Y, that actuates the chute a, which lever has a finger k', that bears upon the periphery of the cam-disk i, except when the notches i' pass under it. When the lever is held in the raised position by the full periphery, as indicated in Fig. 3, it prevents the action of the auxiliary clockwork, as will be presently described. To the cannon-pinion e is fixed the second cam-disk j, which consequently revolves once every hour and which has notches j' j^2 in positions corresponding to the fractions of an hour at which it is required that the spout a c shall be shifted to another compartment of d. By way of example the notches are shown close together at j', so as to effect the shifting of the spout, say, every five minutes, while at j^2 they are shown at longer intervals. Their spacing will of course depend upon the different intervals during an hour when the workmen, &c., are required to deliver their checks. With these notches can engage a second finger k^2 on the lever k.

From the above-described arrangement it will be seen that at such times during the twenty-four hours when no time-checking is required the finger k' of lever k rests upon the full periphery of cam i, as indicated at Fig. 3, and the detent-lever k is then held in such a position that it prevents the auxiliary clockwork Y from running. At the same time the finger k^2 is held out of the notches of the cam j. The stopping of the auxiliary clockwork Y when the lever k is in the raised position is effected by means of a pallet o, projecting from the back of the lever k, which pallet, when the lever is in the raised position described, lies in the path of a pin m', projecting from the escapement-wheel l of the auxiliary clockwork Y, as shown more clearly in the detached view at Fig. 7. This wheel l is urged by the spring of the clockwork in the direction of the arrow, Fig. 3, so that when by its rotation the pin m' is brought against the back surface of the pallet o its further motion is arrested and the clockwork Y is stopped. When, on the other hand, the lever drops, the pallet o drops sufficiently for the pin m' to pass freely over its upper edge, as shown at Fig. 8, and the clockwork Y is then set in motion. When the time of day arrives when time-checking has to be effected, the cam i will have arrived in such a position that one of its notches i' faces the finger k', and the lever k is consequently free to drop, provided the cam j is at the same time in such a position that one of the notches j' or j^2 faces the finger k^2, so that this can drop into it, as shown at Fig. 4. If, on the other hand, the cam j at that time presents its full periphery to the finger k^2, the lever k will still be prevented from dropping, notwithstanding that the cam i may allow it to do so, and the auxiliary clockwork will consequently still be arrested until by the further rotation of the cannon-pinion the exact minute has arrived when the spout c requires to be shifted and a notch j' is presented to the finger k^2, so that lever k can drop. The auxiliary clockwork Y having been thus put in motion, so as to shift the spout c one division, the cam j in continuing to revolve causes finger k^2 to rise out of the notch, and consequently the lever k in rising stops the further motion of the clockwork Y until by the rotation of j another notch j' has been brought opposite finger k^2.

In most cases, in particular where the shifts of the spout c have to be effected at short intervals, it is necessary that the duration of the motion of the clockwork Y shall be more accurately limited than can be done by the action of the notches j' in raising the lever k. In order to provide for such accurate action, the escapement-wheel l of the auxiliary clockwork (which is controlled by the fly t) is provided with two pins m m', which are adapted to engage with a pallet o on the detent-lever k, as follows: The pallet o is so formed, as shown at Figs. 3, 4, and 5, that when lever k is in the raised position, Fig. 3, the pin m' is in contact with the back surface of the pallet, and consequently the wheel l, which is urged in the direction of the arrow, Fig. 3, by the spring-barrel Y, is prevented from turning. The pin m is at that time slightly beyond and below the lower edge of the pallet. When at the appointed time the lever k drops for setting the clockwork Y in motion, the upper edge of pallet o releases the pin m', so that wheel l can revolve. In dropping, however, the lower edge of pallet o is brought into such a position that when by the rotation of wheel l pin m arrives behind the pallet it is stopped by the lower edge hereof, as shown at Fig. 4, and consequently the motion of the clockwork Y and spout c is accurately limited to that corresponding to a single revolution of wheel l, although the lever k may not be raised by notch j' until some time after the completion of that rotation. When the lever k rises, the pallet o rises in front of pin m' and sets pin m free again, ready for the next rotation.

The motion of the clockwork Y is transmitted to the spout a c by suitable gear acting on the spindle p of the latter.

Instead of transmitting the motion to the twenty-four-hour wheel h by means of a special wheel g on the hour-arbor, as described, this may be dispensed with and the motion of h be obtained directly from the pinion q,

that transmits the motion of the cannon-pinion to the hour-wheel r, as shown at Figs. 6 and 9, which show, respectively, a sectional front view and a side view of the arrangement. In this case the cannon-pinion e of the timepiece gears with a pinion of equal diameter, fixed on the same spindle 2 as the small pinion q, which gears both with the hour-wheel r of the timepiece, revolving once in twelve hours, and with the said wheel h, which is twice the diameter of r, so as to revolve once in twenty-four hours. j and i are the notched disk cams, as before.

Having thus described the nature of my invention and the best means I know of carrying the same into practical effect, I claim—

1. The combination with the subdivided tray, and the rotating spout, of a main timepiece having a pivoted, gravitating detent-lever k provided with two pendent detent-fingers k', k^2 of different length, an auxiliary clockwork set in motion by the main timepiece, controlled by said detent-lever and geared with said rotating spout to control the motion thereof, a cam-disk i having a plurality of definitely-spaced-apart peripheral notches i' coöperating with the short detent-finger of said lever, a secondary cam-disk j having a plurality of definitely-spaced-apart peripheral notches j' j^2 coöperating with the long detent-finger of the detent-lever, said lever serving to accurately release and stop the auxiliary clockwork and the rotating spout thereof, an escapement-wheel l having pins m, m', a pallet o coöperating with said pins to accurately stop and release the said escapement-wheel, auxiliary clockwork and rotating spout at predetermined periods of time, and means for revolving notched cam-disks at different speeds, the slow-revolving cam-disk controlling the detent-lever to prevent the action of the rotating spout during the intervals between the times when persons are required to deposit checks, and the fast-revolving cam-disk determining the fractional intervals of an hour at which said spout is set in motion, substantially as and for the purposes described.

2. The combination, in an automatic time-check, of a rotating check-spout, a timepiece having a pivoted detent-lever k provided with two detent-fingers k' and k^2 of different length, an auxiliary clockwork geared to said rotating check-spout, and two cam-disks i and j revolving at different speeds and provided, respectively, with definitely-spaced notches i', i' and j' j^2, the slow-revolving cam-disk with its notches coacting with the spout detent-finger of the detent-lever to prevent action of the check-spout during the intervals between the times when persons are required to deposit checks, and the fast-revolving cam-disk coacting with the long detent-finger of the detent-lever to determine the fractional intervals of an hour at which the check-spout is set in motion, substantially as and for the purposes described.

3. An automatic time-check, consisting of an ordinary timepiece X, an auxiliary clockwork Y, the escapement-wheel l, the pivoted detent-lever k having two pendent detent-fingers k' k^2, the cam-disk j having peripheral notches j' and j^2 and revolved once each hour by the ordinary timepiece, a second cam-disk i having peripheral notches i' and revolved once each twenty-four hours by said timepiece, the pallet o mounted on said detent-lever, the pin m' on said escapement-wheel to strike the pallet when the detent-lever is raised the rotating check-spout a, c, and gearing between the auxiliary clockwork and said check-spout, substantially as and for the purposes described.

4. In an automatic time-checking machine, the combination with a subdivided tray, a rotating spout, and an ordinary timepiece, of an auxiliary clockwork actuating the rotating spout, a detent-lever adapted to control the motion of the auxiliary clockwork, a disk cam having a series of peripheral notches revolving with the cannon-pinion of the timepiece a second disk cam having peripheral notches on its periphery, and revolving once in twenty-four hours, a finger on the detent-lever adapted to engage with the notches of the disk cam revolving with the cannon-pinion, a second finger on said detent-lever adapted to engage with the notches of the cam-disk revolving once in twenty-four hours, and a pallet on the detent-lever which is adapted to stop the motion of the escapement-wheel of the auxiliary clockwork when the detent-lever is raised with its fingers out of engagement with the notches of the disk cams, substantially as and for the purposes described.

5. In an automatic time-checking machine the combination with the rotating check-spout, and an ordinary timepiece, of an auxiliary clockwork Y with escapement-wheel l, actuating the said check-spout, a detent-lever k adapted to control the motion of the auxiliary clockwork, a disk cam j with peripheral notches j' revolved once in an hour by the timepiece a second disk cam i with peripheral notches i' revolved once in twenty-four hours by the timepiece, a finger k' on the detent-lever adapted to engage with the notches i' of disk cam i, a second finger k^2 on the detent-lever adapted to engage with the notches j' of disk cam j, a pallet o on the detent-lever, and a pin m' on the escapement-wheel l which comes in contact with the pallet o so as to stop the auxiliary clockwork when the lever k is in the raised position with its fingers out of engagement with notches of said disk cams, substantially as and for the purpose described.

6. In an automatic time-checking machine, the combination with a subdivided tray, a rotating check-spout, and an ordinary timepiece, of an auxiliary clockwork Y with escapement-wheel l actuating the rotating check-spout, a detent-lever k adapted to control the motion of the auxiliary clockwork, a disk cam j with

notches j' revolved once in an hour by the timepiece, a second disk cam i with peripheral notches i' revolved once in twenty-four hours by the timepiece, a finger k' on the detent-lever adapted to engage with the notches i' of disk cam i, a second finger k^2 on the detent-lever adapted to engage with the notches of disk cam j, a pallet o on the detent-lever, a pin m' on the escapement-wheel l of the auxiliary clockwork which engages with the pallet o when the lever k is raised out of engagement with the notches of the disk cams, and a second pin m on the said escapement-wheel with which the pallet o comes into engagement when the lever k is lowered into engagement with the notches of the disk cams, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES J. STOCKALL, JNR.

Witnesses:

GERALD L. SMITH,

C. L. HOPKINS.