No. 797,491. PATENTED AUG. 15, 1905.

R. BÜRK.

TIME RECORDING APPARATUS.

APPLICATION FILED JUNE 8, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

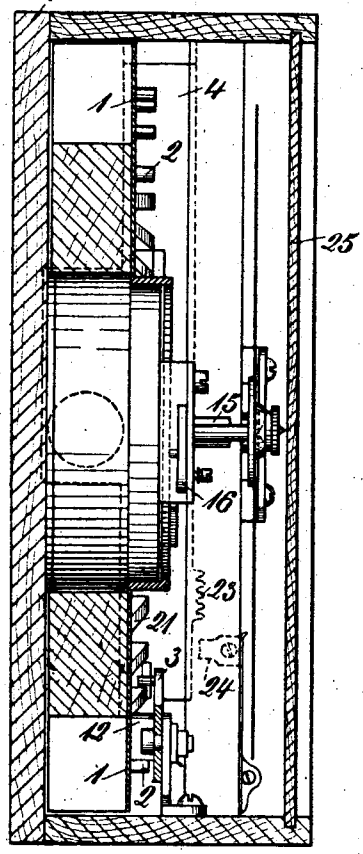


Fig. 4.

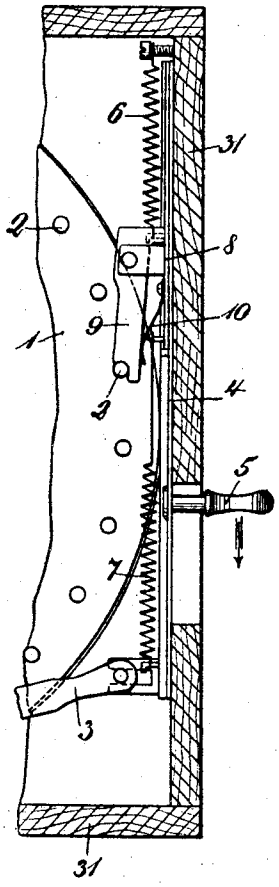


Fig. 5.

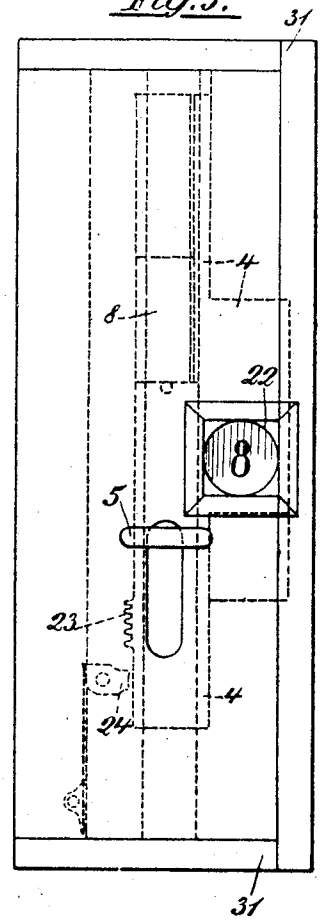


Fig. 8.

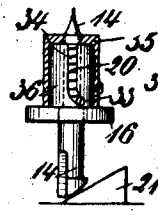


Fig. 9.

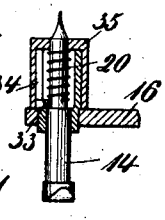
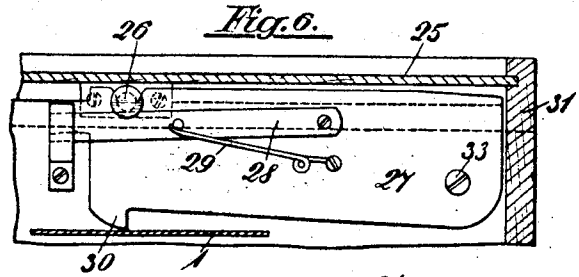


Fig. 6.



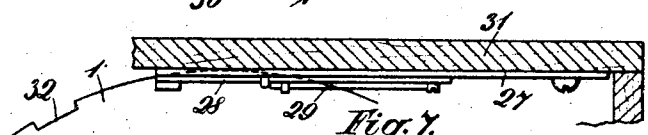


Fig. 7.

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3 SHEETS—SHEET 2.

Fig. 2.

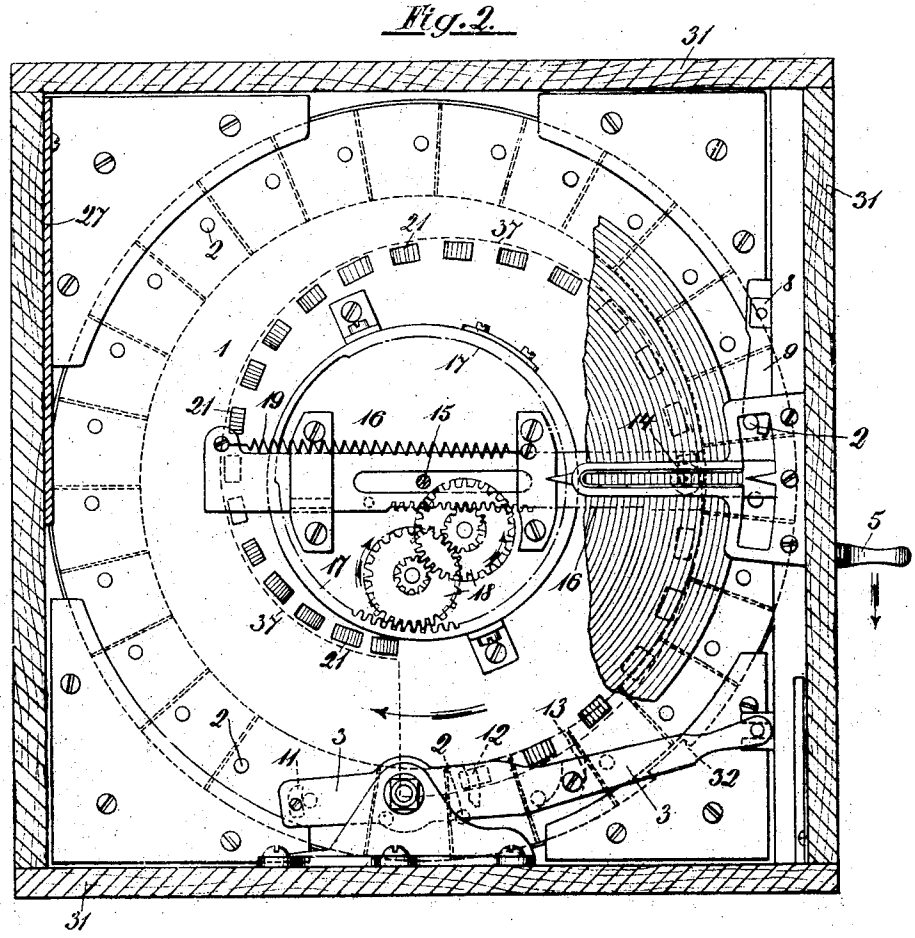
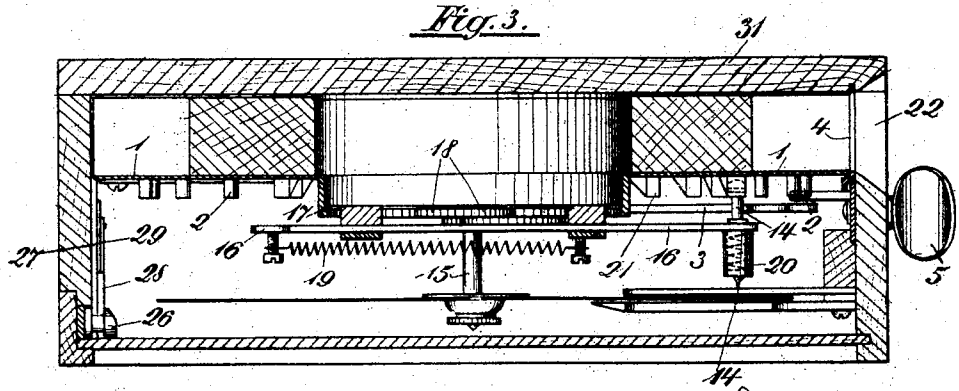


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 10.

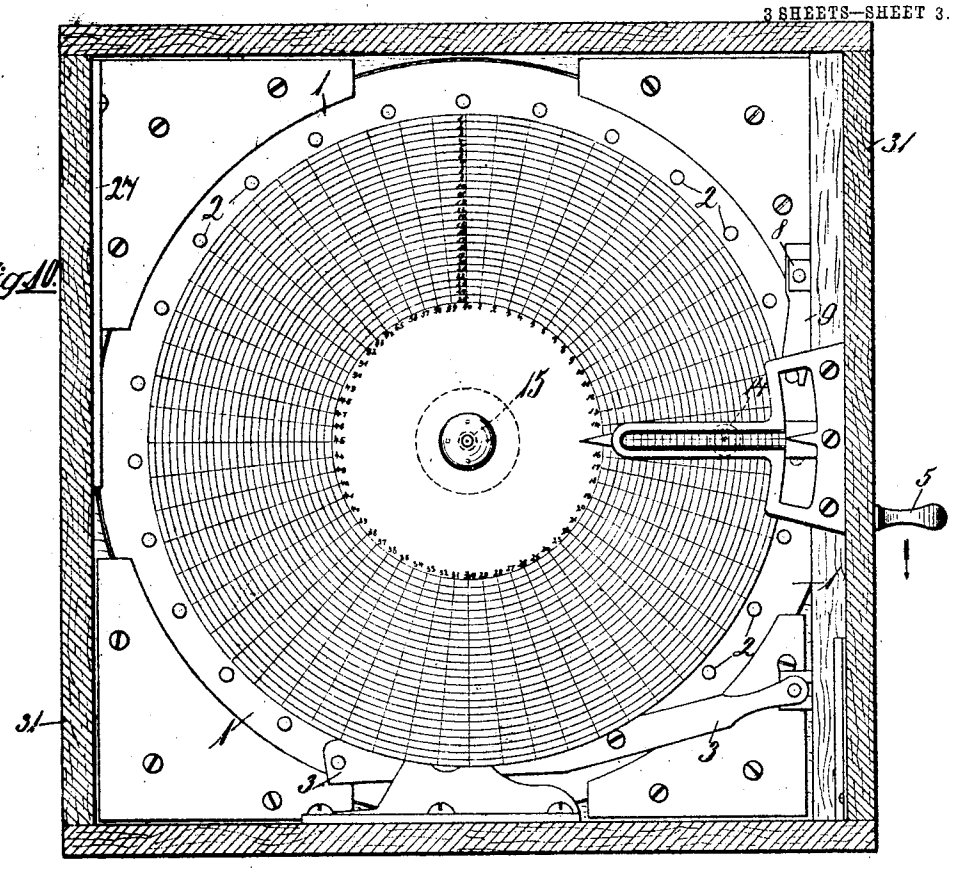
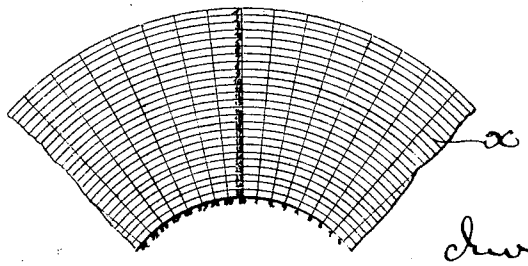


Fig. 11.



Fig. 12.



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UNITED STATES PATENT OFFICE.

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TIME-RECORDING APPARATUS.

No. 797,491. Specification of Letters Patent. Patented Aug. 15, 1905.

Application filed June 8, 1903. Serial No. 160,524.

To all whom it may concern:

Be it known that I, RICHARD BÜRK, a citizen of the German Empire, residing at Schweningen, in the Kingdom of Würtemberg, Germany, have invented certain new and useful Improvements in Time-Recording Apparatus, of which the following is a description, reference being had to the accompanying drawings and to the figures of reference marked thereon.

This invention relates to time-recording apparatus, and has for its principal object to provide a means for recording an operation of the mechanism with the utmost accuracy.

A further object of the invention is to provide a mechanism which cannot be tampered with or false or partial registrations made without detection, and a still further object is to so arrange and construct the machine that none of the parts can operate until a full and complete stroke of the handle or other operating member has been made.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form and proportions of parts and details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a vertical sectional view of a time-recording apparatus constructed in accordance with the invention. Fig. 2 is a similar view, taken at a right angle to Fig. 1. Fig. 3 is a sectional plan view of the apparatus. Fig. 4 is a fragmentary view similar to Fig. 2, the section being taken somewhat more to the rear. Fig. 5 is an end elevation of the apparatus. Figs. 6 and 7 are detail views of the cover-locking mechanism. Figs. 8 and 9 are detail sectional views of the marking-pin. Fig. 10 is a view similar to Fig. 2, showing the recording-dial. Fig. 11 is a sectional plan view of the same, and Fig. 12 is a detail view of a portion of the dial.

Similar numerals of reference are employed to designate corresponding parts throughout the several figures of the drawings.

The working parts of the apparatus are arranged within a suitable casing 31, having a detachable cover 25, that normally is locked in closed position, as hereinafter described. In the casing is arranged a suitable clockwork of any ordinary character, (not shown,) and from this extends a main arbor 15, to which is secured a recording-disk *x*, generally formed of paper or paper-board and divided by radial and concentric lines, the radial lines indicating divisions of time, in the present instance seconds or minutes, and the concentric lines the number of records to be made on the disk, and these may vary from one or two to several hundred, twenty-five being shown in Figs. 10 and 12. This disk receives a uniform rotative movement and is marked or punctured each time a record is made, the first record occurring in the outermost concentric division, the second in the next division, and so on, as will be seen on reference to Fig. 12.

Mounted on the clockwork-casing is a drum 1, which may be provided with a series of pockets arranged at its periphery for the reception of checks that may be inserted through an opening at the side of the main casing, Fig. 5, and at each operation said drum is moved an angular distance equal to the width of a pocket, so that the pockets are successively presented in alinement with the opening. On the face of the disk 1 is an annular series of pins or teeth 2 of a number equal to the number of pockets, and these teeth are engaged by an escapement 3, which controls the rotative movement of the disk.

On the inner face of one of the side walls of the casing is guided a vertically-movable slide 4, having an operating handle or knob 5, which projects through a vertical slot in said casing, and normally this slide is held in elevated position by means of a coiled tension-spring 6. On this slide is mounted a slidable carriage 8, carrying a pivoted pawl 9, that is held out in the path of the pins 2 by a small leaf-spring 10. The lower end of the slide 4 is pivotally connected to one end of the escapement-lever 3, which is operated at each depression of said slide to release one of the pins 2 and permit partial rotative movement of the disk. Between a pin at the lower end of slide 4 and a pin on carriage 8 extends a tension-spring 7, which is placed under stress during downward movement of the slide, and when this movement is complete the escapement releases one of the pins 2 and the spring 7 in retracting draws down the carriage and the pawl 9 turns the disk a predetermined distance.

The slide 4 is provided with an opening 22, which is normally in alinement with the check-

receiving opening in the casing; but when the slide moves down the openings are moved out of alinement and a second check cannot be inserted until the parts are restored to initial position by means of the spring 6.

On the escapement-lever are two pallets 11 and 12 and a lug 13, the latter having a curved face for engagement with the successive pins 2. The pallets are so related that when the slide makes a complete downward movement pallet 11 will slip from engagement with one of the pins 2 and pallet 12 will be in a position to engage the third pin from the one released. The carriage 8 and pawl 9 are then drawn down to turn the disk and said third pin is caught and held by the pallet 12. On reverse movement of the escapement-lever and slide the curved cam-face of lug 13 will engage the pin following that caught by the pallet 12 and will force the same forward until a pin following the one first released comes into engagement with the pallet 11, and thereafter the disk will be positively held from rotative movement in either direction until the next operation of the slide 4. It will be observed that no release movement of the escapement can occur until the slide 4 has accomplished its full downstroke, so that the disk cannot be turned with less than a full and complete depression of the handle 5.

In order to prevent return movement of the slide when downward pressure on the handle is relieved at less than full stroke, the slide carries a rack 23, with which engages a spring-pressed pawl 24, that will engage the rack and prevent return movement until after the uppermost tooth of the rack has passed the pawl. The latter is then free to turn on its pivot and permit the return movement of the slide.

Mounted in guides at the front of the stationary clockwork-casing is a slide 16, having on its lower edge a rack that is connected by reducing-gearing 18 to a mutilated internal rack 17, carried by and rotating with the disk 1, and at each movement of the latter the slide will be moved a predetermined distance, or this may be accomplished by a snail or spiral cam 37, as indicated by dotted lines in Fig. 2. The slide is connected to one of the fixed guides by means of a tension-spring 19, and when the end of the internal rack is reached and the reducing-gear is out of mesh with said rack the spring will return the slide to its normal position.

To the outer end of the slide 16 is rigidly secured a casing 35, in which is fixed a sleeve 36, provided with a helical or similar groove 34. The sleeve and casing serve as guides for a marking or perforating pin 14, that normally is held retracted by a helical compression-spring 20, and at the rear end of said pin is an enlarged head having a tapered or inclined face for engagement with cams 21, carried by the disk 1. The pin carries a small lug 33, that projects into the groove 34, and these interfit in such manner that jarring or pressure on the apparatus will not result in endwise movement of the pin and accidental or intentional marking of the record-dial. The cams 21 are arranged in a spiral line, and there is one for each of the pockets in disk or drum 1, so that at each depression of slide 4 a cam will engage and force the marking-pin outward against the record-disk. The cams are so arranged that the marking-pin will be forced outward slowly and quickly retracted as they drop past the abrupt shoulder of the cam and at the commencement of each movement the pin will first be turned on its axis by said cam until the lug 33 moves into the straight portion of the slot 34.

It will be observed that no movement of the marking-pin can occur until the disk 1 is moved, and as the latter is locked until a full depression of the slide 4 no partial operation can result in any marking of the record, and it is therefore impossible to manipulate the device and make a false record without detection.

The slidable cover 25 carries a headed pin 26, with the shank of which engages the notched portion of a plate 27, pivoted at 33 within the casing. This plate has a tongue 30, which may enter a notch 32 in the disk 1 when the latter has nearly or quite completed a revolution, permitting the plate to disengage the pin. The plate carries as an additional precaution a spring-pressed arm 28, that is held against the shank of the pin by means of a spring 29. When the disk completes a revolution, notch 32 arrives opposite the tongue and permits unlocking of the cover. When the disk again starts, the rounded edge of the tongue is forced outward by the wall of the notch, and the cover is thus automatically locked in place.

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

1. In a recording mechanism, the combination with a locking-pin, of a revoluble dial having an annular series of pins or teeth, an escapement engaging the teeth to control intermittent rotative movement of the disk, an operating member, a pawl-carrier, means for connecting the operating member to the escapement, a spring connecting the operating member to the pawl-carrier, a pawl engaging the teeth and serving on release of the escapement to effect a partial rotative movement of the disk, and marking-pin-actuating means carried by said disk; substantially as described.

2. In recording mechanism, the combination with a marking-pin, of an intermittently-operable disk, cams arranged on the disk and engaging said marking-pin, an annular series of pins or teeth carried by the disk, an escapement engaging the pins and controlling intermittent rotative movement of said disk, an

operating-slide, a pawl-carriage mounted on the slide, a pawl supported by the carriage, and engaging the pins or teeth, means for connecting the escapement to the slide, a spring connecting the slide to the carriage, said spring being placed under stress during downward movement of the slide and serving when the escapement is released to effect movement of the pawl-carriage and pawl, and means for restoring the slide and carriage to initial position; substantially as described.

3. In recording apparatus, the combination with a locking member, of a disk having means for engaging said locking member, an annular series of pins or teeth carried by the disk, an escapement engaging said pins or teeth, an operating-slide having its lower end connected to the escapement, a pawl-carriage mounted on the slide, a pawl supported thereby and engaging the pins or teeth, a spring connecting the slide and carriage and placed under stress during downward movement of said slide, a spring for restoring the slide and carriage to initial position, a marking-pin carrier, and means for imparting a step-by-step movement to said carrier; substantially as described.

4. In recording mechanism, the combination with a marking member, of a revoluble disk, a series of cams arranged in a spiral line on the disk and serving to engage said member, an annular series of pins or teeth carried by the disk, an escapement engaging said pins or teeth, an operating-slide having its lower end connected to the escapement, a pawl-carriage mounted on the slide, a pawl engaging the pins or teeth, a spring connecting the slide to the carriage and placed under stress during downward movement of the slide, a spring for restoring the slide and carriage to initial position, and means for imparting a step-by-step movement to the marking member to present the latter in alinement with the spirally-arranged cams; substantially as described.

5. In recording mechanism, the combination with a marking member, of an intermittently-revoluble dial, a plurality of cams carried by the dial and adapted to engage said marking member, a slide movable across the face of the dial and carrying said marking members, gearing connections between the slide and dial for imparting a step-by-step movement to the slide, and means for restoring the slide to initial position; substantially as described.

6. In recording mechanism, the combination with a marking member, of a record-carrier, a disk or drum having peripheral check-receiving pockets, means carried by the disk or drum for moving said marking member, an operating-slide for effecting intermittent rotative movement of the disk or drum, said slide having an opening normally in alinement with a check-receiving opening in the casing, the opening of the slide being moved out of alinement with the opening in the casing at each operation of said slide; substantially as described.

7. In apparatus of the class described, the combination with a constantly-revoluble record-carrier, of an intermittently-revoluble dial, a marking member, means for moving the marking member in a direction radial of the dial, means carried by the dial for moving said marking member in the direction of the record-carrier, an operating means, and mechanism for preventing movement of the dial or the marking member until said operating means has completed a full stroke; substantially as described.

8. In apparatus of the class described, a locking-pin mounted for longitudinal and rotative movement, a casing containing said pin and provided with a guiding-slot having a helical or offset portion, a lug extending from the pin and adapted to said slot, and marking-pin-engaging cams serving to first effect rotative and then longitudinal movement of said marking-pin; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD BÜRK.

Witnesses:

AUGUST DRAUTZ,

RUDOLF STAERZBACH.