

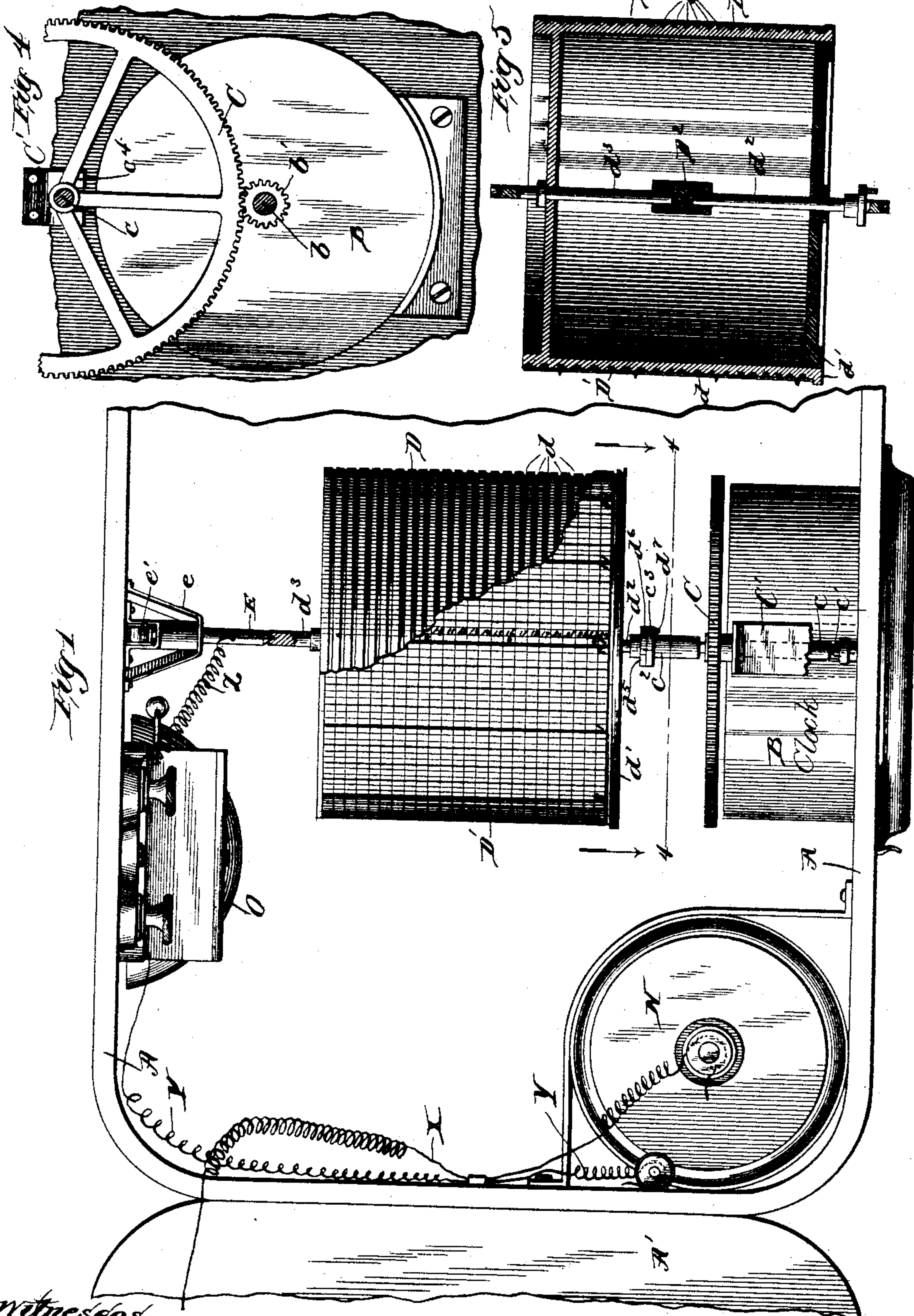
(No Model.)

2 Sheets—Sheet 1.

H. R. ADAMS.
TIME RECORDER.

No. 438,831.

Patented Oct. 21, 1890.



Witnesses -

James H. Scott.
A. M. Best

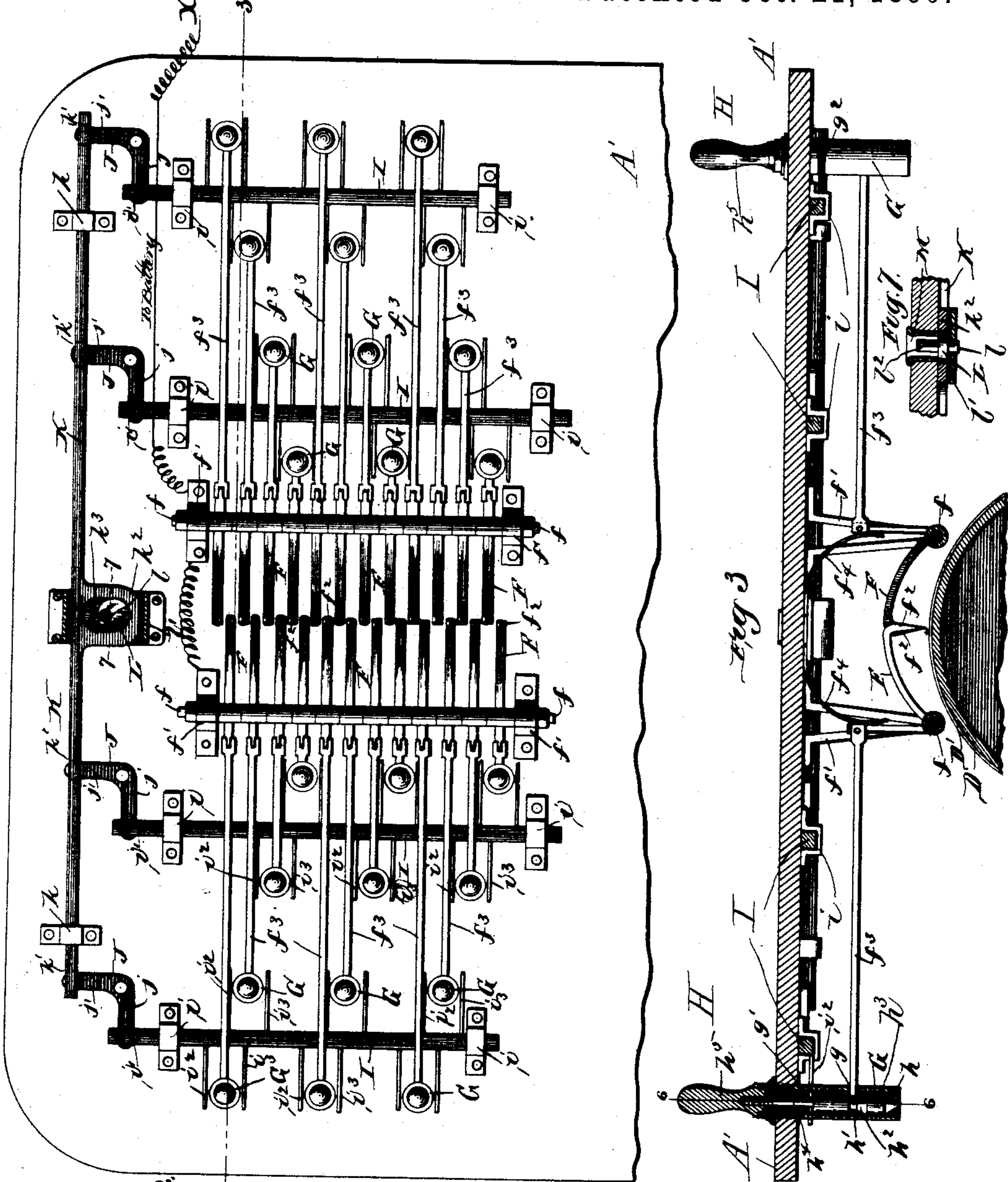
Harvey R. Adams. *Inventor*

By *Cornelius Thacher* *Attys*

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Wm. J. Scott
A. M. Bent.

Fig 6

Inventor
Harvey R. Adams.
By Coburn & Thacher
Attys

UNITED STATES PATENT OFFICE.

HARVEY RAYMOND ADAMS, OF MARSEILLES, ILLINOIS.

TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 438,831, dated October 21, 1890.

Application filed March 10, 1890. Serial No. 343,258. (No model.)

To all whom it may concern:

Be it known that I, HARVEY RAYMOND ADAMS, a citizen of the United States, residing at Marseilles, in the county of La Salle and State of Illinois, have invented certain new and useful Improvements in Time-Recorders, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a plan view of a portion of a time-recording mechanism embodying my invention, the same being shown inclosed in a box or case, one end of which is broken away and the hinged cover of which is thrown up; Fig. 2, a bottom plan of the case-cover and the mechanism mounted thereon, a portion of the cover being broken away; Fig. 3, a section of the latter, taken on the line 3 3 of Fig. 2, with a small section of the recording-cylinder being also shown in connection therewith; Fig. 4, a detail section taken on the line 4 4 of Fig. 1, looking in the direction of the arrows on said Fig. 1; Fig. 5, a longitudinal vertical section of the recording-cylinder detached; Fig. 6, a detail vertical section taken on the line 6 6 of Fig. 3, and Fig. 7 a similar section taken on the line 7 7 of Fig. 2.

My invention relates to an apparatus by means of which the exact time at which a certain event may be accurately recorded for future reference, and also, if desired, indicated at the time of recording by an audible signal.

The apparatus is adapted for use in all establishments employing a number of persons, for the purpose of recording the precise time at which each individual enters and leaves the building or commences and ceases work, and also at railway-stations for the purpose of recording the exact time at which trains arrive and leave the station, and for other like purposes.

The present invention relates to certain improvements upon the apparatus shown and described in Letters Patent No. 400,283, issued to me March 26, 1889, these improvements relating to certain special devices, while the general plan of construction remains the same.

I will proceed to describe in detail the mechanism of a recorder in which I have embodied my present invention in a practical

way, and will then point out definitely in the claims the particular improvements which I believe to be new and wish to protect by Letters Patent.

In the drawings, A represents a suitable case or box, within which the operating devices are inclosed, and which is provided with a hinged lid or cover A', which may be closed down upon the top of the case and locked in this position, whereby the mechanism may be completely inclosed and securely protected from outside interference, except through the regular indicating devices. A clock B is set into one side of the case, the clock-case projecting within the latter, as seen in Fig. 1 of the drawings. The minute-hand shaft *b* of the clock is extended inward through the clock-case and carries upon its inner end a small pinion *b'*. A large gear-wheel C is arranged just over this pinion and in engagement therewith. This wheel is mounted on a shaft *c*, arranged horizontally above the clock-case, and at its outer end mounted on a conical bearing *c'*, fastened to the side of the case. The inner end of this shaft extends somewhat beyond the wheel and is provided with a sleeve *c²*, fastened to it and having on its extremity a slight flange *c³*, which is perforated at one point. It will be seen that this shaft is partly supported by its wheel resting on the pinion *b'*, when the shaft is disconnected at its inner end.

In order to steady the shaft *c* laterally and prevent displacement a guard C' is fastened to the side of the case just above the shaft-bearings, and is extended inward over the shaft and then bent downward, the bent portion being provided with a fork *c⁴*, which embraces the shaft, as seen in Fig. 4 of the drawings. This guard, as shown in the drawings, is a flat metallic strip of suitable thickness to provide a stay of sufficient rigidity. The particular form, however, is immaterial.

The recording-cylinder D is substantially the same as in my prior patent, with certain exceptions that will now be noted. The entire surface of the cylinder is grooved by a series of circumferential grooves *d*, running entirely around the cylinder and parallel to each other. The record-strip D' is applied directly to the surface of the cylinder over these grooves. The head *d'* of the cylinder,

facing the clock or wheel C, is made of rubber or other non-conductor of electricity. The shaft on which the cylinder is mounted is divided, one part d^2 passing in through the head d' and the other d^3 passing in from the opposite head and the two connected within the cylinder by a coupling D^2 of rubber or other electrical non-conductor, the shafts being inserted in the opposite ends of this coupling, but not permitted to touch, so that they are insulated from each other.

The end shaft d^2 has upon its outer end a collar d^5 , which is provided with a narrow flange d^6 , corresponding to that on the sleeve c^2 , and this collar is provided with a small pin d^7 , adapted to enter the perforation in the said flange c^3 , thereby providing means for coupling the cylinder-shaft to the shaft of the wheel C at a single fixed point. The outer end of the shaft d^2 projects slightly beyond the collar and enters the sleeve c^2 when the two parts are to be coupled together, as described above. The opposite end shaft d^3 is mounted at its outer end upon a conical pivot-pin E, which is set in a bracket e , fastened to the side of the case, and is mounted so as to permit a sliding movement in said bracket, there being a spring e' arranged back of the pin between it and the side of the case, as seen in Fig. 1 of the drawings, thus providing for a yielding of the pin horizontally to permit the mounting of the cylinder-shafts on their respective supports, as described above. It will be seen from this description that the end shaft d^2 next to the clock is entirely insulated from the rest of the cylinder, and so, of course, the said recording-cylinder is insulated from the clock-work and the driven wheel C.

The indicating-levers F are mounted independently on suitable rods f , which are supported by brackets f' depending from the inside of the cover, the latter being of some material which is a non-conductor of electricity. The supporting-rods f are parallel to each other and to the axis of the recording-cylinder, and are at such distance from each other that the levers extending inward from each will bring the points in line just above the cylinder. These indicating-levers are of bell-crank shape, one portion being nearly horizontal and terminating in a pointed downward bend f^2 . The other arm of the levers is about perpendicular, and each has pivoted to its upper end a rod f^3 , which extends horizontally outward toward the respective ends of the cover.

A series of short tubes G is inserted in the cover and extended downward some little distance below the latter when closed. These tubes are to receive the operating-keys and, of course, must correspond in number with the indicating-levers. They are placed in the cover in any convenient arrangement for operation and to reach the levers and accommodate the locking devices, which will be presently described. Each of these tubes is

provided with a cross-slot g in the side of the tube next to the recording-cylinder, and the outer or free ends of the rods f^3 are received in these respective slots so as to project slightly within the tubes, as seen in Fig. 3 of the drawings. As the key-tubes are necessarily at different distances from the indicating-levers, the length of these rods f^3 differs, each being of such length as just to project a little into its respective tube when the indicating-levers are in such position that the upright arms thereof will be about vertical. They are held in this position by springs f^4 , fastened at one end to the under side of the cover, from which they are bent downward and inward toward each other until their free ends rest upon the inside of the upright arms of the respective indicating-levers. In this position the points of the indicating-levers are held up just out of contact with the recording-strip on the cylinder, the springs operating to keep them normally in this position.

An operating-key H is applied to each one of the tubes just described. This key is of peculiar construction. Its body is round and of a size to neatly fit the tube in which it is placed. The lower extremity of the key is conical, as seen at h in Figs. 3 and 6 of the drawings. A short distance above this conical point is a groove h' , cut around the body of the key and having its lower face h^2 beveled, while its upper face may be straight. It will be seen, then, that the lower portion of the key consists of a short section h^3 of the normal size of the key-body and that at each end of this section there is a beveled surface, the inclinations being in opposite directions. Above the annular groove described the key-body is of normal size, and from it extends upward a stem h^4 , to the upper end of which, above the cover, is secured a suitable knob h^5 . By means of this knob the keys are raised and lowered in the tubes, and this movement operates the rods attached to the indicating-levers so as to depress the points of the latter upon the recording-strip on the cylinder. The relation of these parts is such that when the knobs are depressed as far as possible the keys will be in such a position that the annular grooves therein will be directly opposite the slots g in the tubes, so that the entering ends of the rods f^3 , under the influence of their springs, will be carried into these grooves, as seen in Fig. 3 of the drawings. Now, if when in this position the key is pulled up, it is evident that the rod f^3 , corresponding thereto, will be pressed outward by the upper bevel, thereby rocking the indicating-lever, to which the rod is attached, in a direction to depress the point to perforate the recording-strip; but as soon as the key is pulled up, so that the straight section h^3 passes above the end of the rod, the latter will at once be pushed inward again under the operation of the spring, thereby raising the indicating-point from the strip. The key will

stand in this elevated position any length of time desired, and it is obvious that when depressed again the operating-rod will be thrust outward as before, thereby making a second record. It will be seen, therefore, that a record is made by the indicating-levers at each movement of the key either upward or downward.

The grooves in the recording-cylinder, heretofore described, are for the purpose of facilitating the operation of the indicating-levers, the points of the latter being arranged directly over these grooves, thereby facilitating the puncture of the strip by the point of the lever and making this operation more certain.

It is desirable, of course, to lock the keys in either position to which they may be adjusted—that is, in their position of greatest elevation or depression—as already described, so that when brought into either adjustment they may be secured to prevent any subsequent indicating movement until unlocked at the required time by the person holding the key. For the purpose of thus locking the keys a series of bars I is employed, the bars being arranged transversely of the cover and mounted in keepers *i* on the underside of the latter, so as to be movable back and forth. They are also arranged one between each two rows of the key-tubes, as seen in Fig. 2 of the drawings. These sliding bars are provided at one end with slots *i'*, and a series of bell-crank levers J is pivoted to the cover in such position that one arm *j* will enter loosely the respective slots in the ends of the bars, while the other *j'* is similarly connected to a long sliding bar K, which is mounted at right angles to the bars I in keepers *k*, fastened to the under side of the cover near one edge thereof, and is provided with slots *k'* to receive the ends of the lever-arms *j'*, as described. The sliding bars I are the locking-bars, and are provided with small elastic pins *i²* *i³*, extending outward from each side of the respective bars and arranged in pairs, so that each key-tube will be embraced by one pair of pins, as seen in Fig. 2 of the drawings, in which the pins of each pair which stand nearest to the bell-crank levers are designated by the letter *i²* and those of each pair on the opposite sides of the tubes by the letter *i³*. The pins in the respective pairs are arranged in different planes, those marked *i²* in the drawings being a little lower than those marked *i³* when the cover is closed down on the box, as seen in Fig. 6 of the drawings.

The key-tubes G are provided on one side with short cross-slots *g'*, which are arranged opposite to the pins *i²*, and on the other side of the tubes there are similar slots *g²*, which are arranged opposite to the pins *i³*. It will be seen, then, that when the bars I are moved in one direction the pins on one side of the tubes will be brought into their respective slots, and that the reverse movement of the bars will bring the other series of pins into their respective slots on the other side of the

tubes, and at the same time disengage the first-mentioned set of pins. The arrangement of these side slots in the tubes is such that when the keys are depressed to their fullest extent the slots *g²* will be just above the upper end of the key-body, and when the keys are raised to their fullest extent the slots *g'* will be just below the upper section of said key-body and registering with the annular groove in the body. It will be seen, then, that if when the keys are to be depressed the locking-bars are moved so as to bring the pins *i³* into engagement with their respective slots, the said pins, being elastic, will pass slightly over the head of the keys when depressed, and so hold or lock them in their position, as seen in Fig. 6 of the drawings; and if when the keys are to be raised to their highest point in their tubes the bars are moved in the opposite direction the pins *i²* will be brought into engagement with their respective slots and will spring underneath the upper portion or head of the keys when raised, thereby stopping any depression of the keys, and so locking them in their elevated position. Now, it is evident that the reciprocation of the sliding bar K will give the necessary reciprocation to the locking-bars I, through the medium of the levers J, to cause the pins to engage with their respective slots on one side or the other of the tubes and press against the bodies of the keys, as just described, and so by the proper movement of the bar K in the required direction the keys may be locked either when elevated or depressed, as may be required.

In order to give the required reciprocation of the bar K, it is provided with a projection *k²* on one side thereof about midway of its length, and in this ear or projection there is made an elongated slot *k³*. Within this slot is a small cam L, which is on a short stem or shaft *l*, mounted in a keeper *l'*, looped around underneath the bar K, as seen in Fig. 7 of the drawings, and fastened to the under side of the cover. On the upper side of the cam there is a square shank or stem *l²*, which projects upward inside of a small tube M, which is set into the top of the cover. This stem of the cam is adapted to receive a suitable key, which is kept in the possession of the time-keeper of the establishment or other person selected for the purpose.

The locking-pins on the bars I constituting each pair, as already described, are set a distance apart a little greater than the diameter of the respective key-tubes, so that when set centrally the pins on both sides of the tube will be free from the latter, and so the keys can be operated in either direction without locking, whenever this is desired. This is the position of the locking-bars and pins when the cam is at the outer end of the slot, as seen in Fig. 2 of the drawings, and may be convenient when the case is to be opened, or when it is desired to remove one of the key-tubes or any other like purpose; but when it is de-

sired to use the apparatus for registration the cam is turned by the key applied on the outside of the case a quarter-way round in one or the other direction, according to the position of the keys, whether elevated or depressed, and this movement will reciprocate the bar K and locking-bars I into the proper position to bring one set of the elastic locking-pins into their respective slots in the tubes, the pins yielding outward somewhat as they come in contact with the full round body of the keys—that is, the movement of the locking-bars is sufficient to carry the pins in beyond this body portion of the keys when released therefrom. Now, whenever a key is raised or depressed, as the case may be, as soon as its full portion passes either above or below the respective slots in which the pins rest the latter will immediately spring inward on account of their elasticity, and thereby effectually stop the keys from a movement in the opposite direction, and so lock them in the position in which they are elevated when the record has been made. The cam when turned in either direction from that shown in Fig. 2 of the drawings can pass just a little beyond its center, but cannot be turned entirely around to the opposite end of the slot, so that there is thus formed a dead-lock for the cam to prevent its disarrangement by jarring or other means until its proper key is applied.

A small battery N is placed within the case, and also a signal-bell O, as in my former patent. The battery is connected up with the indicating-levers by the wires X, as seen in the drawings, and to the signaling-bell by the wires Y, and the signaling-bell is also connected up with the recording-cylinder by means of the wire Z. Hence it will be seen that whenever the indicating-levers are brought down into contact with the cylinder the circuit will be closed and the signal will be sounded. The cylinder is, however, insulated from the clock, as already explained, so that the latter is protected from the effect of the electric current.

The general operation of the apparatus is substantially the same as in my prior patent, and therefore requires no further elaboration in the present case. Reference is made to said patent for any further explanation required. There may be modifications in the construction and arrangement of the devices which are here shown and described, and such modifications are contemplated in my invention, so that I do not wish to be understood as limiting myself to all the specific devices which are herein set forth, and are shown in the drawings.

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

1. In a time-recorder, the recording-cylinder, in combination with the independent indicating-levers, the actuating-rods f^3 , the springs f^4 , and operating-keys adapted to reciprocate the said rods, substantially as and for the purposes specified.

2. The recording-cylinder, in combination with the indicating-levers F, the actuating-rod f^3 , the key-tubes G, and the keys H, arranged in said tubes and adapted to thrust the rods forward out from the tubes by the movement of the keys either upward or downward, substantially as and for the purposes specified.

3. In a time-recorder, the indicating-levers F, in combination with the actuating-rods f^3 , the tubes G, provided with slots g , which receive the ends of said rods, and the operating-keys H, provided with conical extremities h and grooves h' , having their lower faces h^2 beveled, substantially as and for the purposes specified.

4. In a time-recorder, the operating-keys H, provided with locking-grooves, in combination with the key-tubes G, provided with slots g' g^2 on opposite sides of the tubes and corresponding to the said locking-grooves, and the locking-pins i^2 i^3 , adapted to enter through the slots into the grooves, substantially as and for the purposes specified.

5. The key-tubes G, provided with slots g' g^2 , in combination with the operating-keys H, the locking-bars I, provided with the pins i^2 i^3 , the reciprocating bar K, and the bell-crank levers J, loosely connected to the bar K and the respective locking-bars, substantially as and for the purposes specified.

6. In a time-recorder, the reciprocating locking-bars I, in combination with the bell-crank levers J, the reciprocating bar K, provided with slots k^3 , and the actuating-cam L, arranged to work in the slot k^3 and to move in an arc opposed to the arc movement of the ends of the said crank-levers connected to the locking-bars, whereby the said devices are locked in position by the adjustment of the cam, substantially as and for the purposes specified.

7. In a time-recorder, the recording-cylinder provided with a head of electrical non-conducting material, in combination with a divided cylinder-shaft, a coupling, also an electrical non-conductor, the driven section of the shaft being connected with the cylinder by the said insulating-head at one end and at the other end with the other section of the shaft by the said insulating-coupling, and a clock-work for driving said shaft, substantially as and for the purposes specified.

HARVEY RAYMOND ADAMS.

Witnesses:

J. Q. ADAMS,
C. L. STINSON.