(Model.) 3 Sheets—Sheet 1.

# J. KARR.

## CHRONOGRAPH.

No. 266,162. Patented Oct. 17, 1882.

Fig. 1.

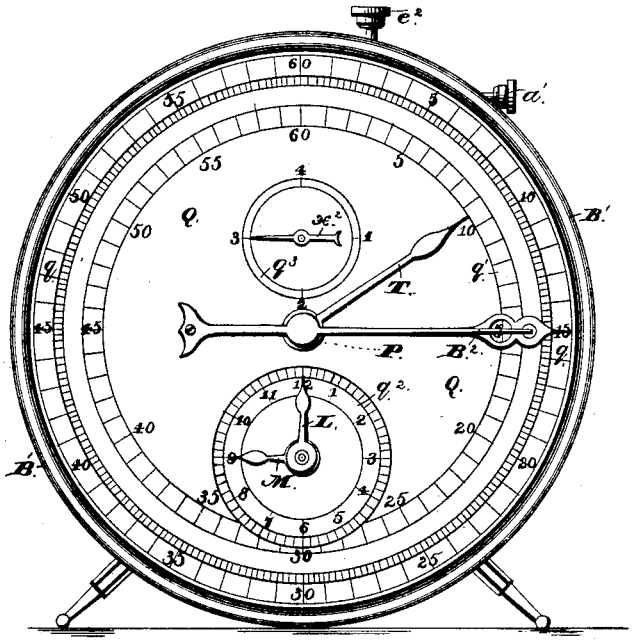
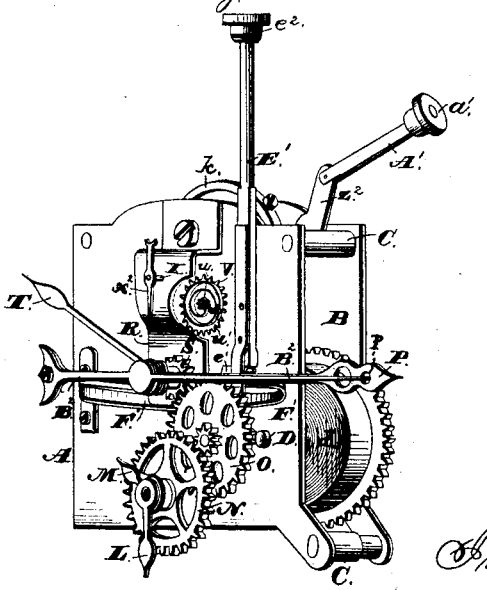


Fig. 2.



Witnesses.
Jas. E. Hutchinson.
Henry C. Hazard.

Inventor.
J. Karr, by
Geo. D. Brindle, his Atty

(Model.)

3 Sheets—Sheet 2.

# J. KARR.

## CHRONOGRAPH.

No. 266,162. Patented Oct. 17, 1882.

Fig. 3.

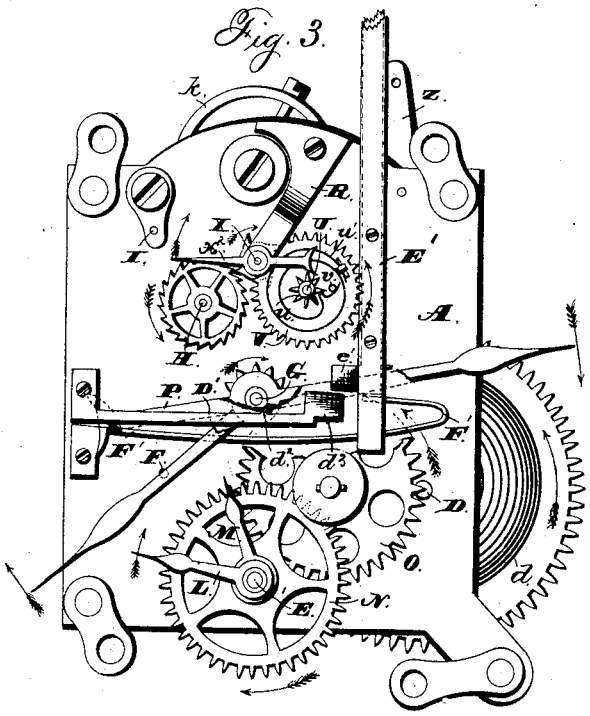
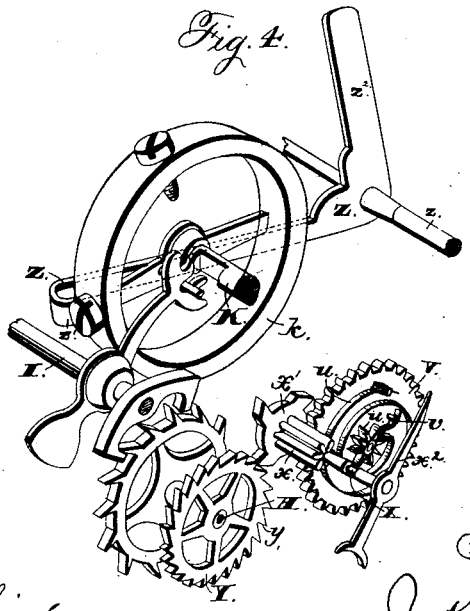



Fig. 4.

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Jas. E. Hutchinson

Henry C. Hazard

Inventor.

J. Karr, by

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(Model.) 3 Sheets—Sheet 3.

# J. KARR.

## CHRONOGRAPH.

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Fig. 5.

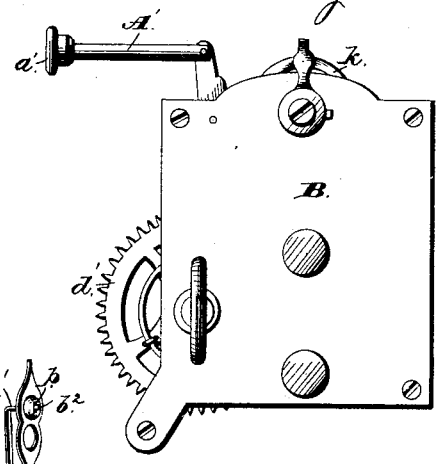



Fig. 6.

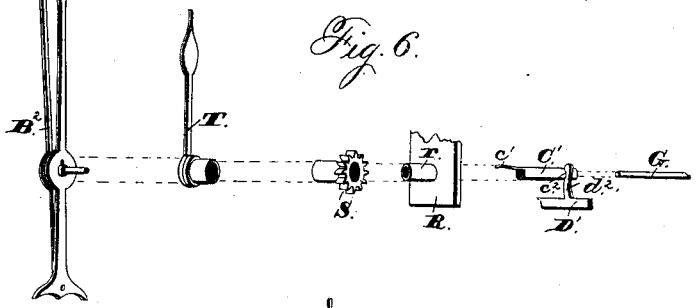



Fig. 7.

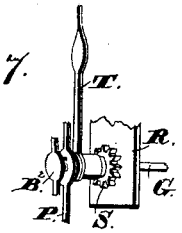
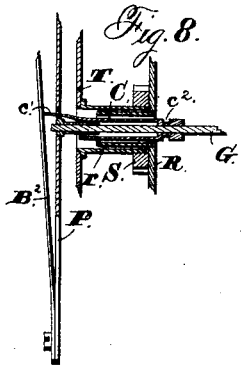



Fig. 8.




Witnesses.
Jas. E. Hutchinson.
Henry C. Hazard,

Inventor.
J. Karr, by
Geo. S. Brindle, his Atty

# UNITED STATES PATENT OFFICE.

JACOB KARR, OF WASHINGTON, DISTRICT OF COLUMBIA.

## CHRONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 266,162, dated October 17, 1882.

Application filed June 23, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, JACOB KARR, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Time Mechanism; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my clock as arranged for use. Fig. 2 is a perspective view from the front of the movement separated from its case. Fig. 3 is an enlarged front elevation of the same. Fig. 4 is an enlarged perspective view of the escapement separated from its connecting mechanism. Fig. 5 is a rear elevation of said movement. Fig. 6 is a perspective view of the outer end of the center arbor and its attachments separated from each other. Fig. 7 is a like view of the same combined, and Fig. 8 is a central longitudinal section of said parts.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to enable seconds and quarter-seconds to be indicated and recorded for timing purposes in a simple and inexpensive manner; and to this end it consists principally in the means employed for operating the quarter-seconds hand, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for producing a pressure upon the quarter-seconds escapement, substantially as and for the purpose hereinafter shown.

It consists, further, in the means employed for relieving the quarter-seconds escapement from undue pressure of the maintaining-spring, substantially as and for the purpose hereinafter set forth.

It consists, further, in the means employed for operating the marker, substantially as and for the purpose hereinafter shown and described.

It consists, further, in a clock in which the ordinary minutes and hours hands are located below the center of the dial, and are driven directly by the second arbor, substantially as and for the purpose hereinafter specified.

It consists, further, in a clock in which the ordinary minutes and hours hands are placed below the center of the dial, and a supplemental minutes hand is located at the center of said dial, and each is driven directly or through dial-wheels by the second arbor, substantially as and for the purpose hereinafter shown.

In the annexed drawings, A represents the front plate, and B the back plate, of my movement, which are connected together at their corners and held in relative parallel positions by means of posts C in the usual manner.

Journaled at one side of the frame is the first arbor, D, which is provided with a spring, *d*, and wheel *d'*, the latter being connected with said arbor by a ratchet-wheel and pawl in the usual manner. Below and at the transverse center of the frame is the second arbor, E, which receives motion from the first arbor, D, which motion is imparted to a third arbor, F, that is located above and to the left of said arbor E. A fourth arbor, G, located at the center of said frame, receives motion from said arbor F and imparts the same to an escape-wheel arbor, H, which is located above and to the left of the former. A pallet-arbor, I, and balance-wheel arbor K complete the arbors of the train, each of which is provided with the usual wheels, pinions, &c., and operates in the ordinary manner. The second arbor, E, has heretofore been located at the center of the train, but is now moved to a lower point in order that an arbor for a sweep seconds-hand may occupy such position. Said arbor E is connected with its wheel and pinion by the usual friction mechanism, which permits the former to be rotated within the latter for the purpose of setting minutes and hours hands L and M, respectively, which are driven in the usual manner by the projecting end of said arbor, with the aid of ordinary dial-wheels, N and O. The center arbor, G, projects beyond the front plate, A, and receives a sweep seconds-hand, P, which is adapted to indicate upon a properly-divided circle, *q*, upon the outer portion of a dial, Q, seconds and quarter-seconds. Said arbor, like the second arbor, E, is connected with its wheel and pinion by friction, and may be turned within the same for the purpose of setting said hand P. The projecting end of the arbor G passes through a bridge, R, upon which is provided a sleeve, *r*, that

encircles said arbor and furnishes a bearing for and upon which is journaled a pinion, S, that engages with and receives motion from the dial-wheel O. Said pinion carries a hand, T, which is caused to move around the dial Q once each hour, and to indicate minutes upon a suitably-divided circle, *q*.

The minutes and hours hands L and M are comparatively short, in order that they may not interfere with the center arbor, and are provided upon the dial Q with a suitably-divided circle, $Q^2$, upon which they indicate minutes and hours in the usual manner. It will thus be seen that by my arrangement of the train the usual minutes and hours hands, with a separate dial, are provided, and that in addition thereto I provide an extra minute-hands and a sweep seconds-hand, with dials for each.

While quarter-seconds are marked by the hand P, for many purposes an independent hand would be desirable for such purpose, and such is provided as follows, viz: An arbor, U, corresponding to the escape-wheel arbor H, is placed horizontally opposite to the same, and is provided with a pinion that corresponds to the pinion of said escape-wheel arbor, and in like manner is engaged by the wheel of the arbor G, the result being that said arbors H and U are rotated in the same direction and with the same velocity. The end of the arbor U projects through the front plate, A, and upon the same is journaled a wheel, V, and outside of said wheel is secured a pinion or toothed carrier, *u*. A spring, *w'*, is secured at one end upon the face of said wheel, near its periphery, and from thence extends spirally around said carrier, and at its inner end engages with the teeth of the same.

Journaled within the plate A and a bridge, R, is an arbor, X, upon which is a pinion, *x*, that meshes with and receives motion from the wheel V, and a four-armed pallet, *x'*, which engages with the teeth *y* of an extra escape-wheel, Y, of ordinary form, that is secured upon the projecting end of the escape-wheel arbor H. Said supplemental escape-wheel Y has just twice the number of teeth of the regular escape-wheel. The spring *w'* acts as a maintaining-power, and causes the arms of the pallet *x'* to press against the teeth of the supplemental escape-wheel and to move forward as soon as released by the rotation of the latter, and as the train is timed so that the balance-wheel vibrates four times each second it will be seen that said pallet-wheel will make one complete revolution in said time, and that such revolution will be by four distinct movements, each followed by a period of rest. A hand, $x^2$, secured upon the end of the arbor X, outside of the dial Q, traverses a circle, $q^3$, upon the latter, which circle is divided into four equal parts, each representing one-quarter of a second.

In order that the spring *w'* may not exert too much power upon the wheel V, its inner end is extended outward, as shown in Figs. 2, 3, and 4, over a pin, *v*, that is secured within and projects from the face of said wheel a short distance from the pinion *u* in such position that if an undue pressure is exerted upon said spring by said pinion said pin will act as a fulcrum and cause said engaging end to be lifted out of engagement with said pinion, which latter will then move forward one tooth, and its next succeeding tooth will then engage with said spring.

Should it be desired to stop the motion of the quarter-seconds hand $x^2$ without stopping the train, the arrangement described will permit such operation, the spring *w'* being caused to trip over each tooth of the carrier *u* and at the same time to maintain a sufficient pressure upon the pallet-wheel *x'* to cause the latter to instantly resume its movements when released.

The motion of the train is arrested by means of a bell-crank, Z, which is secured upon an arbor, *z*, that is journaled between the plates A and B, and is located with relation to the balance-wheel *k* so that one of the arms, *z'*, of said part Z may be moved into or out of contact with one side of said wheel by the partial rotation of said arbor. The opposite arm, $z^2$, of said stop Z is connected with a rod, A', which extends upward through the casing B', and is furnished with a button, *a'*, by means of which said stop mechanism may be operated, as described.

Secured at one end to or upon the outer face at the short end of the seconds-hand P is a marker, $B^2$, which has the form shown in Fig. 6, and is constructed of or from spring metal. The free end of said marker, which extends nearly to the point of said hand P, is provided with an arm, $b^2$, that passes rearward toward the dial Q through an opening, *p*, which is formed in said handle near its point. The normal position of the marker $B^2$ is with its point $b^2$ standing away from the dial Q, and by moving said marker outward and then releasing it said point will be caused to impinge sharply upon said dial and to mark the same, either by the transfer of ink or by indentation.

The manipulation of the marker $B^2$ is effected by means of the following-described mechanism, viz: Journaled loosely upon the arbor G is a sleeve, C', which at its outer end is provided with an arm, *c'*, that extends outward through an opening near the center of the hand P and bears against the rear face of said marker. Near its inner end the sleeve C' is provided with a circumferential groove, $c^2$, which is engaged by a lug, $d^2$, that projects from the edge near the longitudinal center of a flat spring, D', which has one end secured upon the plate A, and at its opposite free end, $d^3$, is twisted, so as to give its outer face at such point an upward and rearward inclination. A bar, E', secured vertically upon said plate and capable of vertical motion thereon, is provided at its lower end with a flat lug, *e'*, which extends over the twisted end $d^2$ of said spring D' and has the same inclination of its faces. The bar E' is held at the upper limit of its motion by means of a spring, F', and when moved downward its

lug $e'$ will engage with the twisted end $d^3$ of the spring D′ and move the same and the sleeve C′ rearward until it has passed out of engagement, when, upon being released, said bar will move sharply to the upper limit of its motion, and by such movement press said sleeve and the hand P outward much beyond their normal positions. As said lug $e'$ passes upward out of engagement with said spring end $d^3$ the rearward spring of said hand will cause its point to impinge sharply upon the dial Q and to mark the same, as before described. The upper end of the bar E′ projects through the casing, and is furnished with a button, $e^2$, by means of which it may be pressed downward to operate the marker.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. As a means for operating the quarter-seconds hand $x^2$, the supplemental escape-wheel V, and four-armed pallet $x'$, each independently driven in the manner and for the purpose specified.

2. In combination with the pallet-arbor X and four-armed pallet $x'$, the wheel V, journaled upon the arbor U and connected therewith by means of the spring $w'$, substantially as and for the purpose shown.

3. The combination of the arbor X, provided with the toothed carrier $x$, with the wheel V, journaled upon said arbor and provided with the relieving-pin $v$, and the spring $w'$, secured to said wheel and adapted to engage with said carrier and pin, substantially as and for the purpose set forth.

4. In combination with the marker B′, the sleeve C′, adapted to move longitudinally upon the arbor G, and provided at its outer end with the arm $c'$ and near its inner end with the groove $c^2$, the spring D′, having the lug $d'$ and twisted free end $d^3$, the vertically-movable bar E′, provided with the inclined lug $e'$, and the spring F′, adapted to hold said bar at the upper limit of its motion, substantially as and for the purpose shown and described.

5. A clock in which the ordinary minutes and hours hands are located below the center of the dial, and are driven directly by the second arbor, to which said minutes-hand is attached, substantially as and for the purpose specified.

6. A clock in which the ordinary minutes and hours hands are placed below the center of the dial, and are driven directly by the second arbor, and a supplemental minutes-hand is located at the center of said dial, and is driven through dial-wheels by said second arbor, substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of June, 1882.

JACOB KARR.

Witnesses:
GEO. S. PRINDLE,
W. C. DUVALL.