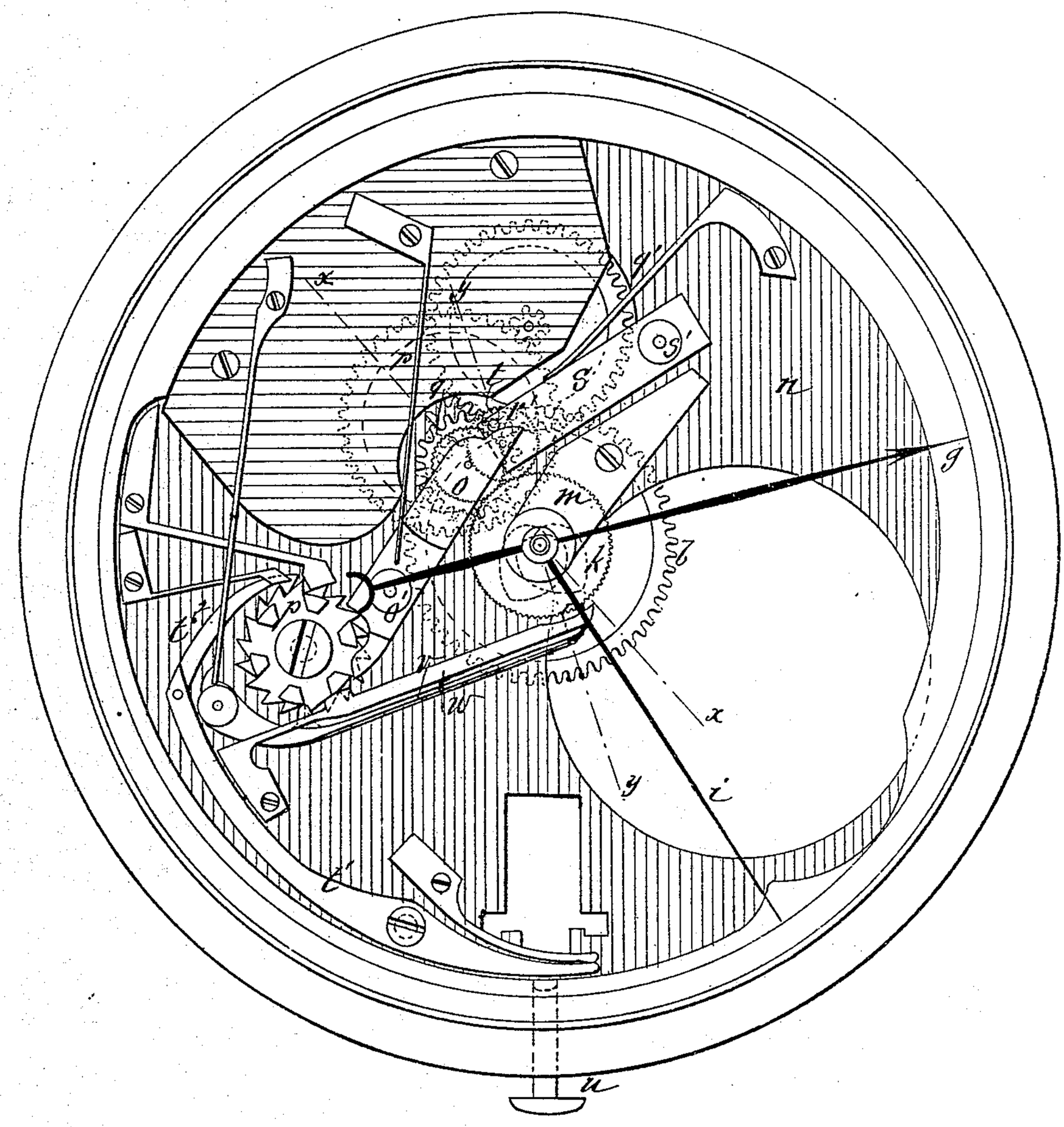
(No Model.) 2 Sheets—Sheet 1.

B. Le COULTRE.

Chronographs.

No. 230,787. Patented Aug. 3, 1880.

Fig. 1



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(No Model.) 2 Sheets—Sheet 2.

B. Le COULTRE.

Chronographs.

No. 230,787. Patented Aug. 3, 1880.

Fig. 2

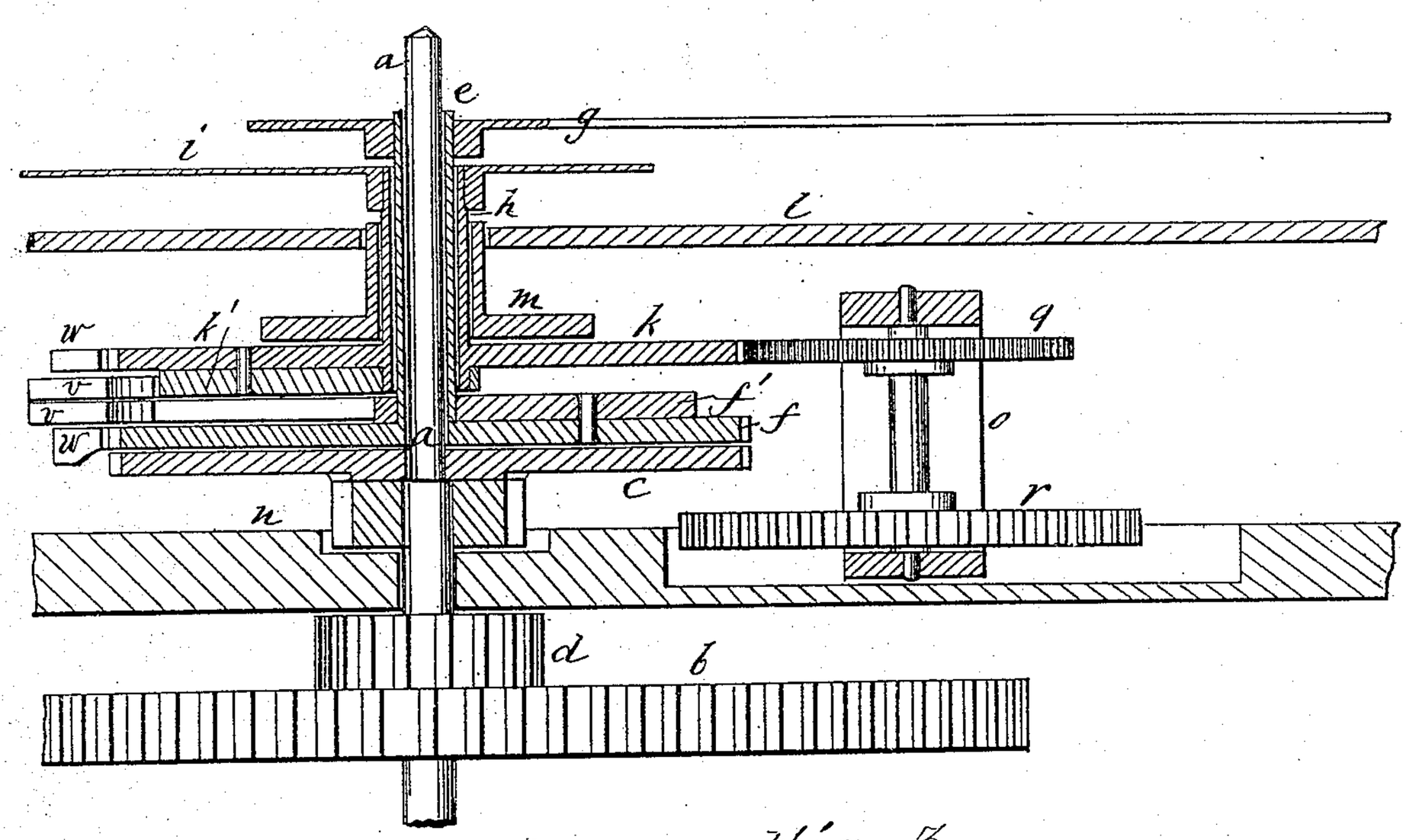
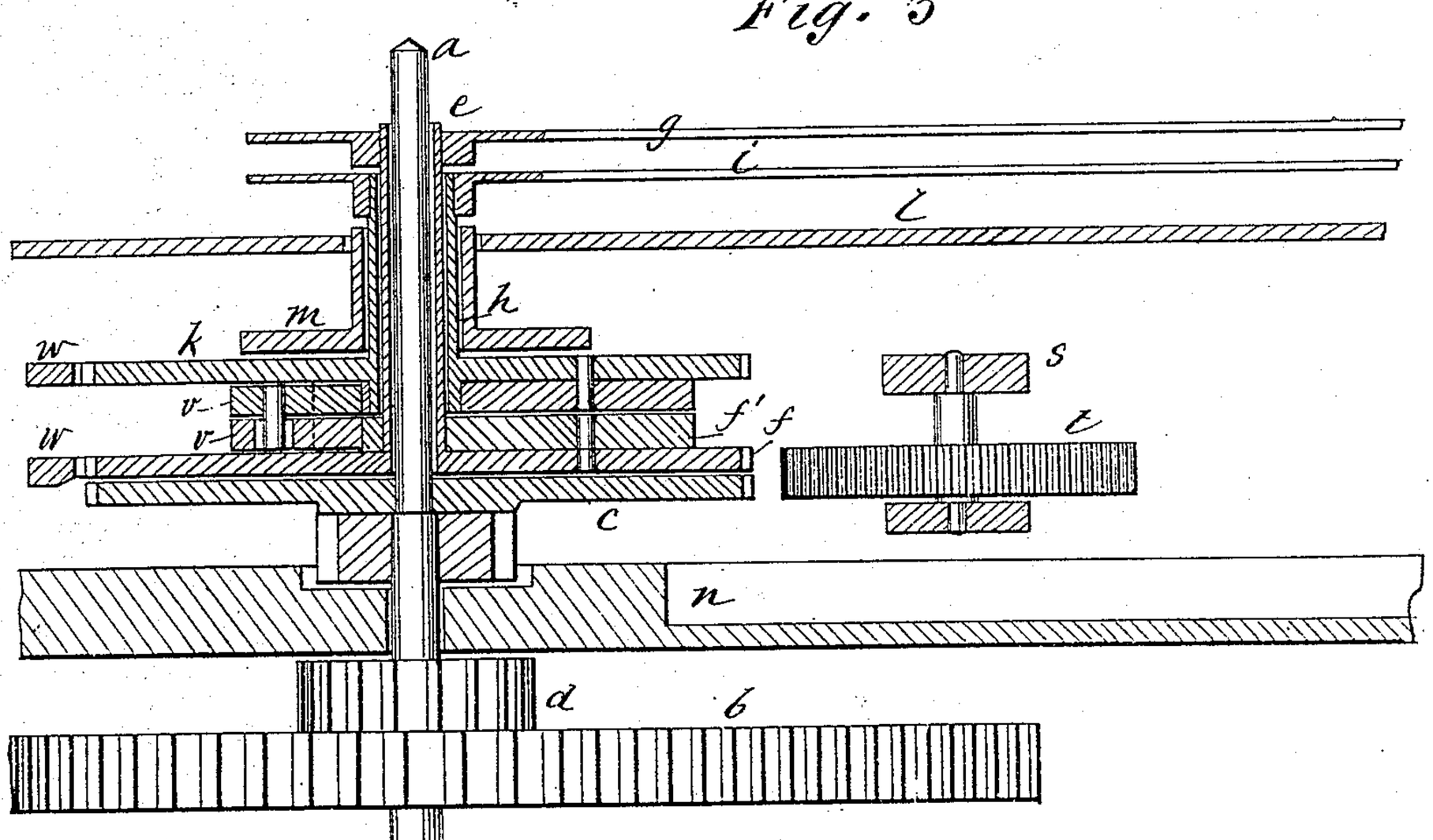


Fig. 3



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UNITED STATES PATENT OFFICE.

BENJAMIN LE COULTRE, OF GENEVA, SWITZERLAND.

CHRONOGRAPH.

SPECIFICATION forming part of Letters Patent No. 230,787, dated August 3, 1880.

Application filed May 31, 1880. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN LE COULTRE, of Geneva, Switzerland, have invented a new and useful Improvement in Chronographs, of which the following is a specification.

The object of my invention is to construct a chronograph having both second and minute hands indicating by one dial and mounted on the same arbor. I fit upon the central arbor of the watch a loose sleeve that carries the minute-hand and a driving-wheel, and outside of this I fit a second loose sleeve carrying the second-hand and a driving-wheel. Upon a lever fitted for movement by a ratchet-wheel in the usual manner are fitted the wheels that operate the second-hand from the center pinion when moved into gear, and upon a pivoted arm that is connected with the lever is a pinion that connects a fixed pinion on the center arbor with the driving-wheel of the minute-hand. The driving-wheels of both the second and minute hands are fitted with heart-cams that are fitted for being acted upon by a T-arm to bring both hands back to the starting-point. By this construction a simultaneous action is obtained on both hands—first, to set them in motion; second, to arrest them; and, third, to return them to the starting-point.

The construction and operation will be described in detail with reference to the accompanying drawings, wherein—

Figure 1 is a face view of a chronograph with my improved mechanism, the dial being removed to show the parts more clearly. Fig. 2 is a cross-section on line *x x*, showing the connecting-pinions for the second-hand. Fig. 3 is a similar section on line *y y*, showing the connecting-pinion of the minute-hand.

Similar letters of reference indicate corresponding parts.

The barrel, trains of gearing therefrom to the center pinion and escapement-wheel, and the escapement-wheel are omitted from the drawings, as they will be of usual character.

a is the center arbor, carrying the pinions *b* and *c* and receiving its movement by the small pinion *d*. *e* is a loose sleeve on arbor *a*, carrying at its inner end the wheel or pinion *f* and at its outer end the minute-hand *g*. *h* is a sleeve loose upon sleeve *e*, and carrying at its outer end the second-hand *i*, and at its inner end the steel wheel or pinion *k* above wheel *f*, which wheel *k* is formed with two hundred and forty teeth. *l* is the dial-plate of the watch, the dial being similar to those of "second" chronographs. *m* is a bridge formed with a bearing for the sleeve *h*, and *n* is a plate carrying the mechanism.

Upon the face of plate *n* a lever, *o*, is hung by a pin, *o'*, which lever at one end extends above the side of a ratchet-wheel, *p*, that is carried by a stud in plate *n*, while the other end of lever *o* extends contiguous to the central arbor, and has fitted in its slotted end a short arbor which carries the pinions *q r*.

Upon the plate *n* is also hung, by a pin, *s'*, an arm, *s*, which is fitted with a pinion, *t*, in its outer forked end, and engages, by a pin, *r'*, with the end of lever *o*. *p'* and *q'* are springs bearing, respectively, on lever *o* and arm *s* to force them toward the center arbor, and thereby engage the pinion *t* with the pinions *e f* and pinion *q* with pinion *k*.

t' is a lever hung on plate *n*, carrying a pawl, t^2, that engages with ratchet *p*, and fitted for movement by a push-pin, *u*, in the usual manner, to turn wheel *p* the distance of one tooth at every depression of the pin. The side of ratchet-wheel *p* is formed with lugs, that come in succession in contact with lever *o* to move said lever and the arm *s* away from the center arbor. There is one of these lugs to every third ratchet-tooth, and they act in succession—first, upon arms *v v*, that extend between the pinions *k f*, to throw said arms outward; second, upon the spring-arms *w w*, that carry brakes bearing on pinions *k f*, to relieve the brakes from the pinions; and, third, on the lever *o*. The arms *v w* are thrown inward by springs when relieved.

Upon the inner adjacent sides of the pinions *k f* are attached heart-cams *k' f'*, and the ends of the arms *v* are formed to bear on said cams and turn said pinions to the starting-point.

The pinions *r q* receive motion through a train of gearing from the pinion *b* on the central arbor to pinion *r*, the latter remaining in gear in both positions of lever *o*. The pinion *q* moves the driving-wheel *k* of the second-hand when in gear therewith, and at the same time the pinion *t* connects the fast pinion *c* with the loose pinion *f*, and thereby transmits the motion of the central arbor to the minute-

and. By this construction it will be seen that both the minute and second hands are upon and driven from the central arbor, and both indicate by a common dial.

In operation, both hands being at the starting-point, the first pressure on the pin moves the pinions *q t* into gear and raises the arms *v w*, so that the hands are turned. The next movement of the pin throws the pinions *q t* out of gear and moves the brake-arms *w* upon the pinions *k f*, thereby stopping the hands. The third movement relieves the arms *v*, so that they are pressed upon the cams *k' f'* and the hands brought back to the starting-point.

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

1. In chronographs, the loose sleeve *e* and pinion *f*, carrying the minute-hand, the central arbor, carrying the fast pinion *c*, and the arm *s*, carrying pinion *t* that connects pinions *f c*, combined together and with the driving mechanism and stop-motion of the second-hand, substantially as shown and described.

2. In chronographs, the pivoted arm *s*, carrying a pinion, *t*, fitted for connecting the movement of the central arbor to the minute-hand, combined with the swinging lever *o*, carrying the connecting-pinions of the second-hand, and with the stop mechanism for moving said lever *o*, all substantially as described.

BENJAMIN LE COULTRE.

Witnesses:
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J. SAVAGE DELAVAN.