(No Model.)

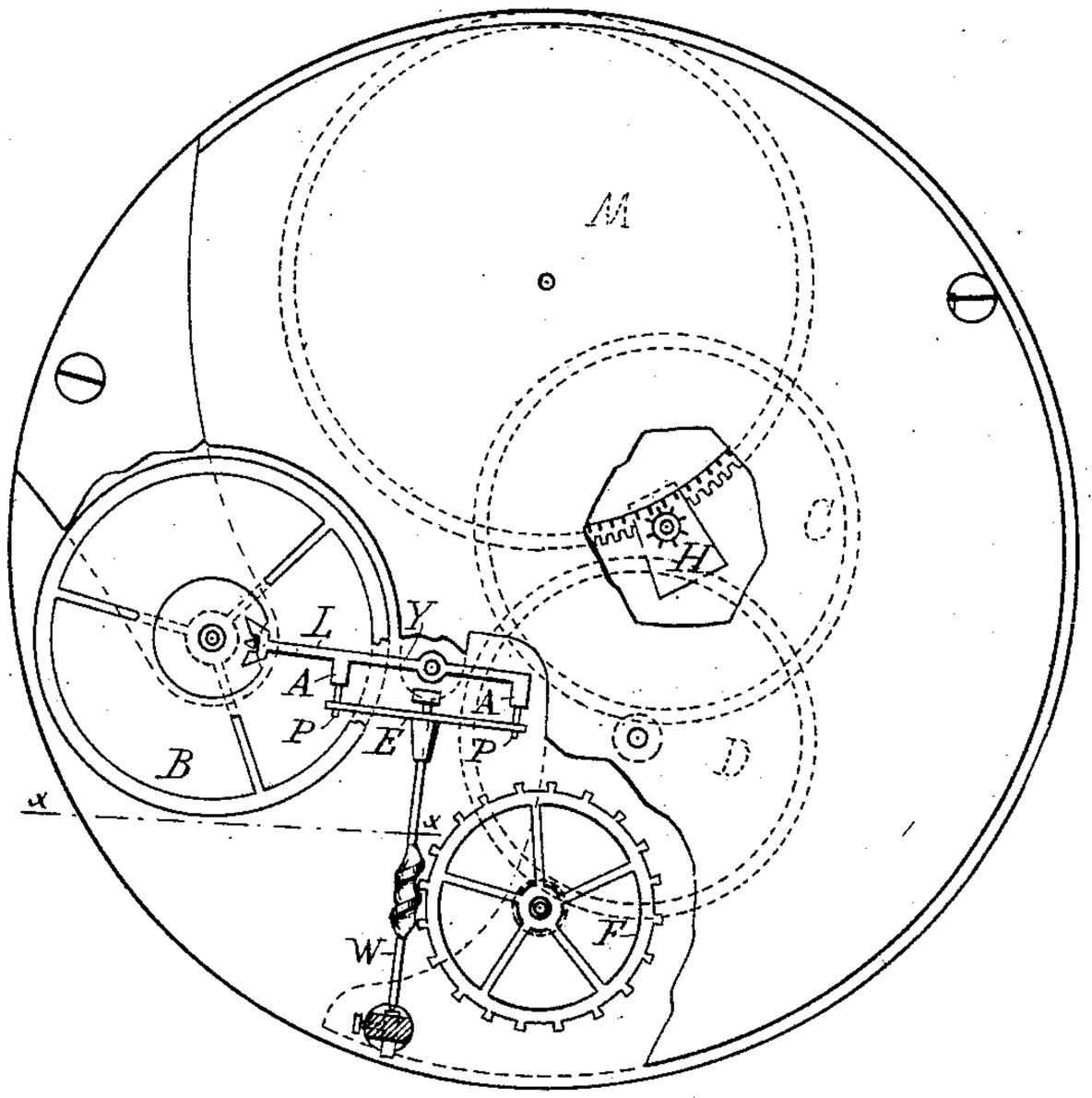
2 Sheets—Sheet 1.

W. HANSON.

WATCH.

No. 371,139. Patented Oct. 4, 1887.

FIG. 1.



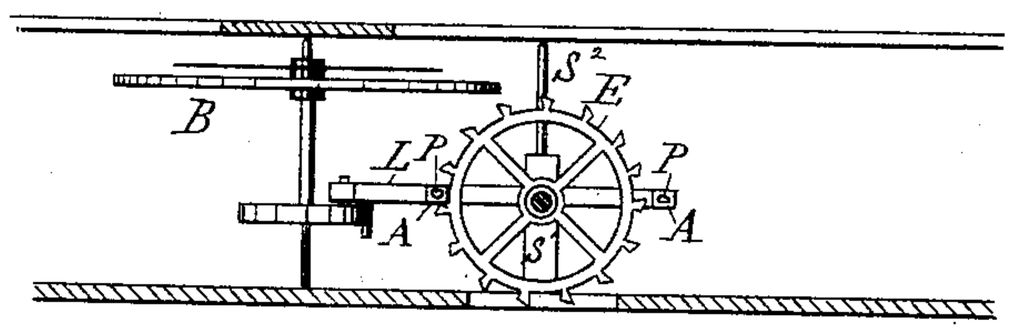


FIG. 2.

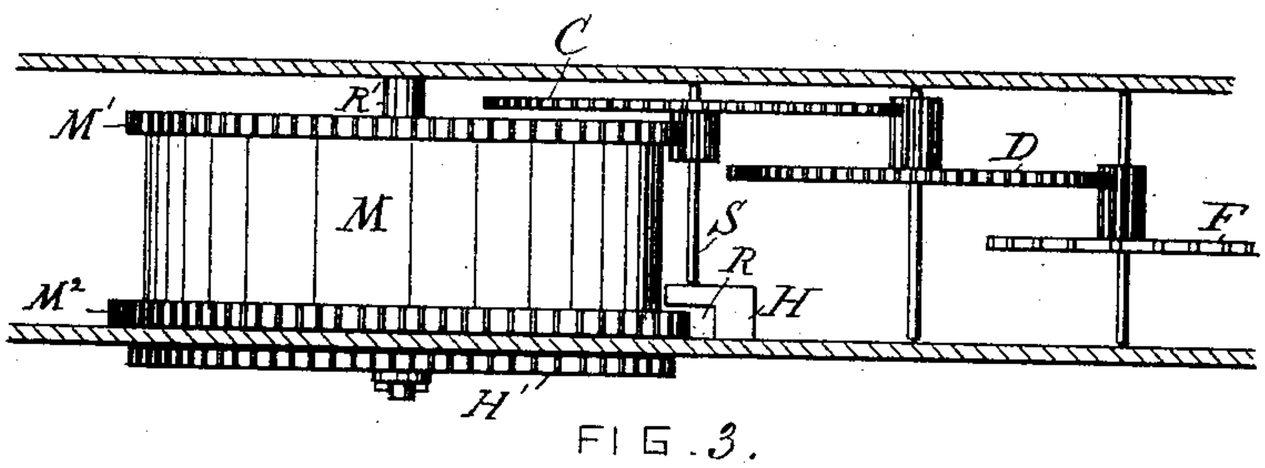


FIG. 3.

WITNESSES

Wm. A. Lowe

Edward S. Berrall.

INVENTOR

William Hanson

(No Model.) 2 Sheets—Sheet 2.

W. HANSON.

WATCH.

No. 371,139. Patented Oct. 4, 1887.

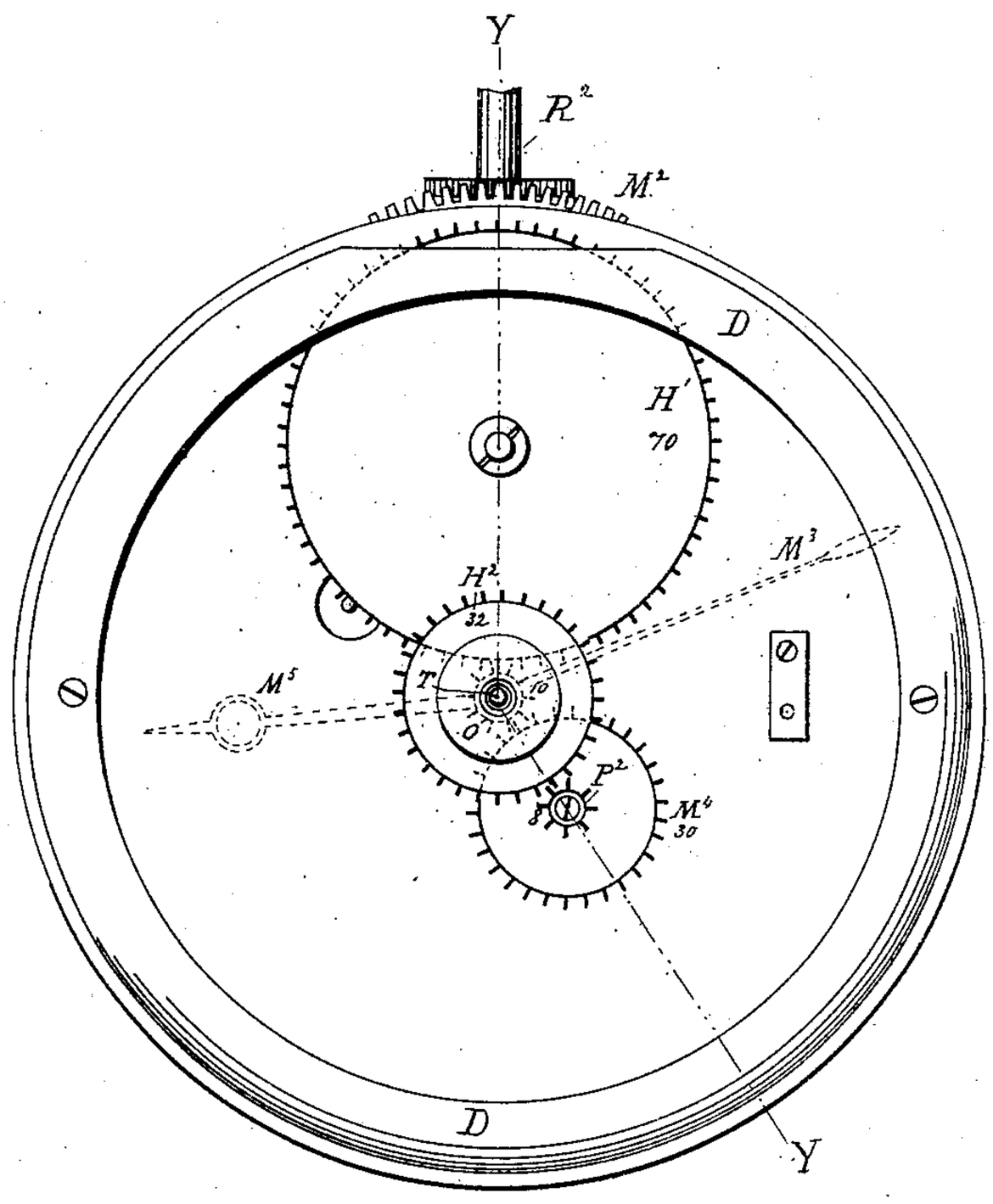


FIG. 4.

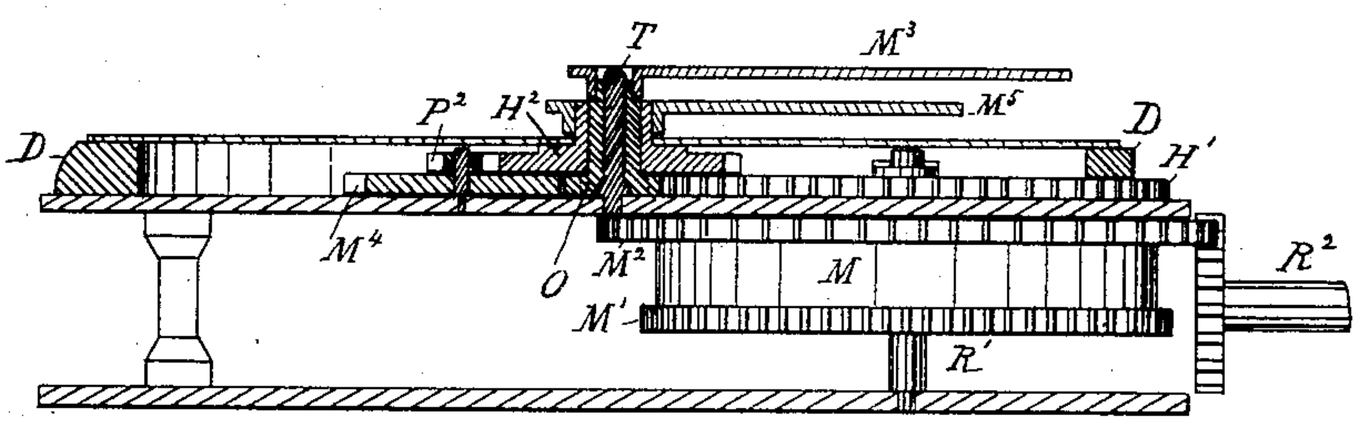


FIG. 5.

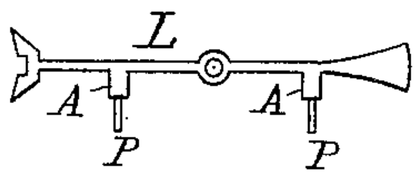


FIG. 6.

WITNESSES

Wm. A. Lowe

Edward S. Berrall.

INVENTOR

William Hanson

UNITED STATES PATENT OFFICE.

WILLIAM HANSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO JAMES A. SKILTON, TRUSTEE, OF SAME PLACE.

WATCH.

SPECIFICATION forming part of Letters Patent No. 371,139, dated October 4, 1887.

Application filed May 1, 1886. Serial No. 200,771. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HANSON, of No. 230 Halsey street, in the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Watch-Movements, of which the following is a specification.

My invention consists in the devices and combinations of devices, as set forth in the claims annexed hereto. The invention relates, particularly, first, to that part of watch-movements which is known under the name of the "escapement," and to the immediately-associated parts of the watch; second, to means used to permit the use of a mainspring-barrel of an enlarged size; third, to means for moving the hands directly from the mainspring-barrel arbor, and, fourth, to means for setting the hands.

The objects of my invention are to provide space for a mainspring-barrel of increased size; to provide a more simple and cheaper escapement-lever; to simplify the mechanism operating the hands and for setting the same, and to organize a watch of a simple construction which may be manufactured at a low cost. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view. Fig. 2 is a sectional view on the line *x x*. Fig. 3 is a side view of the mainspring-barrel and associated parts. Fig. 4 is an opposite plan view. Fig. 5 is a partial sectional view on the lines Y Y, and Fig. 6 is a plan of a counter balance-lever that may be used in place of the lever shown in Figs. 1 and 2.

Similar letters refer to similar parts throughout the several views.

Prior to my invention a contrate escapement-wheel located on the arbor of a worm, which worm was related to the fourth wheel, was shown in Letters Patent of the United States, with a peculiar lever and lever-support located on the side of the contrate-wheel which faced the worm, this lever being connected with the balance-wheel and regulating devices in substantially the ordinary manner.

In a prior application of my own, Serial No. 181,153, filed October 28, 1885, I show a fourth wheel working in a worm on the same shaft which carries a flat escapement-wheel, the lever-staff and the escapement-lever of which, the latter when in its central position, are in direct line with the arbor of the worm-shaft. In the invention shown herein I employ a fourth wheel working in a worm on the arbor of an escapement-wheel which is a flat disk escapement-wheel; but the lever, when in its central position, is not in line with the arbor of the worm. Instead, the lever which forms the connection with the balance-wheel is placed at an angle with the worm-shaft, preferably at a right angle, or parallel with the plane of the escapement-wheel, and on its front side opposite to the worm.

W is the worm-shaft.

E is the flat escapement-wheel.

L is the escapement-lever.

B is the balance-wheel, and F is the fourth wheel, the teeth of which work in the worm for the purpose of actuating the escapement-wheel.

A A are the arms or lugs of the escapement-lever, projecting from the yoke Y of that lever. The lever and the adjacent end of the worm-shaft are supported or pivoted independently for the purposes of free and independent adjustment, the former by the staff S^2 and the latter in the post S′.

M is the mainspring-barrel.

C is the wheel, and D is the intermediate wheel, through which the fourth wheel is actuated in the ordinary way. When extended beyond and on a line with the worm-shaft, the escapement-lever and balance-wheel encroach upon the space which otherwise might be occupied by the mainspring-barrel, the result of which is to compel the use in a watch of such organization of a materially smaller mainspring-barrel. The pallets P P, secured in the lugs or arms A A, act on the teeth of the escapement-wheel E in the same way as in my previous invention before mentioned, and with the same effect; but they are not limited to the positions shown in the drawings, in which the yoke of the lever lies across the center of the escapement-wheel, and the pallets operate upon the escapement-wheel at opposite points on a line drawn through that

center, since the yoke of the lever may possibly be located out of the center of the escapement-wheel and the pallets may operate upon the periphery of the same at other opposite points on lines drawn across the wheel above or below its center.

The lever L in the form shown in the drawings is more simple and may be more economically stamped or cut out of sheet metal than it can be when the long arm of the lever extends from the center of the yoke at right angles or at any angle therewith.

I do not desire to confine myself in this invention to the use of a lever in which that part of the lever which is adjacent to the balance-wheel staff is exactly on a line with the yoke of the lever and at right angles to the worm shaft, since every degree of variation from a continuous straight line and outwardly or away from the mainspring-barrel gives a portion of the desired increased space for the mainspring-barrel, and may be so made for that purpose; but I prefer the formation and location of parts shown in Fig. 1, as more simple and effective than any other. In case it is desired to vary the outer portion of the lever L to any angle or degree between the straight line continuous with the worm and that of the lever, as shown in Fig. 1, it may be done by bending the adjacent end of the lever L to the left away from the plane of the disk escapement-wheel at the base of the adjacent lug or arm A; or the long arm of the lever may be connected with another portion of the yoke Y—as, for instance, at or near the lever staff.

The main wheel M′ is secured to the arbor R′, which arbor extends through the mainspring-barrel M, winding wheel M^2, and setting-wheel H′, the latter being secured to the upper end of the arbor R′ friction-tight. The wheel H′ performs the double function of operating the hour and minute hands through a suitable train of wheels in keeping time and of hand-setting, when necessary, through the same train of wheels, the hand-setting wheel moving with the arbor R′ in keeping time, but being moved around the same in the operation of setting the hands.

The mechanism for moving the hands is operated directly by and from the arbor R′ of the main wheel M′ (which moves with it instead of remaining stationary, as in key-winding watches generally) through the hand-setting wheel H′, which has the same number of teeth as the main wheel, 70, and is friction-tight on its arbor. The barrel proper, M, is secured to the winding-wheel M^2, which is attached to the outer end of the mainspring, and is used to wind it up by means of the stem-winding devices, as shown. The setting-wheel H′ enmeshes with the pinion-wheel of the cannon-pinion O, the upper end of which carries the minute-hand M^3, the cannon-pinion being loosely fitted on the center-post T, which is stationary, being screwed into the plate.

Over the cannon-pinion, and fitting the same loosely, is the hour-wheel H^2, which carries the hour-hand M^5, which hour-wheel H^2 enmeshes with the pinion P^2 of the minute-wheel M^4. The setting-wheel H′ has seventy (70) teeth, as stated. The cannon pinion has ten (10) teeth. The minute-wheel, working in the cannon-pinion, has thirty (30) teeth. The hour-wheel has thirty-two (32) teeth, and is turned by the minute wheel pinion, which has eight (8) teeth.

The setting-wheel, being friction-tight on the main-wheel arbor R′, carries the entire train thus described with the minute and hour hands, so as to properly mark the time, the cannon-pinion being free to move on the post T.

The ordinary method is to spring the cannon-pinion, which carries the minute-hand, friction-tight upon the center-wheel arbor, which is not stationary, but carries the hour wheel and hand through the minute-wheel pinion.

The hour-hand in my invention is fastened upon the socket of the hour-wheel, which is placed over and works loosely on the cannon-pinion. When it is desired to set the hands, it is evidently only necessary to touch and move the setting-wheel at the point near the stem exposed for that purpose, since the setting-wheel will move around the main-wheel arbor on slight pressure being put upon the setting-wheel by thumb or finger, carrying the train which controls the hands.

The operation of winding will be understood from the explanations already given, coupled with an examination of the drawings.

Having obtained additional room for a mainspring-barrel of increased size and capacity on one side by placing the lever L at a right angle with the line of the worm-shaft W, I am met with a further obstacle in attempting to give the desired size to the mainspring-barrel and to the wheels directly connected therewith in the center-wheel arbor as ordinarily located in the center of the watch, the space for which is encroached upon by the winding-wheel and other associated parts of the mainspring-barrel—*i. e.*, in making the mainspring-barrel and winding-wheel of the desired size. To overcome this difficulty I provide the staff S of the wheel C with a pivot or bearing-plate, H, which is undercut at R, so as to allow the wheel M^2 to pass under the staff of the wheel C, which is located at one side of the center, but in such relations to the main wheel M′ that the pinion of the wheel C enmeshes with the main wheel M′, thereby operating the intermediate wheel, D, and the fourth wheel F through their respective pinion-wheels. The center of the watch, however, is made the center of the movements of the minute and hour hands through the mechanism and train thereof connected with the mainspring barrel and arbor by or through the wheel H′, as previously described. The ring D, Figs. 4 and 5, is cut from sheet metal and screwed upon the plate adjacent to the dial, for which latter it becomes the support, as shown in Fig. 5, thereby giving the neces-

sary space and protection to the train which moves the hands, as already described. The ring D is cut away, as shown in Figs. 4 and 5, to give access to the setting-wheel H'.

I have found that a watch made in the manner herein shown, with the bearings only burnished and the blalance-staff alone provided with jewels, all the other parts being made without special finish, will keep excellent time and can be made at a very low cost. I do not desire, however, to limit this invention to watch-movements in which the worm-shaft W, escapement-wheel E, lever L, and fourth wheel F, provided with twenty (20) teeth, are associated with the other parts shown and described, since I am aware that these parts may be substituted by other escapements and associated parts, as by an ordinary escape-wheel and pinion, an ordinary lever and pallets, and a fourth wheel having sixty (60) or any usual number of teeth, having already made such a watch-movement, the escapement being of the ordinary two-pin variety, associated with the enlarged mainspring-barrel, main wheel, setting-wheel, train for moving the hands, stem-winding wheel, &c., as shown in the two sheets of drawings hereof.

One of the advantages of the escapement arrangement, as shown and described herein, is that the lever may be accurately counterbalanced by extending it beyond the inner lug, A, as shown in Fig. 6, and I prefer to make the lever L as a counterbalanced lever, since the counterbalancing of the lever adds much to the value of the watch as a time-keeper and in other respects. Furthermore, the lugs or arms A A may be omitted, the lever being made to consist simply of a straight piece of metal, enlarged only at the center for the staff, the pallets being inserted directly in the lever itself.

Describing a circle around the axis of the lever staff, with a radius-line coincident with the axis of the worm-shaft extending to its outer end, moved to the right toward and beyond the fourth wheel (see Fig. 1) and numbering the quadrants in that order, the fourth wheel may be said to be located in the first quadrant of the circle, the mainspring-barrel and wheel may be said to occupy the second quadrant, leaving the third and fourth quadrants on the side away from or opposite the trains of wheels. As shown in Fig. 1, the lever L is located on the line that separates the third from the fourth quadrant.

As previously stated, I prefer the location shown; but the long or fork arm of the lever may be extended either from the lever-staff or from the outer end of the yoke into the third quadrant, the balance-staff being located therein. The balance-staff, balance-wheel, and fork-arm of the lever being thus located in this third quadrant, large space is thereby obtained for the other parts of the watch-movements, and for their enlargement, if desired.

I am not aware that in a watch in which a worm is used in place of the pinion of the escape-wheel these parts have been located in this third quadrant prior to my invention, herein described and set forth. In my previous application, hereinbefore referred to, the long arm of the lever was located on the line between the second and third quadrants, and my present invention differs therefrom in the respects already stated.

The pivot-plate H is undercut or raised to allow the periphery of the winding-wheel M^2 to pass thereunder. In so doing the wheel M^2 encroaches upon the space which otherwise might be occupied by the center-wheel staff. The stationary center-post T is provided to perform some of the functions which are ordinarily performed by the center-wheel staff, but which that staff cannot perform in this invention, not being in the center of the watch, as previously stated, but being, together with the wheel C displaced therefrom.

What I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. In watch-movements, the following elements: a disk escapement-wheel having upon its arbor a worm for moving the same, in combination with a lever the center of the staff of which is located in line with the center of the escapement-wheel arbor, the yoke and fork-arm of the lever being normally located on a line parallel with the face of the disk escapement-wheel and provided with arms or lugs carrying pallets working in co operation with the teeth of the escapement-wheel.

2. In watch movements, the following elements: a flat or disk escapement-wheel having its arbor provided with a worm and receiving its action from a fourth wheel through such worm, and an escapement-lever the yoke of which is located in a plane parallel with that of the disk escapement-wheel, in combination with a balance staff and wheel located in the segment of the circle formed by a line drawn across the watch on a line with the center or axis of the worm-shaft and opposite to that remaining part of the circle which contains the mainspring barrel and train.

3. The following elements, in combination: the worm and worm-shaft W, the disk escapement-wheel E, and the lever L, which, when in its central or normal position, is parallel to the face of the escapement-wheel E.

4. The worm and worm-shaft W, the disk escapement-wheel E thereon, the balance-wheel B, and the lever L, in combination, when so related to each other that a line drawn through the center of the worm-shaft or arbor and the axis of the escapement-wheel E to the center of the lever-staff will form a right angle with a line drawn through the centers of the lever-staff and of the balance staff.

5. In combination, the worm and worm-shaft W, the disk escapement-wheel E thereon, the balance-wheel B, and the lever L, provided with a fork-arm located at right angles to the prolonged worm-shaft axis.

6. The mainspring-barrel M and the wind-

ing-wheel M^2 united, the main wheel M′ and the arbor R′ united, and the stem-winding arbor and wheel R^2, all in combination.

7. The mainspring-barrel M, winding-wheel M^2, main wheel M′, wheel H′, and the arbor R′, extending through the latter, all in combination, the wheel H′ being secured on the arbor R′ friction-tight for the purpose of operating the hands of the watch and their trains, either in keeping time or in setting the hands.

8. The setting-wheel H′, placed on the end of the arbor R′ of the main wheel M′ friction-tight, and in combination therewith, for the purpose of operating the hands and their trains, and also for the purpose of setting the hands by or through the movement of the setting-wheel H′ and the trains of wheels connecting with the hands, substantially as shown and described.

9. The setting-wheel H′, placed friction-tight on the main-wheel arbor R′, the cannon-pinion O, the hour-wheel H^2, the minute-wheel M^4, its pinion P^2, and the stationary center-post T, in combination.

10. The enlarged winding-wheel M^2 and the enlarged mainspring-barrel M, united to the winding-wheel M^2, in combination with the stationary center-post T, supporting the cannon-pinion O when the winding-wheel M^2 encroaches upon the space usually appropriated to the center-wheel arbor in the center of the watch.

11. The mainspring-barrel M and the winding-wheel M^2 united, the main wheel M′, the wheel C, with its pinion and its staff S, located out of the watch-center, and the undercut or raised pivot-plate H, in combination.

12. The winding-wheel M^2, the main wheel M′, and the wheel C, with its pinion and staff S, located out of the watch-center, all in combination.

13. The main wheel M′, the center wheel, C, and its pinion, the displaced center-wheel staff S, the undercut or raised pivot-plate H, and the wheels D and F, with their pinions, all in combination.

14. In watch-movements, the following elements, in combination: a flat or disk escapement-wheel having its arbor provided with a worm and receiving its action through such worm, and an escapement-lever the yoke of which is located at one side of such escapement-wheel, vibrates in a plane at right angles therewith, and is provided with a counter-balance, substantially as shown.

15. In watch-movements, a flat or disk escapement-wheel, in combination with an escapement lever, the plane of vibration of which is at right angles with the plane of the disk escapement-wheel and of its movement, and is provided with a counter-balance, substantially as shown and described.

WILLIAM HANSON.

Witnesses:
WM. H. BUTTERWORTH,
JAMES A. SKILTON.