This invention relates to a wheel system for wrist-watches mechanisms provided with a second hand in central position. More particularly this invention relates to a watch production, dealing with the wheel system of wrist-watches mechanisms having the second hand in central position.

There exist watch mechanisms provided with a winding drum the height of which is equal to the mechanism thickness. These mechanisms are objectionable in that they are not capable of immediately transmitting the drive from the winding drum to the central gear of the mechanism, and this requires an additional wheel between the drum and the central gear which results in an undesirable increase in the mechanism diameter.

Attempts have been made to decrease the thickness of the watch mechanism by replacing the central second wheel by one or several wheels mounted on an off-center axle. In such mechanisms, the winding drum drives the central gear and the central wheel rigidly connected with it, and which is in mesh with the intermediate gear. Two similar wheels are mounted on the intermediate gear, one of which wheels, rigidly connected therewith, being in mesh with the central second hand, while the other wheel, loosely fitted thereon and driven from the central second gear, is engaged with the side second gear.

Motion is further transmitted in the same way as in mechanisms of the standard type. However, such a wheel system makes it impossible to effect maximum decrease in the mechanism thickness and reduce the same to the height of the winding drum, as the central wheel in this case is placed under the winding drum.

Thus, all efforts for designing a watch mechanism with a central second hand whose thickness would be equal to the height of the winding drum, have as yet been unsuccessful.

All the hitherto existing constructions have led to the necessity of increasing the mechanism diameter, or the mechanism thickness has been increased due to the presence of a central wheel located under the winding drum.

It has now been ascertained that there can be constructed a watch mechanism retaining its optimal diameter and having a thickness which does not exceed appreciably the height of the winding drum.

The present invention is intended especially for small-size mechanisms and for wrist-watch mechanisms in particular. The object of this invention, as already mentioned above, is to construct a maximum possible thin watch mechanism with the second hand in central position.

Another object of the invention is to ensure uniform motion of the second hand without making use of a friction spring which is usually provided for excluding the possibility of arbitrary displacement of such hand by the value of side clearance between the engaged teeth of the second gear and the intermediate wheel. The invention also ensures the absence of wheels mounted at a different level with the balance.

Among other objects of the invention, notice should be made of such grading and operating characteristics of the wrist-watch of this caliber, such as the maximum possible inertia moment of the balance and the maximum duration of watch operation caused by one complete winding of the spring.

Proceeding from the above-mentioned objects, this invention is based on a new device and a combination of units and parts whose construction is described herein.

Generally speaking, this invention may be applied not only to watch mechanisms but also to various kinds of apparatus driven by a winding spring enclosed in a drum, where there is a necessity of reducing their thickness to the minimum.

It should be noted that the present invention ensures the possibility of manufacturing a maximum possible thin watch mechanism with the second hand in central position, which retains all the principal characteristics inherent in the given watch caliber, i.e. without decreasing the accuracy and duration of watch operation, without reducing the vertical distances between the components of the watch mechanism, and also without introducing additional complications in the manufacture of the separate parts as well as in the watch assembly.

Though the present invention is described in accordance with the preferred embodiment, it is understood that it may be subject to certain variations and modifications without departing from the spirit and scope of the invention as defined in the claims as set forth below.

FIG. 1 is an elevational view of a watch mechanism embodying the invention.

FIG. 2 is a plan view of the wheel system, and

FIG. 3 is a plan view showing the wheels located at the face side of the mechanism.

Winding drum 1 meshes with central gear 2 which drives first transmitting wheel 3 in mesh with gear 4 of second transmitting wheel 5 which is rigidly connected thereto and which, in turn, engages intermediate gear 6.

The gear 6 carries two wheels 7 and 8. Intermediate wheel 7 is rigidly secured to gear 6 and meshes with a central second gear 9 on which the central second hand is mounted. Rotation of the central second gear is then transmitted to the third transmitting wheel 8 which is loosely fitted on the axle of intermediate gear 6. The third transmitting wheel 8 is also engaged with side second gear 10 and then, as in the usual standard arrangement, side second wheel 11, rigidly connected with gear 10, transmits rotation to wheel 12 which acts with anchor fork 13 and which fork transmits an impulse to balance 14.

Hour wheel 15 and drum wheel 16 are located respectively under and above the winding drum 1, as is usual for conventional types of watch mechanisms.

Exchange wheel 17 shown in FIG. 3 is positioned to the side of the winding drum and is driven by two transmitting wheels 18.

What we claim is:

1. In a watch movement provided with a second hand in central position, a winding drum, a central gear, an axle for said central gear, means rotating said central gear directly from said winding drum, a second central gear on said axle above said central gear on which a central second hand is adapted to be mounted, an intermediate gear, an axle for said intermediate gear, means encompassed solely between said central gear and said intermediate and lying wholly within the axial dimensions of said drum for transmitting drive from said central gear to said intermediate gear, an intermediate toothed wheel rigidly coupled to said intermediate gear meshing with said second central gear only, a further toothed wheel below and having the same diameter as said intermediate toothed wheel loosely mounted on the axle of said intermediate gear meshing with said second central gear, a side second gear, an axle for said side second gear, said further toothed wheel also meshing with said side second gear, a side second toothed wheel on the axle for
said side second gear, a balance mechanism, a fork co-
operative with said balance mechanism, and gear means
operably connected between said fork and said side sec-
ond toothed wheel for transmitting rotation to said gear
means.

2. The watch movement as claimed in claim 1, where-
in at least a portion of said second central gear is along-
side of said drum and is located within the axial dimen-
sions of said drum.

3. The watch movement as claimed in claim 1, wherein
said further toothed wheel lies in a plane within the axial
dimensions of said drum.

4. The watch movement as claimed in claim 1, wherein
said means for transmitting drive from said central
gear to said intermediate gear includes a pair of gear
wheels meshing with said central gear and intermediate
gear, respectively.

5. In a watch movement provided with a second hand
in central position, a winding drum, a central gear, an
axle for said central gear, means for rotating said central
gear from said winding drum, a second central gear on
said axle on which a second hand is adapted to be
mounted, an intermediate gear, an axle for said inter-
mediate gear, means located between said central gear
and said intermediate gear and lying wholly within the
axial dimensions of said winding drum for transmitting
drive from said central gear to said intermediate gear, an
intermediate toothed wheel rigidly coupled to said inter-
mediate gear meshing with said second central gear, a
second toothed wheel loosely mounted on the axle of said
intermediate gear meshing with said second central gear,
a balance mechanism, a fork cooperative with said balance
mechanism, and gear means operably connected between
said fork and said second toothed wheel for actuating said
fork to transmit an impulse to said balance mechanism.

References Cited in the file of this patent
UNITED STATES PATENTS

2,574,343 Meyer .................... Nov. 6, 1951
2,618,118 Harris et al. ................ Nov. 18, 1952