Nov. 21, 1933. R. H. WHITEHEAD ET AL 1,935,686

TIMEPIECE MOVEMENT

Filed July 25, 1932

Fig. 1.

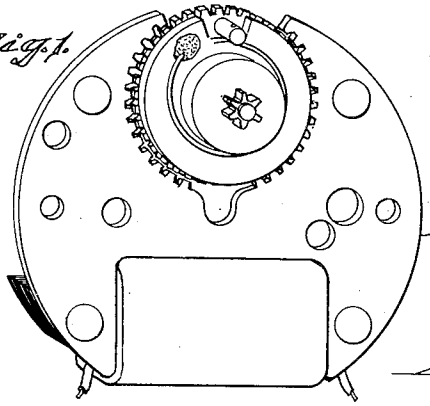


Fig. 2.

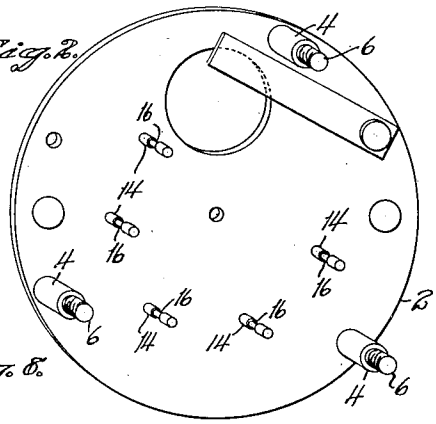


Fig. 8.

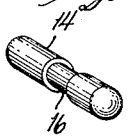


Fig. 3.

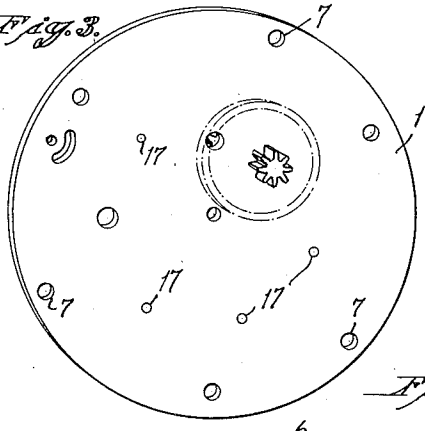


Fig. 4.

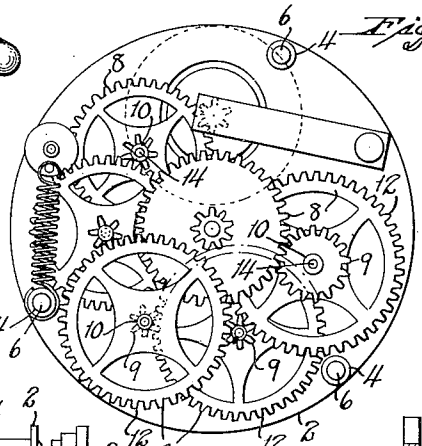


Fig. 6.

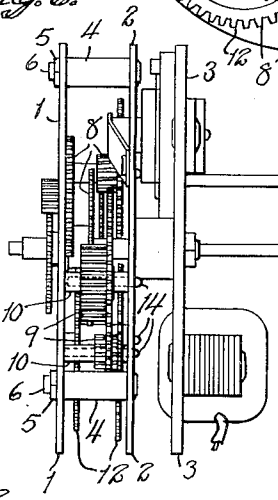


Fig. 5.

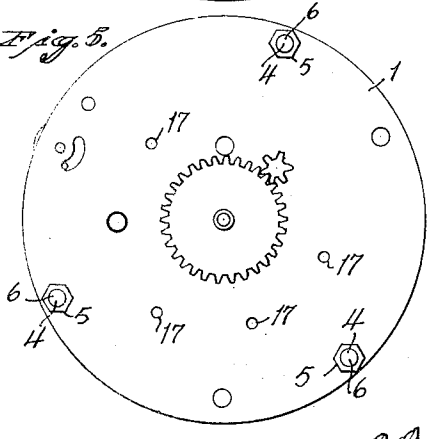


Fig. 7.

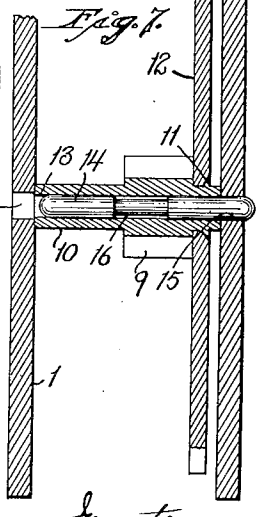
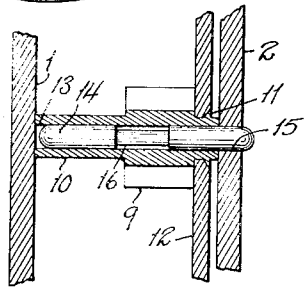


Fig. 9.



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UNITED STATES PATENT OFFICE

1,935,686

TIMEPIECE MOVEMENT

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Application July 25, 1932. Serial No. 624,406

10 Claims. (Cl. 58—7)

Timepiece movements, as ordinarily constructed, comprise two movement plates, commonly called the "front movement plate" and the "back movement plate," provided with bearing means between which are rotatively mounted the arbors of the various gear members comprising the gear train of the movement; the plates referred to being held in relatively fixed spaced relation, and the gear members thus held in their proper rotative bearings, by means of pillars with which the plates are suitably secured.

In assembling timepiece movements constructed in the customary manner as above described, considerable difficulty is often encountered in so arranging and supporting the arbors of the various gear members that their bearing ends will suitably engage the bearing means provided for them in both movement plates when the plates are applied to them. Jigs of various types have been devised for facilitating this operation of assembly, but despite the assistance thus afforded, the time required to properly assemble the parts is, in some instances, especially as regards inexpensive timepieces, entirely disproportionate to the value of the finished timepiece.

The object of the present invention is to provide a means whereby the various gear members may be assembled between the movement plates, without resorting to the use of jigs or other similar positioning and supporting devices, whereby the assembly of the parts may be accomplished much more easily and rapidly than has been possible heretofore.

To this end, the invention consists in a timepiece movement in which each gear member, which usually includes the gear and pinion assembly, has an axial length substantially equal to the distance of separation of the front and back movement plates, each of these gear members being provided with an axial bore within which is inserted a bearing stud carried by one of the plates, the axial length of the gear members, and the spaced relation of the plates substantially commensurate therewith, preventing separation of the gear members from their respective studs; and the invention consists, further, in various structural features of the movement plates, gear members and bearing studs, all as will be explained hereinafter more fully and finally claimed.

In the accompanying drawing illustrating the invention, in the several figures of which like parts are similarly designated,

Fig. 1 is a front perspective view of the motor carrying plate of an electric clock of more or less conventional design;

Fig. 2 is a front perspective view of the back movement plate of the timepiece movement of such clock, certain features of the invention being illustrated in connection therewith;

Fig. 3 is a front perspective view of the front movement plate adapted for cooperation with the back movement plate of Fig. 2 which embodies features of the invention;

Fig. 4 is a front view of the back movement plate with the gear train assembled thereon;

Fig. 5 is a front view of the assembled movement;

Fig. 6 is a side elevation of the same;

Fig. 7 is an enlarged fragmentary sectional elevation illustrating, in detail, the salient feature of the invention;

Fig. 8 is a perspective view of one of the bearing studs; and

Fig. 9 is a view similar to Fig. 7 but showing a modification.

Although the invention resides particularly in the structural details best illustrated in Figs. 7 and 9, a complete timepiece movement embodying the features of the invention has been illustrated in the drawing for the purpose of affording a full disclosure and understanding of the invention.

Referring particularly to Figs. 2, 4 and 6 of the drawing, it will be seen that the particular timepiece movement illustrated includes a front movement or retaining plate 1, a back movement or mounting plate 2 and a motor carrying plate 3, all of which are rigidly connected together to form a compact and efficient mechanism.

The front movement plate 1 and back movement plate 2 are connected in suitable spaced relation, as is customary, by pillars 4, preferably rigidly connected with the back plate 2, and to which the front plate 1 is separably connected by means of nuts 5 applied to their outwardly extending screwthreaded ends 6 which pass through openings 7 (Fig. 3) formed in the front plate to receive them.

As is customary, the gear members, indicated generally by the numeral 8, are assembled between the front and back movement plates 1 and 2. Each of these gear members 8, all of which are broadly similar in construction, comprises a pinion 9 having a hub 10 of an axial length substantially equal to the distance between the plates 1 and 2, and each of these pinions has staked to a portion of its hub, as indicated at 11,

Fig. 7, a gear 12. Each of the gear members is provided with an axial bore 13 extending through it from end to end of its hub.

In order to form rotative bearings for the gear members 8, one of the movement plates, preferably the back plate, carries a plurality of bearing studs 14 equal in number to the number of gear members mounted between the movement plates. As shown in Figs. 7 and 9, these bearing studs are preferably fixedly mounted in the back plate 2 by means of apertures 15 into which they are press fitted, and they therefore extend rigidly from the back plate 2 perpendicular thereto.

All of the bearing studs are preferably alike, are symmetrical as regards their two ends, so that they may be assembled with either end in engagement with the back plate, and are provided with means, illustrated as a recess 16 substantially midway of their length, for the purpose of retaining lubricant within the bores of their respective gear members.

Due to the spaced arrangement of the movement plates 1 and 2, the extent of which is determined by the height of the pillars 4, the gear members, when applied to their bearing studs with the front movement plate 1 thereafter appropriately fixed in position, cannot become disengaged from the bearing studs and must rotate thereon confined between the front and back movement plates.

If desired, the axial length of the hubs 10 of the gear members may be such as to provide for slight end-play of same between the front and back movement plates so as to guard against friction.

It will be obvious, that when a back movement plate is furnished with a plurality of the bearing studs, as illustrated in Fig. 2, it is a simple matter to engage with the studs, in rotative arrangement thereon, the bores of all gear members necessary to produce the complete movement train, and to then apply the front movement plate to the pillars 4 and fasten the same on the pillars by means of the nuts 5, thus securing all of the gear members in operative arrangement between the two movement plates.

It is to be noted that the front movement plate is preferably provided with openings 17 in axial alignment with the studs so that, although the gear members are held against disengagement from the studs by the proximity of their hub-ends to the front movement plate, they and their studs may readily be supplied with lubricant through these openings. As shown particularly in Fig. 7, the openings 17 are preferably of greater diameter than the diameter of the studs, so that in case of irregularity of the axial length of the studs relatively to the two plates the stud ends may, if necessary, extend into these openings and thus guard against distortion of the parts.

If desired, however, the front movement plate may be imperforate at those portions which are axially aligned with the bearing studs, this plate in such case providing at the ends of the gear members adjacent to it blank bearing surfaces against which these ends may bear (see Fig. 9).

It will be apparent, therefore, that it is not necessary, under the practice of the invention, to align bearings for the gear members in the two movement plates, and that the work of assembling the movement is thus greatly facilitated.

A further advantage of the invention is that when the gear members are assembled upon their respective bearing studs, they are supported solely thereby in fixed axial arrangement normal to the back plate 2 and may be transported thus for further assembling operations without danger of becoming lost or displaced.

Various changes and modifications are considered to be within the spirit of the invention and the scope of the following claims.

We claim:

1. In a timepiece movement, a gear member of predetermined axial length and having an axial bore, a bearing stud complemental to said bore, a pair of plates between which said gear member is arranged, and means for connecting said plates in spaced relation at a distance substantially equal to the axial length of said gear member, said stud carried by one of said plates and providing a bearing on which said gear member may rotate, said stud provided intermediate its ends with a recess whereby lubricant may be retained in said bore.

2. In a timepiece movement, a gear member of predetermined axial length and having an axial bore, a bearing stud complemental to said bore, a pair of plates between which said gear member is arranged, and means for connecting said plates in spaced relation at a distance substantially equal to the axial length of said gear member, said stud carried by one of said plates and providing a bearing on which said gear member may rotate, the other plate provided with an opening in axial alignment with said stud, said stud provided intermediate its ends with a recess whereby lubricant introduced through said opening may be retained in said bore.

3. A timepiece movement comprising: a mounting-plate; a retaining-plate secured to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs rigid with and projecting from the said mounting-plate toward the said retaining plate; and gear-members respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

4. A timepiece movement comprising: a mounting-plate; a retaining-plate secured at more than two spaced locations to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs separately formed from and fixedly secured to the said mounting-plate and extending therefrom toward the said retaining-plate; and gear-members respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

5. A timepiece movement comprising: a sheet-metal mounting-plate; a sheet-metal retaining-plate secured to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs separately formed from and fixedly secured to the said mounting-plate and extending therefrom toward the said retaining-plate; and gear-members respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

6. A timepiece movement comprising: a mounting-plate; a retaining-plate secured at more than two spaced locations to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs separately formed from

and fixedly secured to the said mounting-plate and extending therefrom toward the said retaining-plate; and gear-members of substantially the same axial length and respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

7. A timepiece movement comprising: a mounting-plate; a retaining-plate secured to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs separately formed from and fixedly secured to the said mounting-plate and extending substantially the same distance therefrom toward the said retaining-plate; and gear-members respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

8. A timepiece movement comprising: a mounting-plate; a retaining-plate secured at more than two spaced locations to the said mounting-plate in substantially-parallel spaced relation; more than two bearing studs separately formed from and press fitted in openings in the said mounting-plate and extending therefrom toward the said retaining-plate; and gear-members respectively rotatably supported by the said bearing studs, all said gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

9. A timepiece movement comprising: a mounting-plate; a retaining-plate secured to the said mounting-plate in substantially-parallel spaced relation; a plurality of bearing studs separately formed from and fixedly secured to the said mounting-plate and extending therefrom toward the said retaining-plate and each provided intermediate its ends with a recess whereby lubricant may be retained therein; and a plurality of gear-members respectively rotatably supported by the said bearing studs, the said plurality of gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate.

10. A timepiece movement comprising: a mounting-plate; a retaining-plate secured to the said mounting-plate in substantially-parallel spaced relation; a plurality of bearing studs separately formed from and fixedly secured to the said mounting-plate and extending therefrom toward the said retaining-plate; and a plurality of gear-members respectively rotatably supported by the said bearing studs, the said plurality of gear-members being jointly and severally prevented from moving axially off said bearing studs by the said retaining-plate, said retaining-plate being provided with openings adjacent ends of said bearing studs for introduction of lubricant to said studs.

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