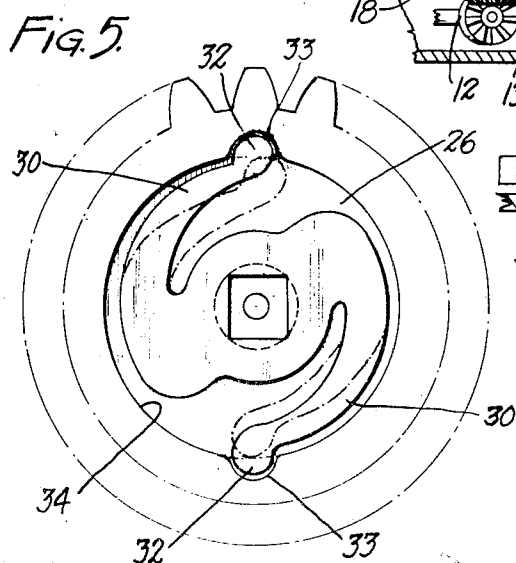
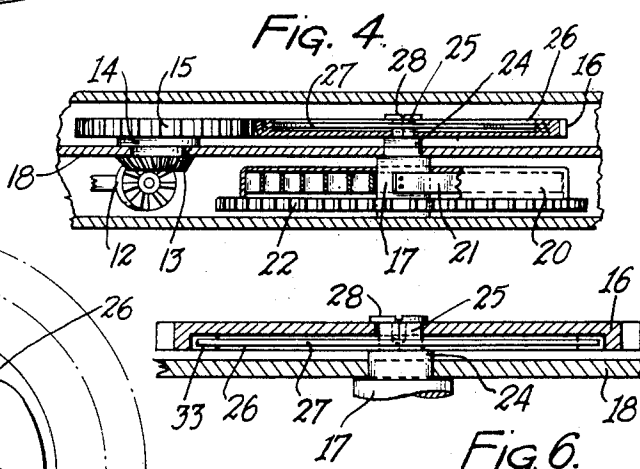
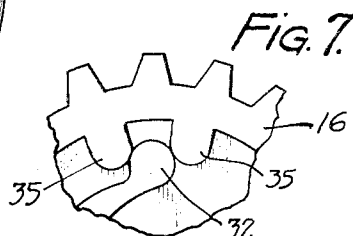
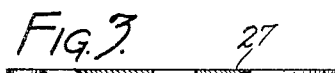
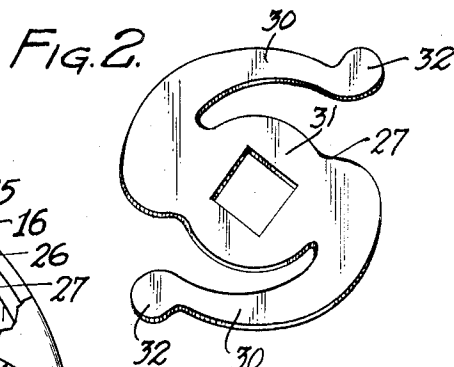
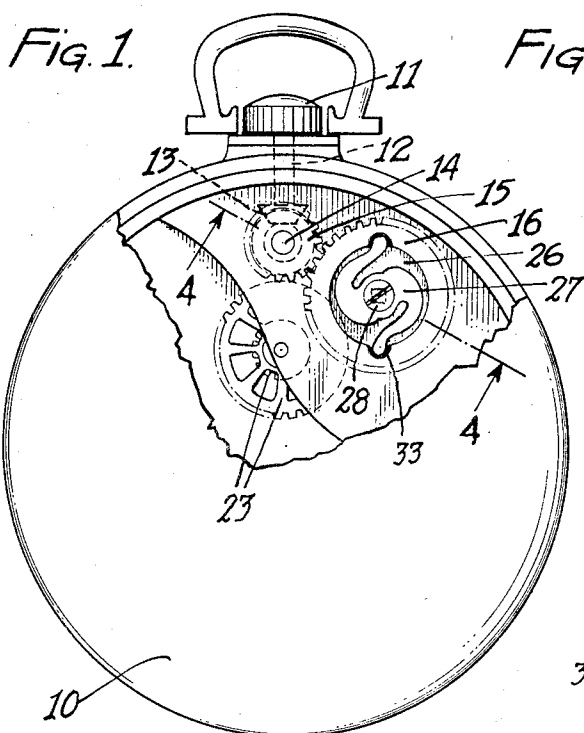


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C. HILL ET AL
 SPRING WINDING DEVICE
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INVENTORS:
 CHARLES HILL &
 CHARLES K. JOHNS
 BY *John Lynch* Att'y.

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SPRING WINDING DEVICE

Charles Hill, Reno, Nev., and Charles K. Johns,
New York, N. Y.

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7 Claims. (Cl. 58—83)

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This invention relates to spring winding means and in particular to a device for connecting two winding mediums in order to protect the parts being wound from damage due to excess winding effort.

In adapting a device of the character disclosed to watches less space is utilized in order to obtain the compact structure so essential in modern time pieces than was possible with the spring tension devices heretofore employed and in which the mounting of the tension member was done on the faces of crown or gear parts and operated toward and away from the faces of the parts in yielding action.

An important object of the invention is to provide a flat tension member the arms of which serve as the yielding agents to provide free action between the parts when a spring being wound attains its fully wound state.

A further object of the invention is to provide a tension member that can be stamped out and tempered, the latter of which can be closely controlled as a step in the manufacture of the spring so that it can be turned out in large quantities and uniform in operating action in accordance with the tension desired in the use to which it is put.

Still further objects of the invention include the provision of a flat tension member whose action and position are coplanar with the member with which it is associated for releasing action, thus conserving space by occupying a recess in the gear or disk to which it is operatively connected; to provide a device of the kind referred to which can be fitted to one of the winding gears of a watch without necessity of supplying a special mounting for said gear; to provide a device that will give an audible click when the spring is fully wound; and to provide a device that will guard against overwinding, stripping of the gears and excess strain on the mainspring, so that rupture of the parts will be prevented.

All of the objects set forth in our copending application Serial No. 761,956 filed July 18, 1947, are embraced within the scope of the present invention with the addition of space saved by the device herein.

With these and other objects in view the invention comprises certain constructions herein-after described and then particularly pointed out in the claim, and a preferred embodiment of our invention is illustrated in the accompanying drawing in which:

Figure 1 is a view of the back of a watch with parts broken away to disclose the application of the invention to the winding wheel thereof,

Figure 2 is a view in perspective of the spring tension member used in connection with one of the gears of a watch structure,

Figure 3 is a view in cross section thereof through the middle of the member shown in Figure 2,

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Figure 4 is an enlarged section taken on the line 4—4 of Figure 1 showing the mounting of the tension device in the winding gear of the watch.

Figure 5 is an enlarged diagrammatic view of a watch barrel arbor and winding gear showing the mounting and action of the tension member therein,

Figure 6 is an enlarged section of the winding wheel portion of Figure 4 showing a reversed position of the wheel and the tension member thereof, and

Figure 7 is a fragmentary showing of a part of a gear showing a modified form of tension member seating means.

Referring to the drawing in detail, 10 indicates a watch, which for the purpose of illustration only, is depicted as a man's pocket style watch which includes the usual winding crown member 11, winding stem 12 operated thereby, the bevel gear combination 13 to operate the stud shaft 14 to which is secured a crown winding pinion 15 meshing with and driving a main winding gear 16 supported on the arbor 17. As shown in Figure 4, the arbor 17 journaled in plate 18 and otherwise mounted in the watch case in the well known manner, passes through a winding drum 20 and has secured thereto one end of a main spring 21. The other end of the spring is suitably connected to the periphery of the drum to drive the same so that the gear teeth 22 formed thereon actuate the watch mechanism in the known manner through the associated gearing 23.

The arbor 17 in that portion which passes through the winding gear 16 may be square or round as desired and the winding gear 16 is provided with a round opening so that it is free to revolve on the arbor at all times. The arbor and the winding gear however will rotate together while the watch is being wound through the medium of a spring tension member used as a winding medium and indicated as at 27.

The upper end of arbor 17 is shouldered as at 24 to provide a support for gear 16 (Figure 4) and a square end 25 above the shoulder 24. The gear 16 is provided with a round opening at its center so that it can revolve freely on the end 25 of the arbor, and is annularly recessed in one face as at 26 to provide a seat in which a spring tension member 27 may be housed in substantially coplanar relation with said gear 16. The upper end of the arbor is provided with a threaded opening to receive the screw 28 which retains the member 27 and gear 16 in place on the arbor and the tension member 27, at its center, has a square opening 29 through which the square end 25 of the arbor fits for driving connection to said tension member.

The spring tension member 27 of relatively thin spring tempered steel is substantially S-shaped with the arms 30 thereof diminishing in width outwardly from a central body disc por-

tion 31 and terminating at their ends in lobes 32 of circular shape adapted to seat in semi-circular notches 33 or seats formed in the vertical wall 34 of the recess 26 of gear 16. The lobes 32 fit into the seats 33 less than the radial dimension thereof so that on movement of the gear 16 in either direction the lobes will ride out of the seats and along the vertical wall 34 of the recess 26 as indicated in outline in Figure 5 when the spring 21, being wound by the arbor, offers fully wound resistance to the further rotary movement of gear 16. Rotation of the gear 16 after the fully wound condition of spring 21 will provide an audible clicking sound due to the action of the lobes riding over said seats 33.

In the modified form shown in Figure 7, the gear 16 may be shaped as at 35 to provide inwardly directed, radially disposed projections to provide the detent means or notches similar to 33 for the lobular end 32 of the spring tension member 27.

The gear 16 may be placed on the arbor with the recess up or down as shown in Figures 4 and 6, respectively, in which latter case the tension member 27 will be hidden. Also, while the member 27 is shown in connection with the driving gear 16 it can be equally well employed in connection with the winding pinion 15 and a suitable square portion on the stud 14 as employed on arbor 17. The tension member 27 constitutes a spring tensioned yieldable driving connection between the gear and the shaft upon which the gear is mounted for free rotation so that resistance of the shaft to turning movement, indicating a fully wound spring, will cause the gear to rotate relatively to the member 27 without further affecting winding action of said shaft.

While we have shown a flat disklike member 27 it is to be understood that a device of similar nature within the scope of the invention could be made from wire or flat steel strip stock in the shape disclosed and having lobular ends for engagement with gear seats which may be used in any member desired that is, one or more; or that, as shown in Fig. 7, projections 35 to provide a seat for the lobe 32 of the tension member.

Our invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the invention or sacrificing the advantages to be derived from its use.

What we claim is:

1. The combination with a spring winding gear and arbor structure of a watch having an annular main recess in one face of the gear, a spring tension member flat in the plane of the gear and, seated in said main recess, means for securing the tension member to the arbor for rotation therewith, seat recesses in said gear opening radially from said recess, arms on said tension member, lobes on the ends of said arms for close interfitting relation with said seat recesses and providing a spring winding connection between the gear and the arbor, and said arm being yieldable for disengagement of said lobes from said recesses to provide free rotation of the gear with respect to said arbor when the spring is wound.

2. The combination with a spring winding gear and arbor of a watch structure of the character set forth in claim 1 wherein the tension member is disposed in coplanar relation with the gear in the recess of which it is seated.

3. The combination with a spring winding gear and arbor structure of a watch having a recess in one face of the gear of the structure providing an annular seat therein and a concentric vertical annular wall bounding said seat, a seat recess opening outwardly from said wall, a tension member shaped to provide a flat body portion and a flat spring arm extending from said body portion and presenting an enlarged end for engagement at said enlarged end thereof with said seat recess, means for securing said body portion to the arbor to provide a driving connection between the gear and the arbor, and said arm being yieldable for disengagement of the enlarged end thereof from said seat recess to provide free rotation of the gear with respect to said arbor when the spring is wound.

4. The combination with the spring winding gear and arbor structure of a watch set forth in claim 3 wherein said seat recess and the end of said arm are substantially semi-circular in shape.

5. The combination, in a watch structure of, an arbor, a gear mounted for free rotation on the arbor and having a recess in one face thereof presenting an annular concentric vertical wall adjacent the periphery of the gear, a substantially S-shaped flat spring tension member secured to said arbor and housed in the gear recess, the ends of said tension member constituting spring arms having flat lobe shaped ends yieldable in coplanar relation with the member for engagement with said wall, and openings in said wall constituting seats for the ends of said arms to provide a yieldable driving connection between the gear and the arbor.

6. In a device of the character set forth in claim 5 wherein the arms are radially tapered and are shaped at the outer ends to provide substantially circular lobes for audible engagement with said seats when the gear rotates relatively to said arbor.

7. A yieldable separate driving connection between the winding gear train and the spring winding arbor of a watch comprising a flat spring tension member fixed to said arbor and having a radial arm, a recess in a face of one of the gears of said train and means associated with the periphery of said recess providing a seat for yieldably detaining the outer end of the radial arm of said tension member, and said radial arm being yieldable in the plane of said tension member to snap into and out of said seat to provide an audible signal when the spring of the watch is wound to a predetermined tension.

CHARLES HILL.
CHARLES K. JOHNS.

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