

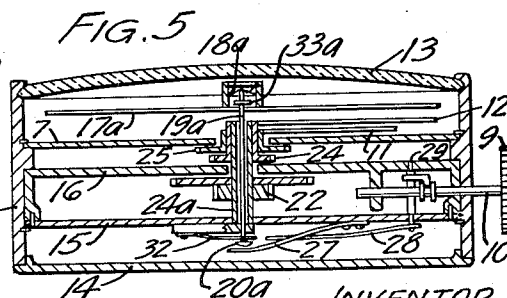
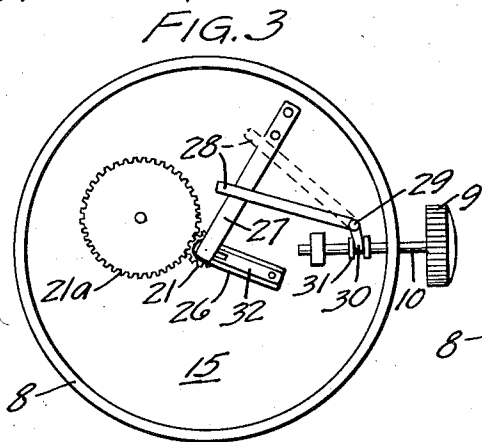
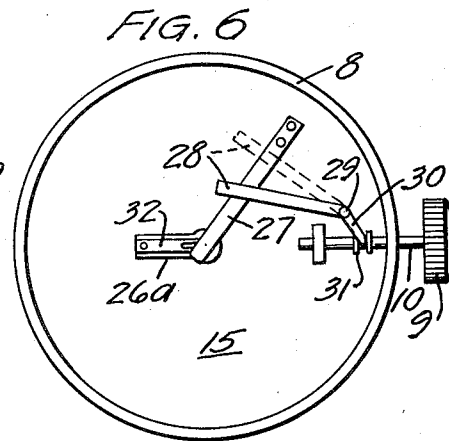
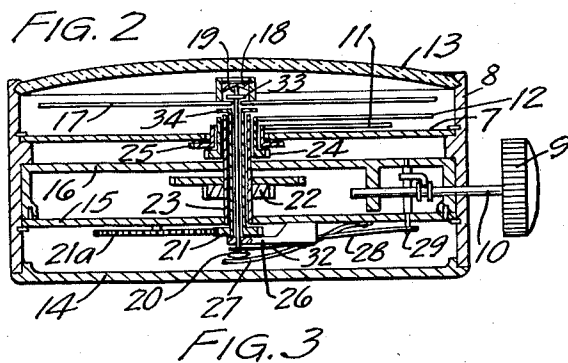
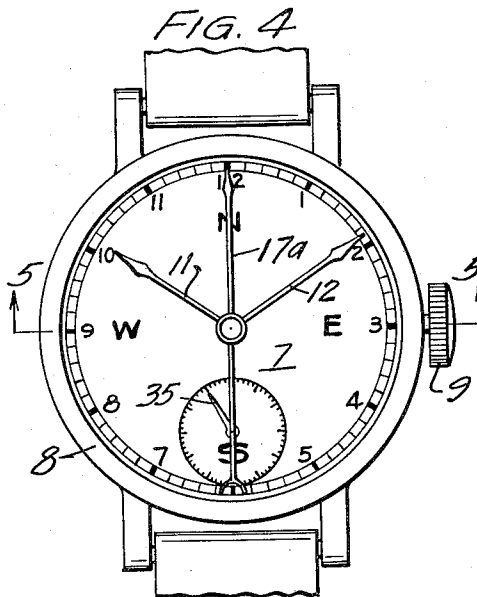
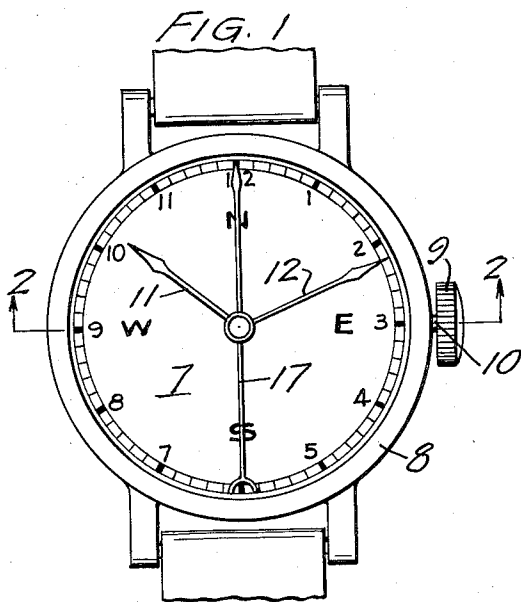
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COMBINATION WATCH AND COMPASS

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COMBINATION WATCH AND COMPASS

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This invention relates to a combination watch and compass having a compass needle which is mounted for rotation about the axis of the watch dial train and particularly to improved means for supporting the compass needle and for moving it to and from its active position in which it floats freely on a supporting shaft.

It is an object of my invention to provide, in connection with watch movements of conventional types, novel mechanism for supporting a compass needle at the center of the dial and for actuating the needle to and from an active freely floating position.

Another object is to provide compass mechanism which is adapted to be embodied in watch movements of several of the conventional or standard types with only minor alteration of or additions to the watch mechanism.

A particular object is to provide in mechanism of the class described a compass shaft carrying a compass needle on its front or normally upper end and movable longitudinally within the hollow center pinion shaft of a watch movement to move the needle from a retracted position in which it turns with the hollow center pinion shaft to an extended position in which the compass needle is free to rotate on its shaft.

A further and particular object is to provide in mechanism of the class described a compass needle which when not in use as a compass functions as a sweep second hand of the watch.

Other objects will appear and be more fully pointed out in the following specification and claims.

Referring to the accompanying drawing, which illustrates, by way of example and not for the purpose of limitation a preferred and modified form of my invention:

Figure 1 is a front elevational view showing a watch with the crystal removed and having my improved compass mechanism of the type wherein the compass needle operates as a sweep second hand;

Fig. 2 is a diagrammatic cross sectional view taken on the line 2—2 of Fig. 1 through the watch dial train and case showing my improved compass mechanism and with the compass needle in its active position;

Fig. 3 is a back side view with the back of the watch removed, showing the compass actuating mechanism mounted at the back of the pillar plate and in the active position;

Fig. 4 is a front elevational view, with the crystal removed, showing a modification of my compass attachment on a watch of another type;

Fig. 5 is a diagrammatic cross sectional view taken on the line 5—5 of Fig. 4 showing the modified form of dial train and compass, with the compass needle in its free or active position, and

Fig. 6 is a back view of the compass actuating mechanism of the modified form shown in Figs. 4 and 5 and in the needle freeing position.

My invention is illustrated in connection with watch movements of conventional types, each having a dial 7 carrying the usual or suitable dial markings and additional markings suitable for a compass. Other elements of the

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watch shown comprise a case 8, winding mechanism having a crown 9 and stem 10 of conventional type and an hour hand 11 and minute hand 12. In Figs. 2 and 5 the dial is shown, diagrammatically, beneath a covering crystal 13 and the case 8 is shown with a back 14 and enclosing pillar plates 15 and 16 and the dial train, all diagrammatically. Many parts of the conventional watch movement including the power assembly, power train, escapement, balance wheel and much of the winding and setting mechanism are omitted from the drawing since they form no part of the present invention. It is, of course, essential that the entire watch be of non-magnetic construction in order to permit free rotation of the compass needle on its shaft when released for use as a compass.

Referring to Figs. 1 and 2, my improved compass needle 17 has at its normally upper side a jewel bearing 18 adapted to support the needle when in active position on the pointed upper end of a compass shaft 19. This shaft extends axially of the dial train from above the needle to the back of the train where a head 20 is formed on the shaft to be engaged by members, hereinafter described, for actuating the pinion longitudinally. The dial train shown in Fig. 2 includes a hollow sweep second pinion 21 and its shaft in which the compass shaft 19 is journaled, a center wheel 22 having a hollow shaft 23, and a cannon pinion 24 having a hollow shaft exteriorly of the shaft 23 carrying the minute hand 12 on its front or upper end. A sweep second wheel 21a actuates the pinion 21 and its shaft. Also shown is an hour wheel 25 and its hollow shaft fitting the exterior surface of the shaft carrying cannon pinion 24 and having the hour hand 11 fixed on its front end.

A sweep second pinion bridge 26 (Figs. 2 and 3) affords a bearing for the compass shaft 19, being rigidly mounted on the plate 15. At the back of this bridge and resiliently engaging the lower or back side of the head 20 is a spring 27 having one end fixed on the plate 15. The free end of this spring engages the head 20 and is movable by a lever 28 to extend the shaft 19. One end of the lever 28 is fixed on a detent screw 29 and the other end portion slidably engages the back side of the spring 27. The detent screw 29 is a part of the conventional watch movement and is oscillated about its axis when the stem 10 of the watch is moved in or out longitudinally to and from its hand setting position. In such movements a detent screw 29 is operatively connected to a clutch lever 30 and the latter is adapted to be actuated by a clutch wheel 31 shown diagrammatically in Figs. 2, 3, 5 and 6.

Pulling the stem 10 and crown 9 out actuates the lever 28 from the broken line position to the full line position shown in Fig. 3 and causes the spring 27 to move the compass shaft 19 and head 20 inward or toward the front of the watch. When the crown 9 is pushed inward the spindle 10 acting through the clutch wheel 31, clutch lever 30 and screw 29 moves the lever 28 to the retracted broken line position and allows the center pinion to return downward toward the back of the watch. A tension spring 32 is arranged to bias the compass shaft 19 downward by engagement with the upper side of the head 20. This spring 32 extends along the lower side of the bridge 26 and is fixed at one end thereon. The other end of the spring 32 is bifurcated to straddle the shaft 19 and engage the head 20.

Near the upper or front end of the compass shaft 19 this shaft is formed with a detent 33 having the form of an annular flange adapted to engage the upper side of the compass needle 17. At the opposite side of the needle the shaft of the hollow sweep second pinion 21 is provided with an annular flange 34 adapted to frictionally engage the lower side of the needle when the shaft 19 is moved downwardly by the spring 32.

When the compass needle is to be used, the watch is held with the dial in substantially horizontal position and the crown 9 is pulled out to extend the compass shaft 19 upwardly and thereby lift the needle 17 from frictional engagement with the flange 34 so that the needle floats freely with its jewel bearing 18 on the point of the shaft 19. To render the needle 17 inoperative as a direction indicator and cause it to function as a sweep second hand, the crown 19 is pushed in. The lever 28 is thereby retracted, freeing the spring 27 for downward movement and causing the tension spring 32 to retract the shaft 19 to its position wherein the needle 17 is frictionally held between the flange 33 on the shaft 19 and flange 34 on the shaft of the sweep second hand pinion 21. This pinion and its shaft are continuously turned at the rate of one revolution per minute by the clock mechanism. Thus the needle 17 is caused to function as a sweep second hand when not in use as a compass needle.

Referring to the form of my invention shown in Figs. 4, 5 and 6, the principal elements of a watch of conventional type are designated by the same reference numerals as in Figs. 1, 2 and 3. In this modification a compass needle 17a, when in inactive position, is caused to turn with the minute hand which is frictionally driven from the hollow shaft of cannon pinion 24 (Fig. 5). The compass needle 17a has a jewel bearing 18a adapted to be supported on the pointed upper end of a shaft 19a similar to the shaft 19. The shaft 19a is movable longitudinally in a hollow center shaft 24a upon which the cannon pinion 24 is friction tight. As further shown in Fig. 5, the hour hand 11 is mounted to turn with the hour wheel 25 and the center wheel 22 of the watch movement is also shown. A second hand 35 and associated dial is shown in Fig. 4.

My mechanism for actuating the compass shaft 19a carrying the needle 17a is similar to that hereinbefore described for actuating the shaft 19. The back or lower end of the shaft 19a is provided with a head 20a disposed to be engaged on one side by the spring 27 and at the other side by the tension spring 32 which is mounted on a bridge 26a. The mechanism also includes the engaging lever 28 operatively connected to the stem 10 by the clutch wheel 31, clutch lever 30 and detent screw 29.

To render the compass needle 17a active so that it floats freely on the upper end of the shaft 19a, the crown 9 is merely pulled out as hereinbefore described. This causes the lever 28 to actuate the spring 27 to move the shaft 19a to its upwardly extended position. The needle 17a is thus freed to point to the magnetic north when the watch is held with the dial in substantially horizontal position. A detent comprising an annular flange 33a is provided on the shaft 19a above the needle 17a for engagement with the upper side of the needle when the shaft 19a is retracted. To retract this shaft and render the needle 17a inactive, the crown 9 is merely pushed in. This allows the tension spring 32 to retract the shaft 19a and draw the needle 17a down against the upper end of the cannon pinion shaft 24a carrying the minute hand 12. Thereupon the needle 17a turns with the minute hand. It may be aligned with the minute hand by suitable manipulation of the watch before the needle is retracted to its inactive position.

Modifications of the mechanism described herein may be made within the spirit of my invention as defined in the appended claims.

I claim:

1. In a combination watch and compass, watch mechanism having a dial, minute and hour hands movable over the dial face, and a hollow center pinion shaft, the improvements which comprise, a compass shaft coaxially mounted in said hollow center pinion shaft and projecting therefrom at the front end thereof, said compass shaft being movable longitudinally in said hollow pinion shaft, a compass needle having a bearing rotatably mounted on the projecting end of said compass shaft, detent means carried by said compass shaft for engaging said

compass needle to retain it against rotation relative to said hollow center pinion shaft and means for selectively moving said compass shaft longitudinally to either an extended position in which the compass needle is free to rotate on said compass shaft or to a retracted position against said hollow center shaft in which said needle is retained against rotation on the center pinion shaft by said detent means.

2. A combination watch and compass according to claim 1 wherein said means for selectively moving said compass shaft longitudinally comprises, manually operable means operatively connected to said compass shaft for actuating it to said extended position.

3. A combination watch and compass according to claim 1 wherein said means for selectively moving said compass shaft longitudinally comprises, spring means operatively connected to said shaft for retracting it, and manually operable means operatively connected to said shaft for actuating it to said extended position.

4. A combination watch and compass according to claim 1 wherein said hollow center pinion shaft comprises a sweep second, constantly rotating shaft whereby said compass needle is operative as a sweep second hand when said detent is in engagement with said needle.

5. A combination watch and compass according to claim 1 having a hollow cannon pinion shaft carrying the minute hand and wherein said hollow center pinion shaft has a friction drive connection with the said cannon pinion shaft of the watch whereby said compass needle is rotated with the minute hand when said detent is in engagement with said needle.

6. In a combination watch and compass, watch mechanism having a dial, minute and hour hands movable over the dial face and a dial train including a hollow center pinion shaft, the improvements which comprise, a compass shaft coaxially mounted in said hollow pinion shaft and projecting at the front and back ends thereof, said compass shaft being movable longitudinally in said hollow pinion shaft, a compass needle having a bearing rotatably mounted on the front end of said compass shaft, detent means carried by said compass shaft for engaging said compass needle to retain it against free rotation relative to said hollow center pinion shaft and means operatively connected to the projecting back end portion of said compass shaft for selectively moving said compass shaft longitudinally to either an extended position in which the compass needle is free for rotation thereon or to a retracted position in which said needle is retained against rotation by engaging it with said detent means and hollow center shaft.

7. A combination watch and compass according to claim 6 wherein said means for selectively moving said compass shaft longitudinally comprises, spring means operatively connected to said compass shaft for moving it to said retracted position, and manually operable means operatively connected to the back end portion of said compass shaft for actuating it to said extended position.

8. A combination watch and compass in accordance with claim 6 wherein said compass shaft has a head fixed on the back end portion thereof, and said means for selectively moving said compass shaft longitudinally comprises a spring engaging said head at one side to bias said compass shaft toward said retracted position, a spring finger engaging the opposite side of said head for moving said compass shaft to said extended position and manually operable means operatively connected to said spring finger for causing it to move said compass shaft to said extended position.

9. A combination watch and compass according to claim 6 wherein said hollow center pinion shaft comprises, a sweep second, constantly rotating shaft whereby said compass needle is operative as a sweep second hand when said detent is in engagement with said needle.

10. A combination watch and compass according to claim 6 having a hollow cannon shaft carrying the min-

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ute hand of the watch and wherein said hollow center pinion shaft has a friction drive connection with said cannon pinion shaft whereby said compass needle is rotated with the minute hand when said detent is in engagement with said needle.

11. In a combination watch and compass, watch mechanism having a dial, minute and hour hands movable over the dial face, a winding and setting stem and a hollow center pinion shaft, the improvements which comprise, a compass shaft coaxially mounted in said hollow center pinion shaft and projecting therefrom at the front and back ends thereof, said compass shaft being movable longitudinally in said hollow center pinion shaft, a com-

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pass needle having a bearing rotatably mounted on the front end of said compass shaft, detent means carried by said compass shaft for engaging said compass needle to retain it against rotation relative to said hollow center pinion shaft, and means operatively connected to said stem for selectively moving said compass shaft longitudinally to either an extended position in which the compass needle is free to rotate on said compass shaft or to a retracted position in which said needle is caused to rotate with said hollow center pinion shaft.

No references cited.