Jan. 25, 1955 G. W. TRICHEL 2,700,272

CLOCK WITH DETACHABLE DIAL TRAIN UNIT

Filed July 21, 1949 2 Sheets-Sheet 1

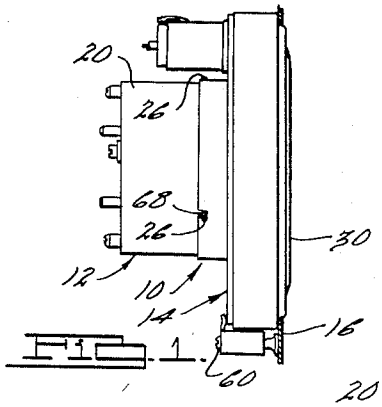

FIG. 1.

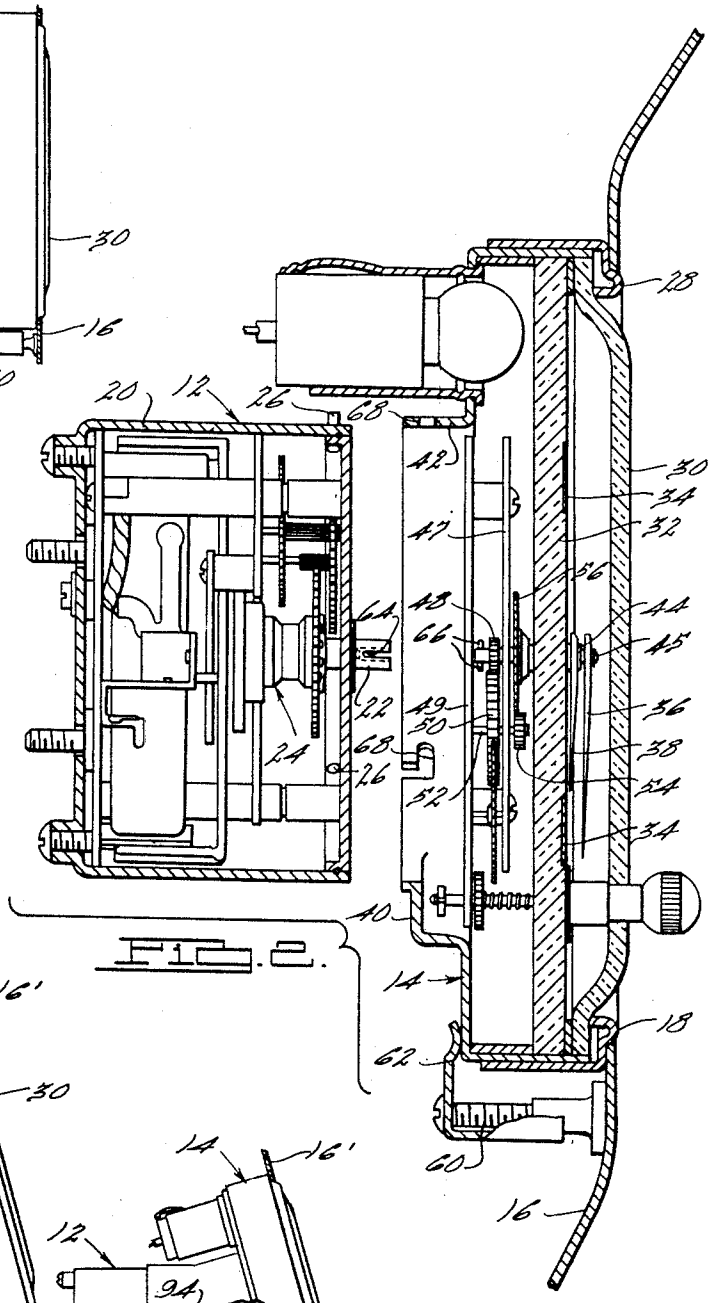

FIG. 2.

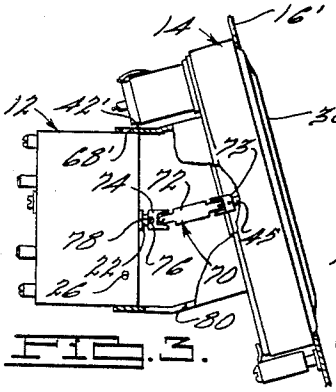

FIG. 3.

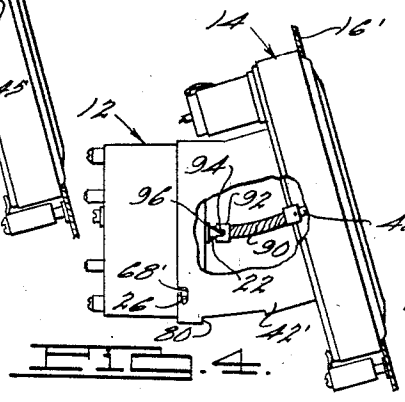

FIG. 4.

INVENTOR.
Gervais W. Trichel.
BY
Harness and Harris
ATTORNEYS.

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CLOCK WITH DETACHABLE DIAL TRAIN UNIT

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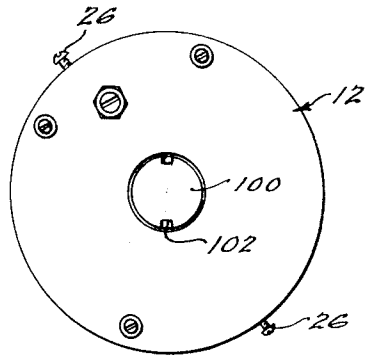

Fig. 5.

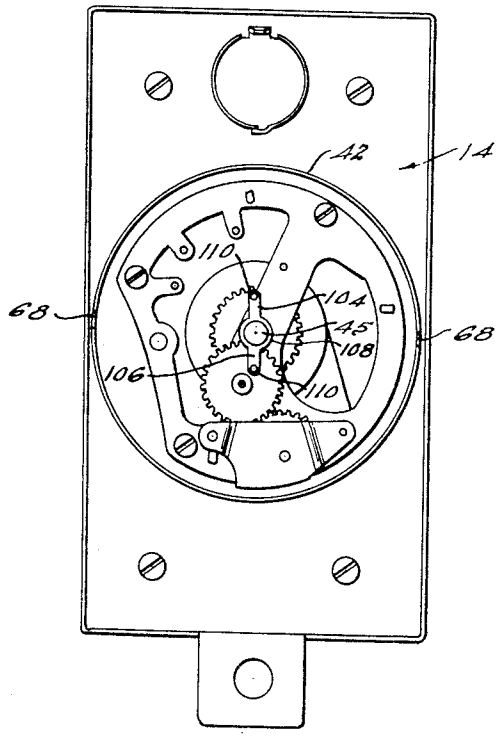

Fig. 6.

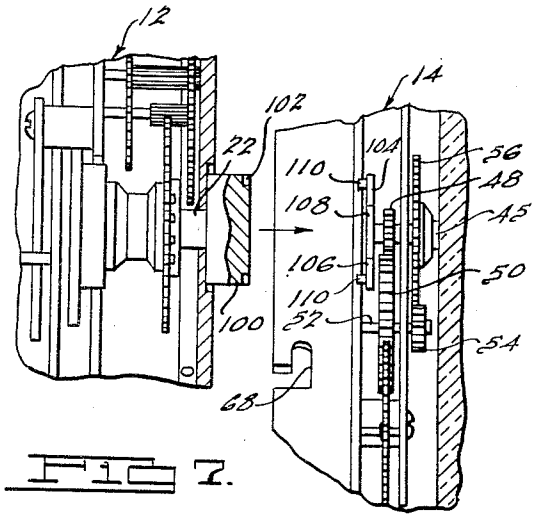

Fig. 7.

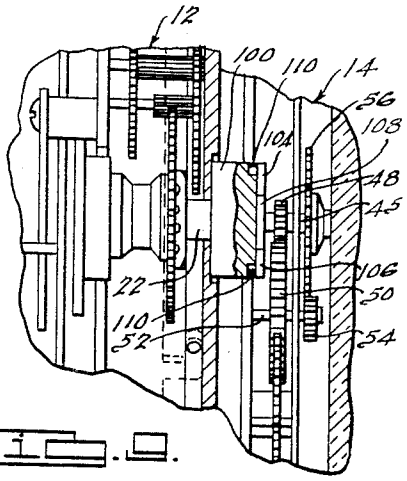

Fig. 9.

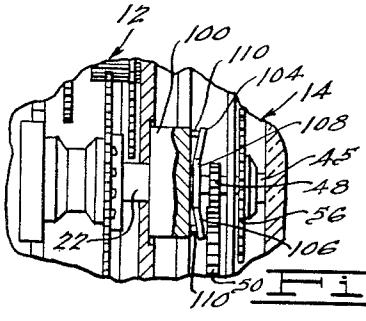

Fig. 8.

INVENTOR.
Gervais W. Trichel.
BY
Harness and Harris
ATTORNEYS.

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CLOCK WITH DETACHABLE DIAL TRAIN UNIT

Gervais W. Trichel, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich., a corporation of Delaware

Application July 21, 1949, Serial No. 105,970

4 Claims. (Cl. 58—53)

This invention relates to improvements in instrument construction and is a continuation in part of my application Serial No. 79,573, filed March 4, 1949, now abandoned.

It is customary in installing instruments in a panel to provide an opening in the panel and to mount the instrument on the panel with the face of the instrument aligned with the opening therein so that the instrument face may be viewed from one side of the panel while its driving mechanism is mounted on the other side of the panel. It is a principal object of this invention to so mount the instrument that the decorative portions, such as the face and hands, are permanently associated with the panel while the driving mechanism is removably carried thereby in order that the driving mechanism may be removed for repairs or replacement without disfiguring the panel by exposing the opening.

It is a further object of the invention to provide means to seal the driving mechanisms of such instruments in an air and dirt tight casing and to associate such casing with the decorative portion of an instrument for ready removal therefrom.

In many installations it is desirable to have the panel and registering face of the instrument inclined from the vertical. It is well known to those skilled in the art however, that delicate mechanisms, such as clock mechanisms, operate better when mounted with the axis thereof in a horizontal plane so that the thrust on the bearings is maintained at a minimum. It is another object of the invention to provide means for so mounting the components of an instrument that the face thereof may be inclined while the driving mechanism may be maintained in a level position and to provide means for the easy removal of the mechanism for repair or replacement.

Certain other advantages are obtained by applicant's invention in that standardization of the driving mechanism may be employed for a number of installations where the decorative portion of the instrument is not uniform. For example, where one company manufactures a number of automobiles having different dashboard designs the decorative or face portion of the instruments may be adapted to the dashboard design while a driving mechanism which is identical for all installations may be readily attached thereto. Such a construction also simplifies repair and reduces inventories because any repairs that are required are usually needed in the driving mechanism which is the standardized portion which may readily be removed and replaced.

Referring to the drawings:

Fig. 1 is a side elevation of an assembled clock suitable for installation in the dashboard of a vehicle;

Fig. 2 is a vertical section of the separated components of such a clock illustrating one portion of the clock installed in an instrument panel;

Fig. 3 is a vertical elevation partly in section of a modified form of clock;

Fig. 4 is a vertical elevation, partly broken away, of another modified form of clock;

Fig. 5 is a front elevation of a driving mechanism showing a modified clutching means;

Fig. 6 is a rear elevation of the associated clock portion showing the modified clutching means adapted to cooperate with the device of Fig. 5;

Fig. 7 is a partial vertical section showing the modified clutch means of the clock components prior to coupling thereof;

Fig. 8 is a partial vertical section of the clock components showing the modified clutch means assembled prior to the establishment of a driving relationship therebetween; and

Fig. 9 is a partial vertical section of the clock components showing the modified clutch means in driving relationship.

A self-contained unit 12 of the clock includes a sealed case 20 having a driving shaft 22 projecting therefrom and a conventional clock mechanism 24 operatively connected to the shaft and carried within the case 20. A pulurality of lugs 26 are provided on the periphery of the case 20 for reasons to be described herein.

A unit 14 includes a trim ring 28 having a transparent crystal 30 and clock face 32 mounted therein. The clock face 32 has markings 34 thereon which cooperate with a minute hand 36 and an hour hand 38 to indicate time. A shell 40 is carried by ring 28 and terminates in a projecting collar portion 42 which is adapted to receive the case 20 of the driving mechanism. A hollow driven shaft 44 is rotatably mounted in the face 32 and has the hour hand 38 secured thereto. A second shaft 45 is rotatably mounted within the hollow shaft 44 and has the minute hand 36 keyed to one end thereof and a pinion 48 keyed to the opposite end thereof. A pair of parallel plates 47 and 49 are carried by shell 40 and support an idler shaft 52 which carries a relatively large spur gear 50 and has a small pinion gear 54 mounted thereon. Pinion gear 54 engages a gear 56 keyed to shaft 44. Rotation of shaft 45 rotates minute hand 36 and through the gear train 48, 50, shaft 52, pinion 54 and gear 56 rotates the hour hand 38. The unit 14 is secured to the panel 16 by means of screws 60 and fingers 62 which engage the case 40.

The driven shaft 22 carried by the unit 12 is provided with a hollow end portion and a pair of aligned slots 64 while the driven shaft 45 of the unit 14 has a diameter sufficiently small to penetrate the hollow end portion of the shaft 22 and is provided with a pair of aligned laterally extending pins 66 which are adapted to project out of the slots 64. The clock units 12 and 14 may thus be brought into driving relationship by axial movement which permits shaft 45 to enter the hollow shaft 22 and permits the pins 66 to extend out of the slots 64. The projecting collar 42 of the shell 40 of unit 14 is provided with a plurality of bayonet slots 68, each of which is adapted to receive one of the pins 26 projecting from the case 20 of unit 12, to thereby provide a releasable supporting connection between the case 12 and the case 14.

The vehicle instrument panel 16 does not have the decorative appearance thereof impaired when the case 12 containing the clock driving mechanism 24 is removed for repair for unit 14 remains installed on the dash 16. The removal of unit 12 may be effected by a combination of rotary and axial movement of the case 20 relative to the case 14 which effects a disengagement of the pins 26 from the bayonet slots 68 and the retraction of the drive shaft 22 out of driving relation with the driven shaft 45. After repairs have been made to the driving mechanism 24, or a new driving mechanism substituted therefor, the case 20 may be reassembled with the clock portion 14 by introducing a relative axial movement therebetween. This permits pins 26 to enter the bayonet slots 68 and the driving shaft 22 to encompass the driven shaft 45 and connects the latter in a driving relationship. A simple relative rotation of the units sufficient to move the pins 26 circumferentially in the bayonet slots 68 will effect a locking of the clock components together in their assembled relationship.

In Fig. 3 a modified form of the device has been illustrated in which the clock portion 14 has been installed in an inclined panel 16'. It is desirable to mount the unit 12 in a level position with the driving shaft 22 horizontal and this has been accomplished by elongating the projecting collar 42' and introducing a connection 70 comprising a shaft 72, a universal joint 74 at one end thereof and a universal joint 73 at the other end thereof to form a constant velocity driving connection between shaft 22 and shaft 45. The universal joint 74 carried by one end of the connection 70 is provided with a hollow end portion having aligned slots 76 adapted to receive pins 78 carried by shaft 22. An opening 80 is provided in the collar 42' to facilitate the connection of end portion 74 with shaft 22.

Collar 42' is provided with bayonet slots 68' adapted to receive pins 26 carried by unit 12.

In Fig. 4 a modified form of the invention is illustrated in which the clock portion 14 is mounted in an inclined panel and a flexible cable 90 is used to connect the driving shaft 22 and driven shaft 45. The flexible cable 90 preferably has one end thereof fixed to shaft 45 and is provided with a portion 92 at the other end which is hollow and adapted to receive the shaft 22 and has aligned slots 94 to cooperate with pins 96 carried by shaft 92 to effect a releasable driving connection. The bayonet slots 68 and opening 80 are provided in the elongated collar 42' as described with reference to Fig. 3.

In Figs. 5 through 9 a modified clock construction is illustrated in which the separable self-contained units 12 and 14 are provided with a modified form of clutching means. In Fig. 5 a front elevation of the modified unit 12 is illustrated. A clutch disc 100 is carried by the driving shaft 22 (Fig. 7) previously described with reference to Fig. 2. The clutch disc 100 has a plurality of serrations 102 provided around its periphery. In Fig. 6 a rear elevation of the clock unit 14 is illustrated. This is the unit that carries the hands and face as described with reference to Fig. 2 although they are not visible in Fig. 6 because the latter is a rear elevation. The shaft 45 which was previously described with reference to Fig. 2 is provided in the Fig. 6 form of the device with a pair of radial arms 104 and 106 which are carried by a collar 108 keyed to shaft 45. Each of the arms 104 and 106 is provided with a driving lug 110. The driving lugs 110 are so positioned on the arms 104 and 106 respectively that the radius from the center of shaft 45 corresponds to the radius of the disc 100.

The arms 104 and 106 are yieldable and when the clock components 12 and 14 are brought together by relative axial movement to effect a coupling between the driving parts thereof the lugs 110 will automatically engage the slots 102 to effect a driving relationship between the clock components. Fig. 7 illustrates the relative position of the clutch components when they are separated but oriented so that axial movement will effect a joinder of the parts.

It is to be understood that the clock unit 14 carries the collar portion 42, previously described with reference to Fig. 2, which has bayonet slots 68 therein operable to cooperate with the lugs 26 carried by unit 12 to effect a mechanical connection between the clock units.

When the clock units 12 and 14 are moved from the Fig. 7 position into a position in which the lugs 26 are located in the bayonet slots 68 so that the two clock units are mechanically joined the clutch parts will assume the relative positions illustrated in Fig. 8 if the lugs 110 and slots 102 did not happen to be oriented. Referring to Fig. 8 it will be noted that the arms 104 and 106 are flexible and that they have been deformed by engagement of the lugs 110 with the flat surface of clutch disc 100. However, as the driving mechanism carried in clock unit 12 produces a rotation of shaft 22 and clutch disc 100 the slots 102 will rotate relative to the lugs 110 until they become oriented with the latter whereupon the resilient arms 104 and 106 will act as springs to force the lugs 110 into the slots 102 to effect a driving engagement between the clutch components. As is illustrated in Fig. 9, continued rotation of the shaft 22 and disc 100 will then, through the lugs 110 and arms 104 and 106, effect a rotation of shaft 45 and its associated clock hands.

The form of the invention illustrated in Figs. 5 through 9 possesses one advantage over the driving mechanism illustrated in Figs. 1 and 2 for in the latter form some difficulty might be encountered in orienting the lugs 66 with the slots 64 simultaneously with the alignment of lugs 26 with the bayonet slots 68. In the form of the invention illustrated in Figs. 5 through 9 it is only necessary to insert the driving lugs 26 into locked relationship with the bayonet slots 68 and a driving connection between the clutch components is automatically assured.

I claim:

1. In a clock comprising first and second units adapted to be assembled in drive transmitting relationship, said first unit including a case supporting a driving shaft and mechanism for driving said driving shaft at a predetermined speed, said second unit including a shell, a clock face and means for designating time supported by the shell and a driven shaft drivingly connected to said means and operable to actuate said means, cooperating means carried by said case and said shell respectively and operable to provide a supporting connection for said second unit on said first unit, a resilient arm attached to one of said shafts and carrying a lug extending generally parallel to said last mentioned shaft, and a disc carried by the other of said shafts, said lug and said disc being so positioned relative to their associated case and shell that mounting of said case on said shell orients said lug with said disc so that the mounting of said case on said shell is opposed by a collision between said lug and said disc, said flexible arm being adapted to accommodate deflection of said lug in a direction parallel to said shafts to accommodate the mounting of said case on said shell, and said disc having a slot adapted to receive said lug therein under the spring influence of said resilient arm when said shafts assume a predetermined relative rotary position to orient said lug and said slot to thereby establish a drive transmitting relationship between said shafts.

2. A device for transmitting drive between a first clock unit including a shell, a dial and hands and a second clock unit including a case and a clock driving mechanism mounted therein, said units having driven and driving shafts extending therefrom respectively and cooperating means carried by said shell and said case for mounting said second unit on said first unit, said device comprising a flexible finger extending radially outwardly from one of said shafts and having a driving lug carried thereby and a cooperating notched plate carried by the other of said shafts and adapted to receive said lug in a notch therein when said lug and a notch are oriented, the flexible finger being adapted to deflect to compensate for interference between said lug and said plate when said lug is not oriented with a notch so that mounting of said case on said shell can be accomplished independently of shaft orientation and rotation of the driving shaft by said driving mechanism will eventually orient said lug with a notch to establish a driving connection between said shafts.

3. In a clock comprising two units adapted to be assembled in drive transmitting relationship, one of said units including a case supporting a driving shaft and mechanism for driving said driving shaft at a predetermined speed and the other unit including a shell, a clock face, means for designating time supported by the shell and a driven shaft drivingly connected to said means and operable to actuate said means, cooperating means carried by said case and said shell respectively and operable to provide a supporting connection between said units, a resilient arm attached to one of said shafts and having a projecting portion, and a disc carried by the other of said shafts, said projecting portion and said disc being so positioned relative to their associated case and shell that mounting of said case on said shell orients said projecting portion with said disc so that the mounting of said case on said shell is opposed by a collision between said projecting portion and said disc, said flexible arm being adapted to accommodate deflection of said projecting portion in a direction parallel to said shafts to accommodate the mounting of said case on said shell, and said disc having a slot adapted to receive said projecting portion therein under the spring influence of said resilient arm when said shafts assume a predetermined relative rotary position to orient said projecting portion and said slot to thereby establish a drive transmitting relationship between said shafts.

4. A device for transmitting drive between a first clock unit including a shell, a dial and hands and a second clock unit including a case and a clock driving mechanism mounted therein, said units having driven and driving shafts extending therefrom, respectively, and cooperating means carried by said shell and said case for mounting said second unit on said first unit, said device comprising a flexible finger extending radially outwardly from one of said shafts and having a driving element carried thereby and a cooperating notched plate carried by the other of said shafts and adapted to receive said element in a notch therein when said element and notch are oriented, the flexible finger being adapted to deflect to compensate for interference between said element and said plate when said element is not oriented with a notch so that mounting of said case on said shell can be accomplished independently of shaft alignment and rotation of the driving shaft by said driving mechanism will eventually orient said element with a notch to establish a driving connection between said shafts.

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