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M. GOODMAN

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DOOR ACTUATED CLOCK WINDING MECHANISM

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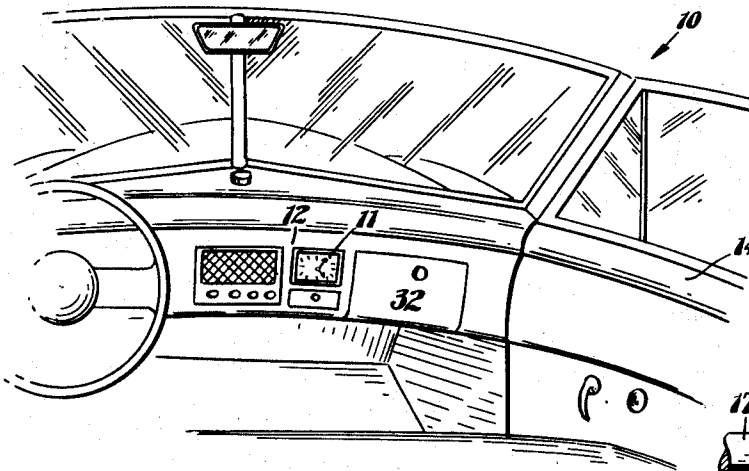


Fig. 1.

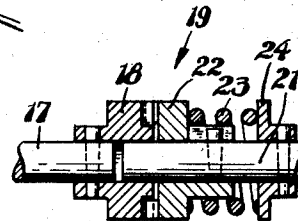


Fig. 3.

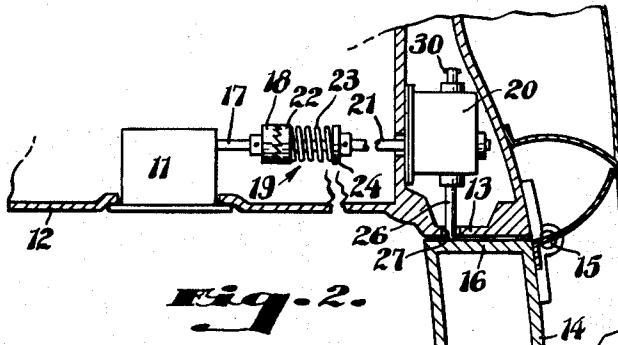


Fig. 2.

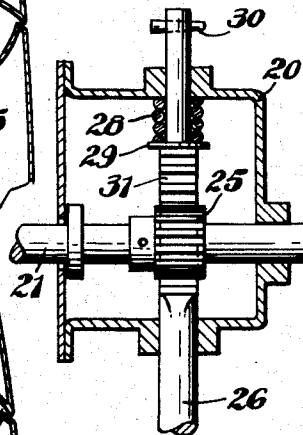


Fig. 4.

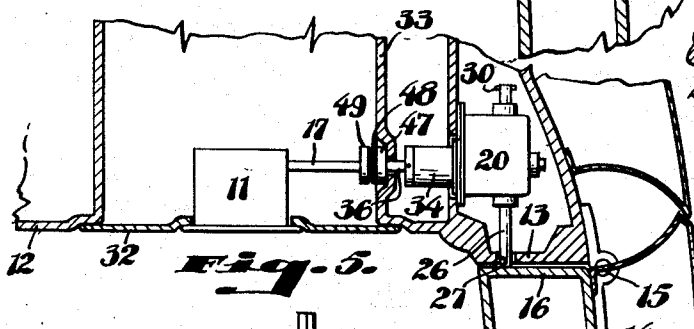


Fig. 5.

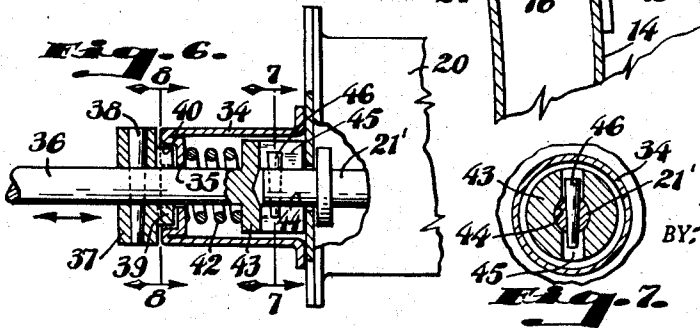


Fig. 6.

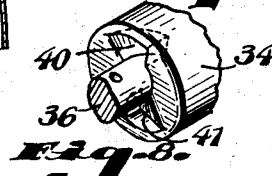


Fig. 7.

INVENTOR.
MORRIS GOODMAN,

BY: *Harold B. Hood.*
ATTORNEY.

UNITED STATES PATENT OFFICE

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DOOR ACTUATED CLOCK WINDING
MECHANISM

Morris Goodman, Indianapolis, Ind.

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10 Claims. (Cl. 58—46)

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The present invention relates to mechanism for automatically winding a spring-driven clock in, for instance, an automotive vehicle, and is particularly directed to novel mechanism whereby, each time a door of such a vehicle is opened and/or closed, at a time when the clock spring is not fully wound, a turning force will be applied to the winding element for the clock spring.

The primary object of the invention is to provide means, including an element yieldably projected into the path of a door on a vehicle, or the like, and a driving train between that means and the main spring of a clock mounted in the vehicle, whereby the opening and closing of the door, at fairly frequent intervals such as are customary in the ordinary use of a vehicle, will keep the clock spring sufficiently wound. A further object of the invention is to provide, in such a system, safeguards against possible overwinding of the clock spring. A still further object of the invention is to provide a driving train between the door-actuated element and the clock spring, of such character as to permit the mounting of the clock upon a movable element such, for instance, as the hinged door of a glove compartment.

Still further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the forms illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific constructions illustrated and described, so long as the scope of the appended claims is not violated.

Fig. 1 is a fragmental perspective view showing one of the positions in which a clock is conventionally mounted on an automobile instrument board;

Fig. 2 is a fragmental horizontal section through part of a vehicle body, including a door, and showing the manner in which my winding mechanism may be associated with the conventional parts of such a body;

Fig. 3 is an enlarged fragmental section through the parts making up a ratchet clutch embodied in the drive train of the assembly shown in Fig. 2;

Fig. 4 is an enlarged fragmental section through the drive train connecting a plunger with a shaft, forming parts of the invention, to convert reciprocating movement into rotary movement;

Fig. 5 is a view similar to Fig. 2 but showing a

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modified form of my invention adapted for use with a clock mounted on a movable support;

Fig. 6 is an enlarged fragmental section through the clutch-actuating means of the form of invention illustrated in Fig. 5;

Fig. 7 is a transverse sectional view taken substantially on the line 7, 7 of Fig. 6; and

Fig. 8 is a perspective view taken substantially on the line 8, 8 of Fig. 6, parts being broken away for clarity of illustration.

Referring more particularly to the form of invention illustrated in Figs. 1 to 4 inclusive, it will be seen that I have illustrated a clock 11 stationarily mounted in the instrument board 12 of a vehicle indicated generally by the reference numeral 10, said vehicle having a door 14 mounted, through hinge means 15, to swing between open and closed positions relative to the vehicle body. At 13, I have indicated an element of a frame for the door 14; and 16 indicates a portion of the door which, during closing movement of the door, moves toward substantial juxtaposition with the frame element 13.

The clock 11 is provided with a conventional winding spindle 17 suitably connected with the main spring (not shown) through which the clock is driven; and preferably the connection between the spindle 17 and the winding means directly connected to the clock spring will include a one-way clutch, in accordance with conventional practice.

According to the present invention, the spindle 17 has fixed thereto a crown-toothed ratchet member 18 constituting one element of a one-way ratchet clutch indicated generally by the reference numeral 19.

A bracket or housing 20 is suitably fixed to an element of the vehicle body. A shaft 21 is journaled in said bracket or housing, and said bracket or housing will be so located, relative to the clock 11, that the shaft 21 is substantially coaxial with the spindle 17. A crown toothed ratchet member 22 is suitably mounted, as illustrated in detail in Fig. 3, upon the shaft 21 for coactive meshing engagement with the ratchet member 18. The member 22 is fixed to rotate with the shaft 21, but is axially movable relative thereto, being resiliently urged toward meshing engagement with the member 18 by a spring 23 sleeved on the shaft 21 and confined between the member 22 and a collar 24 fixed to said shaft 21. A pinion 25 is fixed to the shaft 21 within the bracket or housing 20.

A plunger 26 is supported within the housing 20 for axial reciprocation relative thereto; and

an aperture 27 is formed in the door frame element 13 in alignment with the path of movement of the plunger 26. As is clearly illustrated, the plunger 26 is mounted with its axis transverse with respect to the axis of the shaft 21; and a spring 28, confined between a wall of the housing 20 and a shoulder 29 on the plunger 26, yieldably urges the plunger 26 to project through the aperture 27 into the path of the door portion 16, as said door moves toward closed position. A pin 30 limits the degree of projection of the plunger 26. Said plunger 26 is formed, in an intermediate region within the bracket 20, with a rack portion 31 held constantly in mesh with the pinion 25 on the shaft 21.

The operation of the structure just described will be clear. When the door 14 is opened, its portion 16 will be moved away from the frame element 13. If the clock spring is not, at this time, fully wound, the spring 28 will shift the plunger 26 downwardly as viewed in Figs. 2 and 4, whereby the engagement between the rack 31 and the pinion 25 will rotate the shaft 21 in a clockwise direction as viewed from the right in Figs. 2 and 4. The clutch element 22 will be held, by the spring 23, in driving engagement with the clutch member 18; and consequently the spindle 17 will be correspondingly rotated to wind the clock spring. Now, when the door 14 is closed, its portion 16 will engage the projecting end of the plunger 26 to return said plunger to the illustrated position, against the tendency of the spring 28. If a one-way clutch is, in accordance with conventional practice, incorporated in the driving train between the spindle 17 and the clock spring, the spindle 17 will partake of the counter-clockwise rotation of the shaft 21 which results from such retrograde movement of the plunger 26. If, however, no such clutch is embodied in that train, counter-clockwise rotation of the shaft 21 will cause the teeth of the clutch member 22 to click past the teeth of the member 18, the spring 23 permitting the member 22 to be cammed toward the right as its teeth pass those of the clutch member 18.

Of course, if the door 14 is opened at a time when the clock spring is fully wound, the spindle 17 will be held against rotation by a force which is sufficient to overcome the expansive tendency of the spring 28, and the plunger 26 will simply remain in its illustrated position. The advantage of this arrangement, under which spring-winding force is applied to the spindle 17 only by movement of the plunger 26 under the influence of the spring 28, and no winding force is applied to the spindle when the plunger 26 is moved positively by the door 14, will be readily apparent. If, on the contrary, that movement of the plunger 26 enforced by the positive action of the door 14 were directly applied to the spindle 17 to turn the same in a spring-winding direction, it will be obvious that something would be broken upon closure of the door 14 at a time when the clock spring was fully wound. Of course, a slipping clutch could be introduced to prevent such damage, but at increased manufacturing cost.

In some models, it is conventional for a clock to be mounted in the door 32 of a glove compartment, said door being hinged to, or slidably associated with, the instrument panel 12. Obviously, the specific structure just described would be inapplicable to such an installation. It is necessary, in order to apply my invention to such an installation, to provide clutch means between the shaft corresponding to the shaft

21, and the clock winding spindle 17, of such character as to permit movement of said spindle 17 out of alignment with the door-actuated shaft. In Figs. 5 to 8, I have shown a modified form of my invention, applicable to such installations. In this form, the clock 11 is mounted in a suitable aperture in the door 32 of the glove compartment 33. Fixedly mounted on that wall of the bracket or housing 20 adjacent the glove compartment is a tubular shell 34 whose outer end is closed except for an aperture 35 through which projects a clutch shaft 36. A block 37, pinned to the shaft 36 just beyond the outer end of the shell 34, carries a cam 39 adapted to enter a cam seat 40 which is symmetrical on diametrically opposite sides of the aperture 35, and which provides a sharply-rising cam surface 41, as is most clearly illustrated in Fig. 8.

A spring 42 is confined within the shell 34 between the outer end of said shell and a block 43 on the inner end of the shaft 36. Said shaft end is formed with a cylindrical socket 44 in which is received the projecting end of the shaft 21' which corresponds to the shaft 21 of the form of invention heretofore described. The block 43 is further formed with diametrically oppositely extending slots 45 in which are received the projecting ends of the pin 46; whereby the shaft 36 is constrained to rotate with the shaft 21', but may have a limited axial movement with respect thereto.

It will be clear that, as the shaft 21' is turned in a clockwise direction as viewed from the right of Fig. 6, the cam 39 will quickly rise from its seat 40, over the surfaces 41, whereby the shaft 36 will be shifted toward the left, as viewed in Fig. 6, and will thereafter continue to turn, with the shaft 21', with its cam 39 riding the flat end surface of the shell 34. The parts are so proportioned and designed that the shaft 21' will be turned through something less than 180° upon projection of the plunger 26 from its illustrated position to its outer limiting position in which the shoulder 29 engages the pinion 25.

On its outer end, the shaft 36 carries a head 47 upon which is mounted a friction pad 48; and a similar head 49 is carried upon the spindle 17, the arrangement of the parts being such that, when the door 32 is in its closed position, the heads 47 and 49, which constitute mating elements of a friction clutch, will be in registry. So long as the cam 39 is located in its seat 40, the clutch elements 47 and 49 will be spaced apart, so that the door 32 may be opened and closed without interference. When, however, the shaft 21' is turned sufficiently to cause the cam 39 to ride out of its seat 40, the pad 48 on the head 47 will be pressed firmly against the head 49, if the door 32 is in closed position, and further rotation of the shaft 21' will cause the spindle 17 to be driven in a clockwise-spring-winding direction.

Where the conventional one-way clutch is embodied in the train between the spindle 17 and the clock spring, the spindle may safely move, in a counter-clockwise direction, with the shaft 36 as the plunger 26 is moved in a retrograde direction by the door 16. If, however, the clock 11 is not provided with such a one-way clutch, any suitable form of driving connection, ineffective in one direction, may be substituted for the friction clutch 47, 48, 49 illustrated in Fig. 5.

I claim as my invention:

1. In an automotive vehicle having a door and a clock, said clock having a main spring and an

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element rotatable to wind said main spring, a member movably supported on said vehicle, means yieldably urging said member to a position in the path of closing movement of said door, said door engaging and shifting said member against the tendency of said means as said door moves toward closed condition, and means providing a driving connection between said member and said element.

2. The device of claim 1 in which said driving connection includes one-way clutch means.

3. The device of claim 2 in which a spring provides the force yieldably urging said member to said position to be engaged by said door, and in which said one-way clutch means is effective to rotate said element as said member moves under the influence of said spring and is ineffective to rotate said element as said member is moved by said door.

4. In an automotive vehicle having a door and a clock, said clock having a main spring and an element rotatable to wind said main spring, a bracket mounted on said vehicle near said door, a plunger reciprocally supported in said bracket, spring means engaging said bracket and said plunger and urging said plunger into a position to be engaged by said door, and shifted against the tendency of said spring, as said door moves to closed condition, a shaft having a portion journaled in said bracket, gear means providing a driving connection between said plunger and said shaft for converting reciprocation of said plunger into rotation of said shaft, and means operatively connecting said shaft to drive said element.

5. The device of claim 4 in which said last-named means includes a one-way clutch.

6. The device of claim 5 in which said one-way clutch is effective to transmit rotary movement from said shaft to said element when said shaft is driven by movement of said plunger under the influence of said spring means, but is ineffective to transmit movement from said shaft to said element when said plunger is moved by said door.

7. For use in a vehicle having a door frame and a swinging door mounted in said frame and having a portion which moves away from an element of said frame as said door is opened and toward said frame element as said door is closed, a clock having a winding spindle, said clock being supported in said vehicle near said door frame, and means for actuating said spindle comprising a plunger mounted for movement relative to said door frame element and yieldingly biased into the path of said door portion, a rotary member arranged for driving engagement with said spindle, and a driving connection between said plunger and said rotary member, said door portion acting to shift said plunger against its bias when said door moves to closed position.

8. For use in a vehicle having a door frame and a swinging door mounted in said frame and having a portion which moves away from an element of said frame as said door is opened and toward said frame element as said door is closed, a plunger, means supporting said plunger for projection through said door frame element into the path of said door portion, spring means biasing said plunger toward such projected position

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but yieldable to permit retrograde movement of said plunger by said door portion as said door closes, a shaft, means providing a driving connection between said plunger and said shaft, a clock supported in said vehicle and having a winding spindle, and means providing a driving connection between said shaft and said spindle.

9. In an automotive vehicle having a door and a clock, said clock having a main spring and a winding spindle therefor, a support movable relative to said door between a normal position and an abnormal position, said clock being mounted on said support, a shaft journaled on said vehicle near said door upon an axis with which the axis of said spindle is aligned when said movable support is in its normal position, a rack supported on said vehicle for movement in a direction transverse to the axis of said shaft, spring means urging said rack toward a position in which a portion thereof is disposed in the closing path of said door, said rack being movable against the force of said spring by said door as said door approaches closed condition, a pinion mounted on said shaft and fixed to rotate therewith, said pinion meshing with said rack, a clutch member arranged to rotate with said shaft, a mating clutch member arranged to rotate with said spindle, spring means normally separating said clutch members, and means acting, upon rotation of said shaft in one direction, to shift one of said clutch members into operative engagement with its mate when said spindle is aligned with said shaft.

10. In an automotive vehicle having a door, a spring-driven clock having a winding spindle, means for stationarily mounting said clock in such a vehicle, a housing, means for stationarily mounting said housing in such a vehicle, a shaft journaled in said housing and aligned with said spindle, a crown toothed ratchet element fixed to said spindle, a crown toothed ratchet element on said shaft and engageable with said first-named element, means providing a rotary drive connection between said shaft and its ratchet element, said last-named ratchet element being axially movable relative to said shaft, spring means urging said last-named ratchet element into driving mesh with said first-named ratchet element, a plunger mounted in said housing for reciprocation on a line transverse to the axis of said shaft, interengaging means on said shaft and on said plunger, within said housing, providing a driving connection between said plunger and said shaft, and spring means acting on said plunger to project the same into the closing path of the door of such a vehicle when said housing is so mounted.

MORRIS GOODMAN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,403,538	McCarthy	July 9, 1946

FOREIGN PATENTS

Number	Country	Date
164,588	Switzerland	Dec. 16, 1933
355,719	Italy	Jan. 15, 1938