May 15, 1956 E. MORF 2,745,241

WATCH WITH AN AUTOMATIC WINDING MECHANISM FOR A MOTOR VEHICLE

Filed March 30, 1953 4 Sheets-Sheet 1

Fig. 1

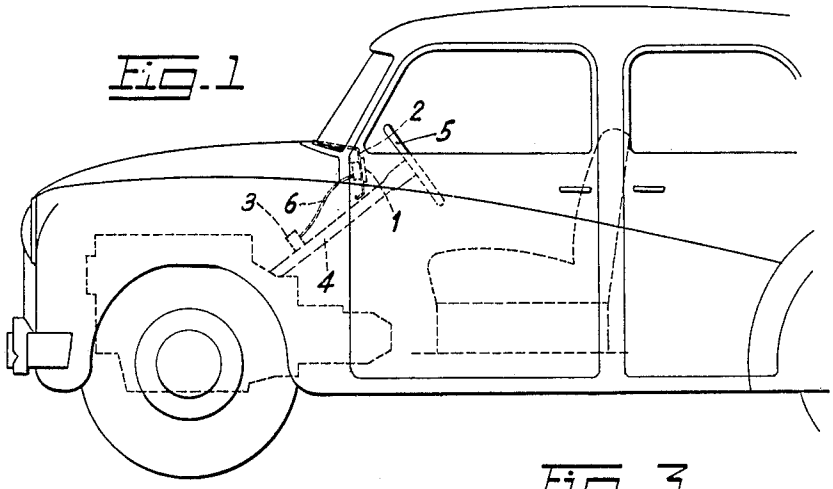


Fig. 3

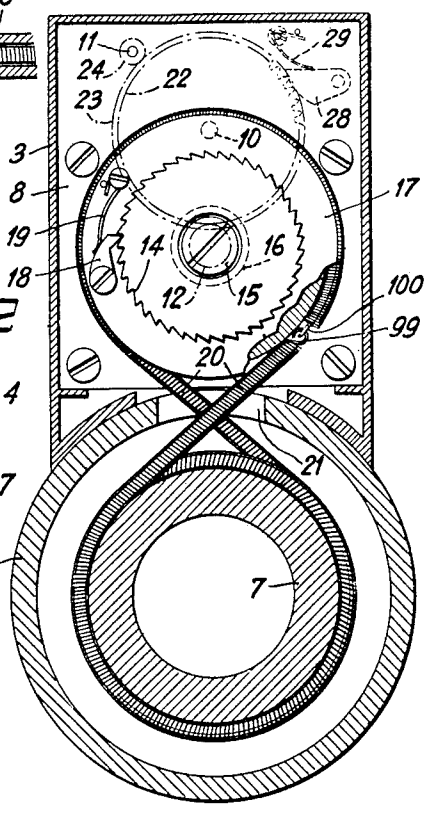
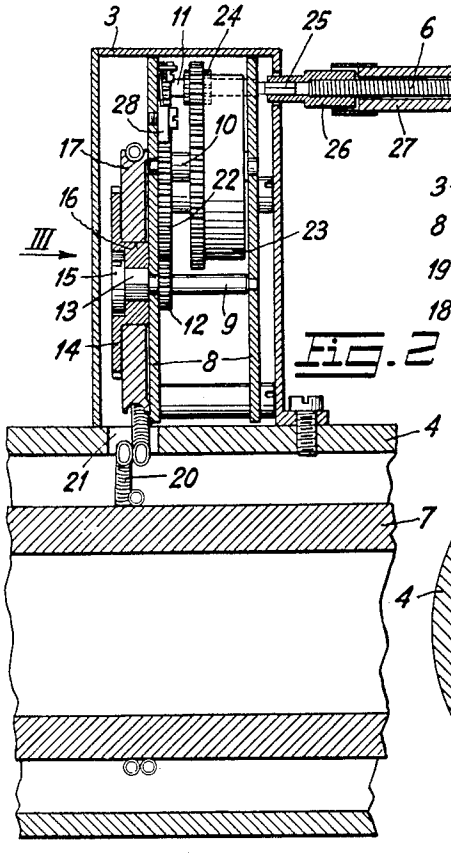


Fig. 2



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WATCH WITH AN AUTOMATIC WINDING MECHANISM FOR A MOTOR VEHICLE

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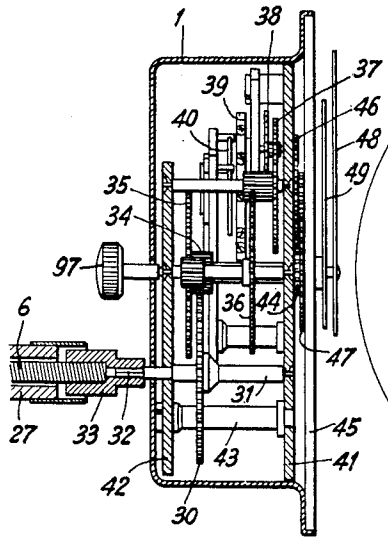

Fig. 4

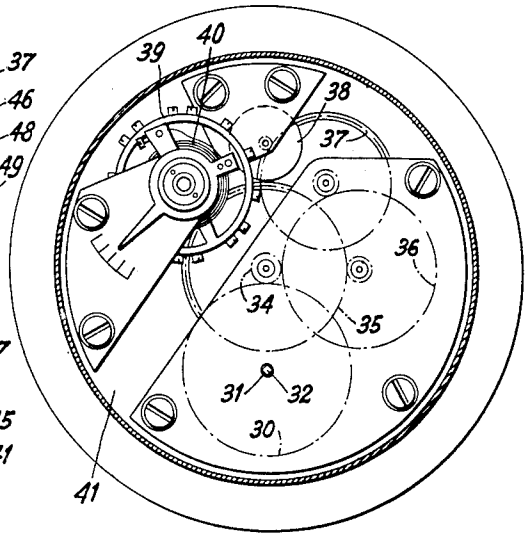

Fig. 5

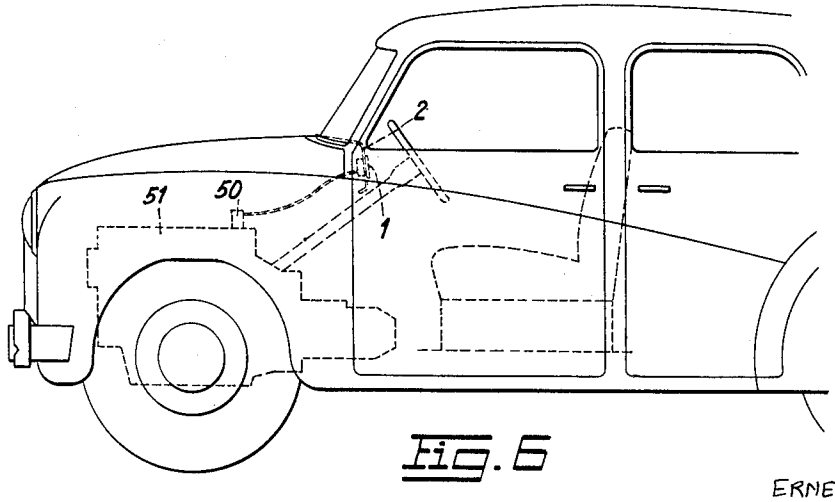

Fig. 6

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WATCH WITH AN AUTOMATIC WINDING MECHANISM FOR A MOTOR VEHICLE

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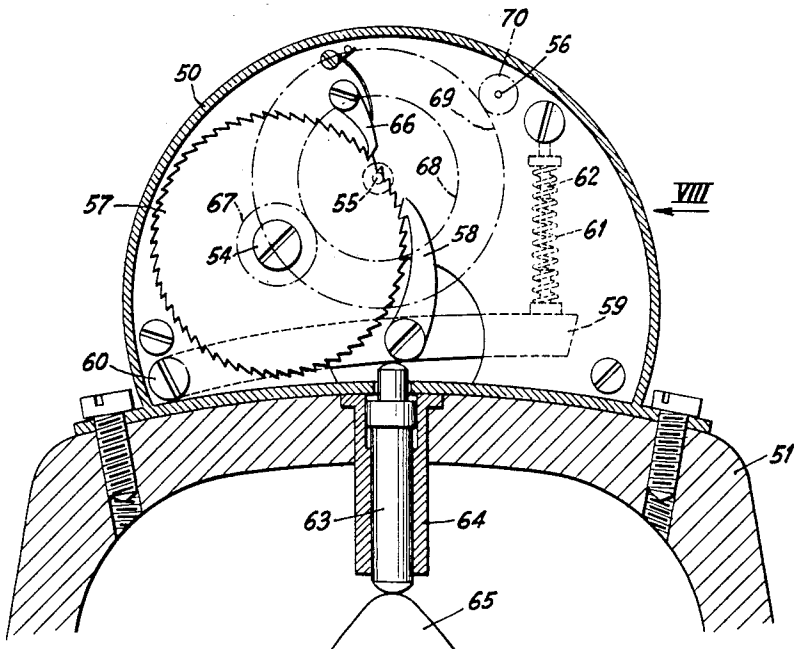

Fig. 7

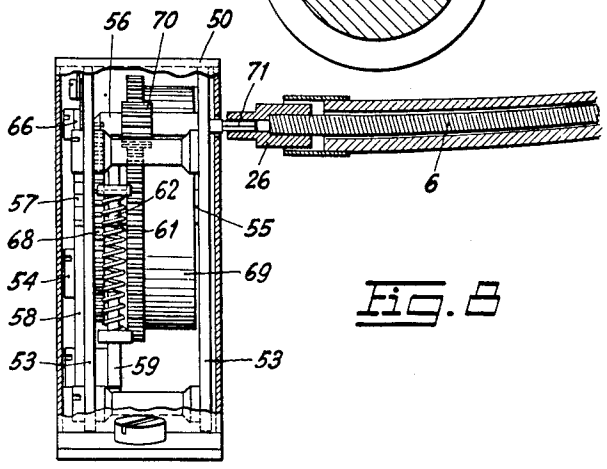

Fig. 8

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WATCH WITH AN AUTOMATIC WINDING MECHANISM FOR A MOTOR VEHICLE

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Fig. 9

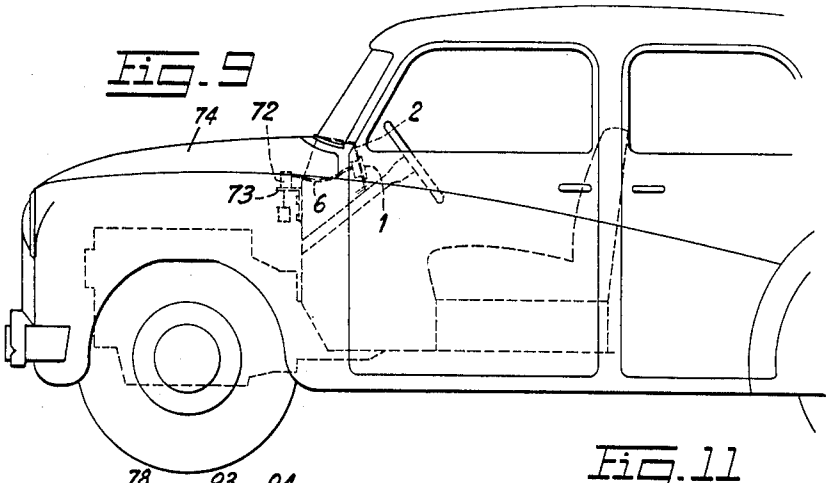


Fig. 10

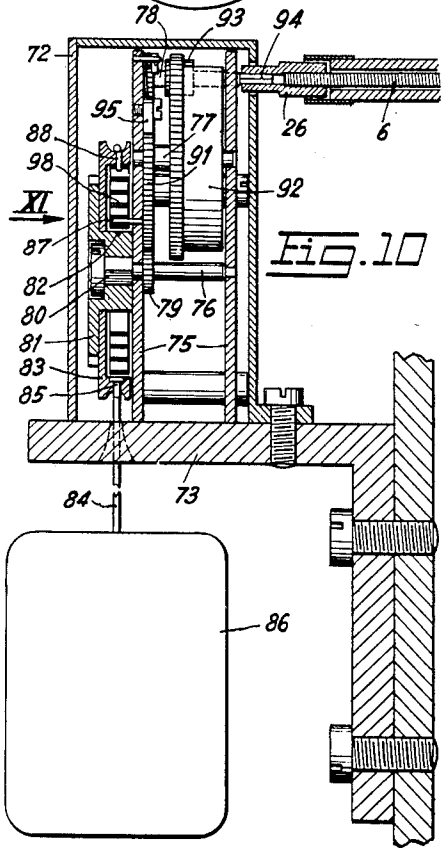
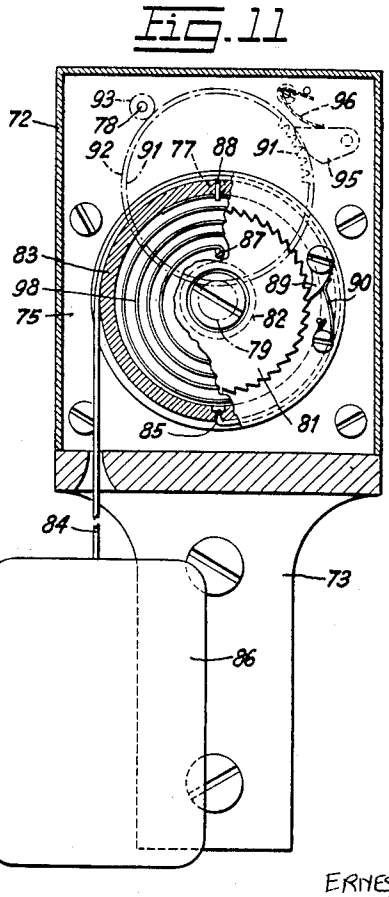


Fig. 11



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United States Patent Office 2,745,241 Patented May 15, 1956

2,745,241

WATCH WITH AN AUTOMATIC WINDING MECHANISM FOR A MOTOR VEHICLE

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Application March 30, 1953, Serial No. 345,426

Claims priority, application Switzerland March 11, 1953

8 Claims. (Cl. 58—46)

The invention relates to a watch with an automatic winding mechanism for a motor vehicle. Such watches have already been provided in which the winding is ensured by the jarrings of the car. In this case, the automatic winding mechanism is actuated by a rockable weight provided in the casing of the watch. This displacements of this rockable weight are, however, generally insufficient in the smooth-running cars. In order to obviate this disadvantage, it has already been foreseen to increase the movements of the watch by fixing it at the periphery of the steering-wheel. This location of the watch is, however, not well appropriated because the watch is constantly displaced.

It has also been foreseen to fix the watch in the center of the steering-wheel whereby the winding of the watch is owed to the movements of the steering-wheel relative to the stationary tube surrounding its arbor. This location of the watch is not adequate since it lies only at the sight of the driver.

Finally, it has been foreseen to pick up the energy of any one of the elements of the vehicle, e. g. the variations of the intake pressure in the gas mixing or vaporizing chamber, or the tachometer, or even the odometer, for ensuring the winding of the watch which is usually fixed on the instrument board of the vehicle.

In these last cases, all parts of the watch as well as the elements of the automatic winding mechanism are lodged in one and the same casing and the members for leading the energy from the motor of the vehicle to the automatic winding mechanism of the watch are subjected to very speedy displacements causing a wear thereof after a certain period.

It is therefore an object of the invention to locate the train of gear wheels, the escapement mechanism and the time indicating device in a first casing fixed to the vehicle, at a place well at sight of its passengers and to locate the power mechanism and the automatic winding mechanism in a second casing fixed to the car at another place than the first casing, said automatic winding mechanism picking up the necessary energy for winding up the power mechanism of the watch from an element of the vehicle, said power mechanism of the watch being mechanically connected to the first of the gear wheels of said train contained in the first casing.

The advantage of this construction depends on the fact that the first casing containing all the common parts of a watch except the power mechanism, may be easily set at a place of the vehicle which is believed to be the most suitable, without taking too much space. Moreover, the power mechanism and the automatic winding mechanism may have the desired sizes and be provided at a place where sufficient space is at disposal. They may already be planned with the vehicle itself and be mounted therewith.

Finally, the transmission members of the energy of the power mechanism of the watch to its train of gear wheels being only subjected to very slow displacements, the wear of these transmission members may be neglected.

It is another object of the invention to fix the second of said casings to the tube surrounding the shaft of the steering wheel, or on the motor of the vehicle above the valve-operating camshaft.

Still another object of the invention is to fix said second casing to the frame of the vehicle anywhere under the engine bonnet whereby the winding of the watch is ensured by the displacements of an inertia block.

In the accompanying drawing forming a part of this application and in which like numerals are employed to designate like parts throughout the same, three embodiments are shown.

Fig. 1 schematically shows the general arrangement of the parts of the watch in the motor vehicle, in the first embodiment;

Fig. 2 is a sectional view of the automatic winding- and power-mechanisms of the watch;

Fig. 3 is a view of Fig. 2 in the direction of arrow III;

Fig. 4 is a sectional view of the part of the watch fixed to the instrument-board of the vehicle;

Fig. 5 is a plan view of the parts shown in Fig. 4;

Fig. 6 schematically shows the disposition in the car of the different parts of the watch, in the second embodiment;

Fig. 7 is a plan view of the automatic winding- and power-mechanisms of the watch in this second embodiment;

Fig. 8 is a view of Fig. 7 in the direction of arrow VIII, with certain parts in section;

Fig. 9 schematically shows the disposition in the car of the different parts of the watch, in the third embodiment;

Fig. 10 is a partially sectional side view of the automatic winding- and power-mechanisms of the watch and

Fig. 11 is a view of Fig. 10 in the direction of arrow XI.

In Fig. 1, a first casing 1 containing the train of gear wheels, the escapement mechanism and the time indicating device of the watch, is fixed on the instrument board 2 of a motor vehicle. A second casing 3 containing the automatic winding- and power-mechanisms of the watch, is fixed on the tube 4 surrounding the shaft of the steering wheel of the vehicle. An element of the casing 3 driven by said power mechanism is mechanically connected by a Bowden wire 6 to the first gear wheel of the train contained in casing 1.

Figs. 2 and 3 show in detail the parts contained in casing 3 fixed on the tube 4 surrounding the shaft 7 of the steering wheel. Two plates 8 are rigidly fixed to the casing 3 in any appropriate manner not shown. Three axles 9, 10, 11 are journalled in said plates. A pinion 12 is fixed on the axle 9 which is formed with a square 13; a ratchet wheel 14 provided with a central opening the form of which corresponds to that of the square 13, is rigidly linked to the axle 9 by a screw 15. The wheel 14 is formed in one piece with a bearing surface 16 round which a pulley 17 freely rotates.

The pulley 17 carries a pawl 18 which co-acts with the ratchet wheel 14 under the action of a spring 19, so that the ratchet wheel is driven with the pulley 17 when the latter rotates clockwise in Fig. 3, whereas the pulley 17 freely rotates on the bearing surface 16 of the ratchet wheel 14 when it is driven in the other direction by a coil spring 20 wound round the shaft 7 of the steering wheel of the car and the pulley 17 and passing through an aperture 21 provided in the tube 4.

The pinion 12 meshes with the ratchet wheel 22 fixed on the axle 10 constituting the arbor of the barrel 23. The main spring of the watch (not shown) is as usual located within the barrel. The toothing of the latter meshes with a pinion 24 fixed on the axle 11 which is formed with a square 25 on which is adjusted a sleeve

26 rigidly fixed to the Bowden wire 6 which rotates in a sheath 27.

A brake block 28 bears against the toothing of the ratchet wheel 22 under the action of a spring 29, in order to prevent this ratchet wheel from rotating clockwise in Fig. 3 under the action of the main spring of the watch.

The above described automatic winding mechanism functions as follows:

When the steering wheel of the vehicle is moved in any direction, the pulley 17 follows its movements. If this pulley rotates counterclockwise in Fig. 3, the pawl 18 simply jumps over the teeth of the ratchet wheel 14, while if the pulley 17 rotates clockwise, the pawl 18 drives the ratchet wheel 14 in the same direction. The latter drives in turn the barrel arbor by means of the pinion 12 and the ratchet wheel 22.

Figs. 4 and 5 show the details of the parts of the watch contained in the casing 1 which is fixed to the instrument board 2 (Fig. 1) of the motor vehicle. These parts comprise the train of gear wheels, that is, firstly, an intermediate wheel 30, as commonly provided in watches intended for running eight days without being rewound. The wheel 30 is riveted on an axle 31 formed with a square 32 on which is adjusted a sleeve 33 rigidly fixed to the Bowden wire 6. The wheel 30 meshes with the pinion 34 of the second wheel 35 driving in turn a third wheel 36, a fourth wheel 37 and an escapement wheel 38. The latter as usual drives the escapement mechanism of the watch, constituted by a balance wheel 39 with a hair spring 40, by means of a lever which is not shown. The intermediate, second, third and fourth wheels consituting the train of gear wheels of the watch, are pivoted in a plate 41 fixed to the casing 1 and a bridge 42 fixed to the plate 41 by means of pillars 43. A pinion 44 is pressed on the axle of the second wheel 35 and located between the plate 41 and the dial 45. This pinion as usual drives a minute-setting wheel 46 and an hour wheel 47. The minute-hand 48 and the hour-hand 49 are fixed on the axle of the second wheel 35 and the hour-wheel 47 respectively. The setting of the hands is as usual ensured by a knurled button 97.

From the disposition of the parts of the watch described above it follows that the Bowden wire 6 is constantly charged but this Bowden wire only moves very slowly (3 to 4 revolutions in 24 hours).

In order to prevent an excessive winding of the main spring of the watch, the pulley 17 and the coil-spring 20 are so provided that the spring 20 slides in the groove of the pulley 17 as soon as the main spring of the watch is sufficiently wound. For this purpose the groove of the pulley 17 is polished and the spring 20 is twice wound round the shaft 7 in order to avoid a sliding of said spring on the shaft at an inopportune moment. The tension of the coil spring 20 may be regulated for ensuring the desired sliding in the groove of the pulley 17 by cutting it at the desired length and by forming a hook 99 and an eyelet 100 at both its extremities to link them up with one another.

In the second embodiment of the invention (Figs. 6, 7 and 8) a first casing 1 identical with that described in the first embodiment, is first on the instrument board 2 of the motor vehicle. A second casing 50 is fixed on the motor 51 of the car above the valve-operating camshaft 52. Three axles 54, 55 and 56 are journalled in two plates 53 (Fig. 8), fixed to the casing 50. A ratchet wheel 57 is riveted onto the axle 54 and a pawl 58 supported by a lever 59 co-acts with this ratchet wheel. Said lever is pivoted round an axle 60 and a coil spring 61 leaning against a stop 62 fixed on one of the plates 53 normally pushes the lever 59 downwards in Fig. 7. A shank 63 sliding within a cylindrical tubular projection 64 of the casing 50 may push the lever 59 upwards under the action of a cam 65 fixed onto the camshaft 52. In the position represented in the drawing, the shank 63 and the lever 59 occupy their upper position, the spring 67 being compressed. If the cam 65 rotates either in one or the other direction, the spring 61 slackens and pushes the lever 59 and the shank 63 downwards. During this movement the pawl 58 pivoted on the lever 59 drives the ratchet wheel 57 clockwise. The latter, kept in its new position by a detent 66, drives, by means of its pinion 67, the ratchet wheel 68 rigidly fixed on the arbor 55 of the barrel 69. The latter drives by its toothing a pinion 70 integral with the axle 56 which is formed with a square 71 on which is adjusted the sleeve 26 of the Bowden wire 6.

In this construction, the winding of the main spring of the watch is indirectly ensured by means of the spring 61. For avoiding an overpressure of this main spring, the tension of the spring 61 may be previously regulated in the appropriate manner. As soon as the main spring of the watch is sufficiently wound, the spring 61 can no longer push the lever 59 and the shank 63 downwards, and the cam 65 now rotates without any function on the described mechanism, until the watch has run a certain period and the main spring is sufficiently slackened so that the spring 61 may again push the shank 63 in the path of the cam 65.

In the third embodiment of the invention (Figs. 9, 10 and 11), a casing 1, identical to that of Figs. 1, 4, 5 and 6, is fixed on the instrument board 2 of the automobile. A second casing 72 connected to the first by a Bowden wire 6 is fixed by means of a bracket 73 on the frame of the motor vehicle under the bonnet 74 of the motor.

The parts contained in the casing 72 are shown in detail in Figs. 10 and 11. The axles 76, 77 and 78 are journalled in two plates 75, fixed in the casing 72 in any appropriate manner, not shown. A pinion 79 is rigidly fixed onto the axle 76 formed with a square 80, on which is fixed a ratchet wheel 81 formed in one piece with a bearing surface 82 around which a pulley 83 freely rotates. A thread 84 is fixed to the pulley 85 by one of its extremities and it carries an inertia block 86 at its other end. For keeping the block 86 in balance against the gravity, a spiral spring 98 is fixed by its internal end to a pin 87 fixed in one of the plates 75 and by its external end to a pin 88 fixed in the pulley 83. A pawl 89 pivoted around an axle fixed to the pulley 83 co-acts with the ratchet wheel 81 under the action of a spring 90.

The pinion 79 meshes with the ratchet wheel 91 rigidly fixed on the arbor 77 of the barrel 92 meshing itself with the pinion 93 integral with the axle 78 which is formed with a square 94 on which is adjusted the sleeve 26 of the Bowden wire 6. A brake-block 95 bears against the teeth of the ratchet wheel 91 under the action of a spring 96 for preventing the ratchet wheel 91 from rotating clockwise in Fig. 11.

The automatic winding mechanism of this third embodiment functions as follows:

When the inertia block 86 is displaced, e. g. downwards, by the jarrings of the automobile, the thread 84 partially wound round the pulley 83 drives the latter counterclockwise (Fig. 11) against the action of the spiral spring 98. During this movement, the pawl 89 simply jumps over the teeth of the ratchet wheel 81 and the brake-block 95 keeps immobile the ratchet wheels 81 and 91. When the block 86 is pulled upwards by the spiral spring 98 against the gravity, the pulley 83 rotates clockwise and the pawl 89 drives the ratchet wheel 81 in the same direction. The pinion 79 drives in turn the ratchet wheel 91 rigidly fixed onto the arbor 77 of the barrel 92 in counterclockwise direction.

An excessive winding of the barrel spring is avoided by regulating the tension of the spring 98 so that the latter may no longer pull the block 86 upwards as soon as the main spring of the watch is sufficiently wound.

The casing which contains the automatic winding- and the power-mechanisms of the watch could also be fixed on the motor of the automobile in the proximity of the

gas-mixing or vaporizing chamber. This casing could then contain a diaphragm whereby the space to one side of this diaphragm would be in communication with the atmosphere and the space to the other side of the diaphragm would be connected to the gas-mixing or vaporizing chamber. Such diaphragm would thus move according to the variations of the intake pressures within the said gas-mixing or vaporizing chamber. A shank fixed to said diaphragm could then actuate the automatic winding mechanism of the watch in the same manner as the shank **63** in the second embodiment.

The locations for the casing containing the automatic winding and power mechanisms of the watch have not yet been exhaustively mentioned. This casing could indeed also be disposed in the proximity of a wheel, a brake, the accelerator or clutch pedals or any otherwise movable element of the automobile for picking-up a small part of the kinetic energy of this element in view of ensuring the winding of the watch.

It is to be understood that the forms of the invention herewith shown and described are to be taken as examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. In a motor vehicle, in combination, time indicating means mounted on the motor vehicle at a location visible to the operator; a movable motor vehicle part forming a source of energy; spring means for operating said time indicating means mounted on the vehicle remote from the time indicating means and adjacent said movable motor vehicle part; winding means operatively engaging said motor vehicle part to be operated thereby during use of said vehicle and connected to said spring means for winding the latter means during movement of said part only while said spring means is not fully wound; and elongated motion transmitting means connecting said spring means to said time indicating means for operating the same.

2. In a motor vehicle having a passenger compartment and a rotatable steering member, in combination, time indicating means mounted in the passenger compartment of the motor vehicle; belt means engaging said rotatable steering member for movement thereby during use of the motor vehicle and located remote from said time indicating means; spring means for operating said time indicating means mounted in said vehicle remote therefrom and adjacent said belt means; winding means including pulley means frictionally engaged and rotatable by said belt means during use of said vehicle and connected to said spring means for winding the latter means during movement of said belt means only while said spring means is not fully wound, said belt means slipping on at least one of said rotatable steering member and said pulley means when said spring means is fully wound; and elongated motion transmitting means connecting said spring means arranged adjacent said winding means and remote from said time indicating means to said time indicating means for operating the same.

3. In a motor vehicle having a passenger compartment and a rotatable steering member, in combination, time indicating means mounted in the passenger compartment of the motor vehicle; belt means engaging said rotatable steering member for movement thereby during use of the motor vehicle and located remote from said time indicating means; spring means for operating said time indicating means mounted in said vehicle remote therefrom and adjacent said belt means; winding means including pulley means frictionally engaged and rotatable by said belt means during use of said vehicle, pawl and ratchet means driven by said pulley means, and a gear mechanism driven by said pawl and ratchet means and connected to said spring means for winding the latter means during movement of said belt means only while said spring means is not fully wound, said belt means slipping

on at least one of said rotatable steering member and said pulley means when said spring means is fully wound; and elongated motion transmitting means connecting said spring means aranged adjacent said winding means and remote from said time indicating means to said time indicating means for operating the same.

4. In a motor vehicle having a passenger compartment and a motor-operated cam shaft, in combination, time indicating means mounted in the passenger compartment of the motor vehicle; reciprocating means engaging said cam shaft for reciprocation thereby during use of the motor vehicle and located remote from said time indicating means; spring means for operating said time indicating means mounted in said vehicle remote therefrom and adjacent said reciprocating means; winding means including lever means and resilient means tending to urge said lever means into engagement with said reciprocating means for oscillation by said reciprocating means during use of said vehicle and connected to said spring means for winding the latter means during movement of said reciprocating means only while said spring means is not fully wound, said spring means when fully wound preventing said resilient means from urging said lever means into engagement with said reciprocating means; and elongated motion transmitting means connecting said spring means arranged adjacent said winding means and remote from said time indicating means to said time indicating means for operating the same.

5. In a motor vehicle having a passenger compartment and a motor-operated cam shaft, in combination, time indicating means mounted in the passenger compartment of the motor vehicle; reciprocating means engaging said cam shaft for reciprocation thereby during use of the motor vehicle and located remote from said time indicating means; spring means for operating said time indicating means mounted in said vehicle remote therefrom and adjacent said reciprocating means; winding means including lever means and resilient means tending to urge said lever means into engagement with said reciprocating means for oscillation by said reciprocating means during use of said vehicle, pawl and ratchet means operable by said lever means, and a gear mechanism driven by said pawl and ratchet means and connected to said spring means for winding the latter means during movement of said reciprocating means only while said spring means is not fully wound, said spring means when fully wound preventing said resilient means from urging said lever means into engagement with said reciprocating means; and elongated motion transmitting means connecting said spring means arranged adjacent said winding means and remote from said time indicating means to said time indicating means for operating the same.

6. For use in a motor vehicle, in combination, time indicating means adapted to be located at a part of the motor vehicle visible to the operator; a single spring and spring winding unit separate from said time indicating means; and transmission means interconnecting said unit and time indicating means for transmitting energy from said spring of said unit to said time indicating means, whereby when said unit is operatively connected to a movable vehicle part forming a source of energy, the movable vehicle part may be used to operate said unit.

7. In a motor vehicle, in combination, time indicating means located at a part of the vehicle visible to the operator; a turnable vehicle part forming a source of energy; spring means for operating said time indicating means mounted on the vehicle adjacent said turnable part thereof; tensioning means operatively connected to said spring means for tensioning the same; first transmission means engaging said tensioning means and turnable vehicle part for transmitting energy therefrom to said tensioning means only when said spring means is not fully wound; and second transmission means interconnecting said spring means and time indicating means for transmitting the energy of said spring means to said time indicating means.

8. In a motor vehicle, in combination, time indicating means located on the vehicle in a position visible to the operator; a turnable vehicle part forming a source of energy; spring means for operating said time indicating means mounted on the vehicle adjacent said turnable part thereof; a pulley operatively connected to said spring means for tensioning the same; an endless coil spring passing about said pulley and said turnable vehicle part for transmitting energy from the latter to said pulley to wind said spring means, said endless coil spring slipping when said spring means is fully wound; and transmission means

interconnecting said spring means and time indicating means for transmitting the energy of said spring means to said time indicating means.

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