July 22, 1941. J. W. FITZ GERALD 2,250,014

DOOR LOCKING SYSTEM

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Fig. 1.

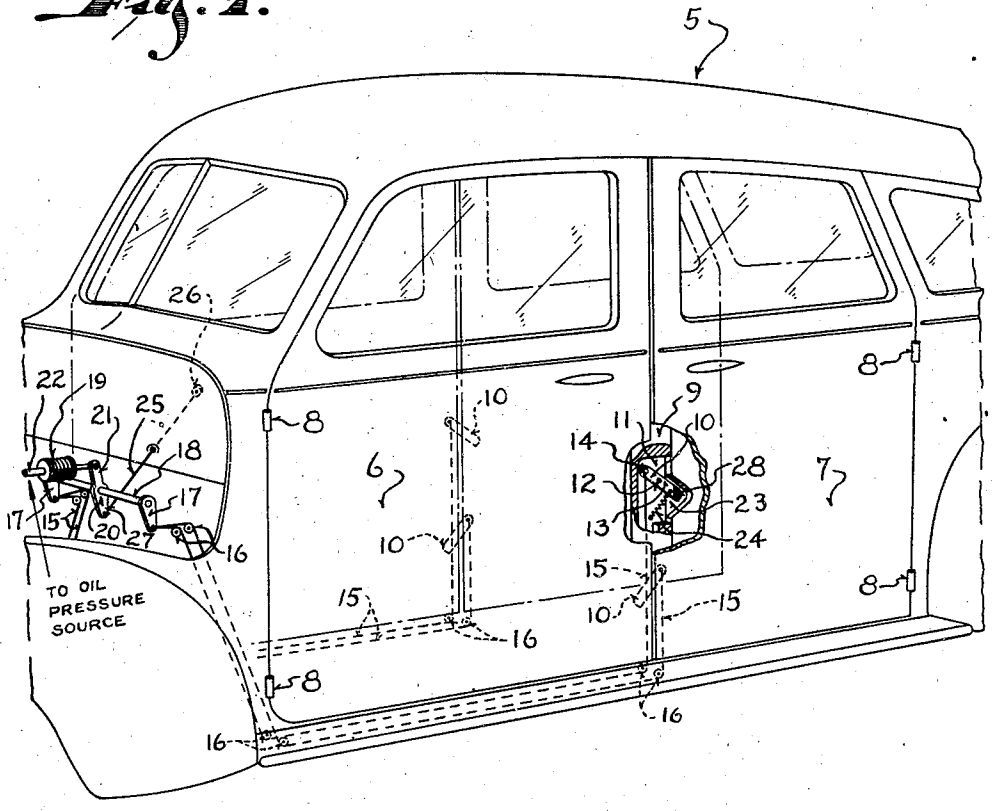
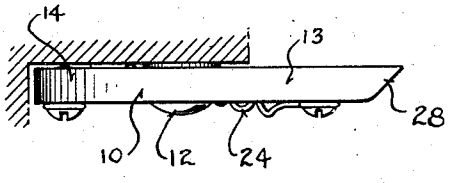


Fig. 2.



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DOOR LOCKING SYSTEM

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10 Claims. (Cl. 180—82)

This invention relates to door locking systems for engine driven vehicles.

The invention has as its general object the provision of a door locking system for engine driven vehicles which is operable to maintain all of the doors of the vehicle locked while the engine is in operation and which will automatically release the doors for opening upon stopping of the engine.

The desirability of a locking system of this nature has long been appreciated. Frequent accidents due to opening of the doors of a moving vehicle have definitely established the need for locking the doors against the possibility of opening either intentionally and thoughtlessly by children or unintentionally as when occupants are thrown against doors having faulty latches. Such opening of the doors has often led to serious and sometimes fatal injury to the occupants of the vehicle.

A locking system which locks all the vehicle doors against opening from the outside as well as the inside is also highly desirable inasmuch as it prevents unauthorized opening of the doors as by robbers or the like while the vehicle is temporarily at a standstill.

While it is desirable to maintain the doors locked against opening from the outside of the vehicle as well as from the inside, the locking system should be so designed that in case of accident, when the occupants of the vehicle may be incapable of actuating releasing means, opening of the doors from the outside must be possible.

Another problem which presents itself in the design of a satisfactory locking system is that of preventing the operator of the vehicle from being locked out.

In the past, the automobile industry has given the hereinabove problems and prerequisites a great deal of consideration, directing special attention to the problem of enabling opening of the doors from the outside in case of accidents, but up to the present time, however, has failed to produce a locking system of the character described which was practical, efficient, low in cost, and above all, reliable. The inability of the industry to provide a locking system in which the vehicle doors were positively unlocked in the event of accident is chiefly responsible for the absence of any locking systems on present day automobiles.

The patents to Toren, No. 2,065,839 and McClanahan, No. 2,115,643 are typical of the manner in which the problem of providing a practical locking system was approached. Each of these patents provides means responsive to engine suction for actuating door latches to a door engaging position so as to hold the doors locked.

Aside from the complicated nature of these devices, the major objection to these prior systems was that the doors were not positively held locked under all driving conditions. This results from the fact that the latching was rendered ineffective upon acceleration of the motor, which caused the vacuum necessary for maintenance of the latches to be destroyed and as a consequence the latches were permitted to return to their inoperative positions.

Such vacuum controlled systems obviously afford little better than no protection at all to the occupants of the vehicle for it is of major importance that the doors be maintained locked upon an increase in vehicle speed.

To correct this objection to vacuum operated door locking systems the installation of a check valve between the engine manifold and the latch operating means has been suggested, so that although the engine when accelerated produced little or no vacuum there would still be vacuum in the bellows of the operating means. While such an expedient was effective to overcome one objection it resulted in the development of several new objections.

Thus, in case of an accident or stoppage of the engine, the doors of the vehicle would be maintained locked until they were opened by a manual operation of the vacuum valve to release the vacuum from the bellows of the operating means. Any attempt to correct this objection with the object of releasing the vacuum in the bellows automatically as the motion of the vehicle ceased is also impossible from the standpoint of practicability, and as the occupants of the vehicle would have no protection against thieves while temporarily stopping, as for traffic signals.

With these objections to past practices and the foregoing prerequisites in mind, the present invention contemplates the provision of a door locking system which is operated in response to the pressure of the oil in the engine lubricating system so as to positively insure locking of the doors as long as the engine of the vehicle remains in operation.

By utilizing the oil pressure of the engine lubricating system as an operating medium, sufficient pressure is at all times available during operation of the engine to maintain the doors latched. Oil pressure is also superior to suction

or vacuum as an operating medium as oil pressure increases upon acceleration of the vehicle, as compared with destruction of vacuum upon such acceleration.

A further object of the invention is to provide a latch for each door and biasing means for the latches to positively retract the same when the engine is not in operation or upon failure thereof due to any reason whatsoever so as to enable the doors to be opened at all times except when the engine is runnnig.

A further object of this invention is to provide a door locking system of the character described, the operativeness of which may be controlled by the operator of the vehicle from the interior thereof.

Still another object of this invention is to provide a door locking system of the character described with an oil pressure operated prime mover and motion transmitting elements connected between the prime mover and the door latches consisting entirely of flexible tension members incapable of being placed in compression to eliminate the possibility of jamming of the latches in locked positions and to insure ready disengagement of the latches either at the dictation of the operator of the vehicle or upon stopping of the engine.

Another object of this invention is to provide a locking system of the character described which permits closing of the doors of the vehicle while the latches are in operative positions.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described, and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed in accordance with the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a perspective view diagrammatically illustrating the application of this invention to an engine driven vehicle; and

Figure 2 is a detail view partly in section illustrating one of the latches.

Referring now particularly to the accompanying drawing in which like numerals indicate like parts, the numeral 6 generally designates the body of an automobile of the enclosed type having doors 6 and 7 at the front and rear respectively at each side thereof.

The doors are hinged in the customary manner as at 8 and in the present instance have their free vertical edges adjacent to each other when in closed position, although it is to be appreciated that the locking device of this invention is readily adaptable to vehicle doors hinged in any other manner.

With the hinge arrangement shown, however, the free vertical edges of the doors when closed overlie a common door post 9 which contains the conventional keeper sockets (not shown) for the ordinary latch bolts with which the doors are customarily equipped. In this respect it is desired to note that the latching system of this invention is provided in addition to the regular door latches and does not interfere therewith in any way.

The latches of the locking system comprise latch levers 10 pivotally mounted on the door posts in a recess 11 therein by means of a stud or pin 12 passing through the medial portion of the levers. When the vehicle is provided with four doors as shown, the recesses 11 for each door post are of sufficient length to accommodate two such latch levers 10, one being provided for each door of the vehicle.

The latch levers are so balanced on their pivots 12 as to normally assume a depending position with the long arms 13 of the levers lowermost. The opposite end 14 of each latch lever has secured thereto one end of a tension member or flexible cable 15 which is trained over suitable pulleys 16 at the under side of the body and in the engine compartment to connect with the free end of a lever 17 secured on a rock shaft 18 held in any suitable manner for oscillation in the engine compartment. As is apparent, one such flexible cable is provided for each latch lever.

Rocking motion is imparted to the shaft 18 by means of a prime mover 19 of the bellows type through a lever 20 fixed on the shaft and having one arm 21 thereof connected with the movable end of the bellows. The interior of the bellows is connected with the oil pressure lubricating system of the engine not shown, by means of a duct 22 so that during operation of the engine the bellows will be caused to expand and rock the shaft 18 through the lever 20. Such rocking motion of the shaft 18 is transmitted to the latch levers through the tension members or cables 15 and causes the levers to be swung on their pivots to engage the arms 13 of the levers in keeper sockets 23 carried by the doors at their free vertical edges.

Thus the latch levers operate to maintain the doors locked in their closed positions whenever the engine of the vehicle is running. Immediately upon stopping of the engine or failure thereof for any cause, the pressure in the bellows is relieved and the force of gravity acting on the arms 13 of the latch levers disengages the same from the door keeper sockets permitting opening of the doors.

To positively insure disengagement of the latch lever arms 13 from the keeper sockets tension springs 24 are provided. These springs have one end secured to the door post 9 beneath the pivots 12 and their other ends fastened to the arms 13 of the latch levers.

A control device 25, by which the operator of the vehicle is enabled to simultaneously disengage all the latch levers, is provided to permit disabling of the system while the engine is in operation. For this purpose, the control 25, which may be formed as a rod or cable as desired, has one end connected with the rock shaft 18 preferably through an arm 27 on the lever 20 opposite the arm 21 thereof. The opposite end of the control 25 leads to the passenger compartment of the vehicle, where a handle 26 thereon is readily accessible to the operator of the vehicle.

Thus upon exerting a pull on the handle 26 of the control, the bellows is contracted and oil is expelled therefrom. Contraction of the bellows in this manner causes oscillation of the rock shaft in a direction to relieve the tension on the flexible cables 15 and permits the springs 24 acting in conjunction with gravity on the latch lever arms 13 to disengage the levers and return the same to their normal inactive positions.

If it is desired to maintain the latching mechanism inoperative for considerable periods of time, it is apparent that the control 25 may be

provided with suitable means to hold the bellows compressed and against expansion.

The door engaging arms 13 of the latch levers are preferably formed with a cam surface 28 facing the exterior of the vehicle to enable the levers to be cammed out of a position projecting into the door opening by the door when it is desired to close the door during such a condition.

The provision of the cam surfaces therefore prevents breakage of the latch levers in the event the engine is started after one of the doors has been opened and while the control 25 is in a position such as to allow expansion of the bellows.

The operation of the locking device is as follows:

With the engine not operating, the latches are maintained disengaged from the keeper sockets and in a depending position with respect to their pivots regardless of the position of the control 25. The doors then may be freely opened for access to the interior of the vehicle. Upon starting of the engine by the operator, however, assuming that the control 25 is set to permit operation of the locking system, the oil pressure developed by the engine and built up in the interior of the bellows expands the same and through the tension members connecting the bellows with the latches engages the latches with the keeper sockets to lock the doors closed.

Under these conditions the doors can neither be opened from the outside nor from the inside, and it is apparent that the occupants of the vehicle are protected from being thrown out of the vehicle as upon accidental opening of the doors or upon intentional tampering with the doors by children.

Inasmuch as the doors cannot be opened from the exterior the occupants of the automobile are protected against thieves attempting to gain unauthorized access to the interior of the vehicle during temporary stops.

All of the latches are immediately disengaged to permit opening of the doors in the event of engine failure whether such failure is due to accident or mechanical difficulty, by the failure of the oil pressure in the engine lubricating system. Consequently, in such instances the doors are readily opened from either the inside or the outside of the vehicle.

Inasmuch as the oil pressure is always sufficient to maintain the system operative throughout the entire range of driving conditions, it is apparent that the locking system is positively maintained operative to lock the doors closed while the engine is in operation. This is of special importance as the oil pressure is never diminished when the engine is accelerated to increase the speed of the vehicle.

The shape of the keeper sockets is also important as it permits ready disengagement of the latch levers therefrom in response to their biasing means upon failure of the engine.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent that the locking system of this invention is particularly practical and reliable and that it completely overcomes all the objections found in past devices of this type.

What I claim as my invention is:

1. A locking system for engine driven vehicles having an oil pressure lubricating system and a door comprising: a latch member; means mounting the latch member adjacent to an edge of the door for movement of a part thereof into and out of a keeper socket in the door, said mounting means permitting the latch member to be moved by gravity to a position disengaged from the keeper socket of the door; and means responsive to pressure in the engine lubricating system during operation of the engine for moving said latch member part into the keeper socket of the door.

2. A door locking device for engine driven vehicles having an oil pressure lubricating system comprising: a latch member for the door movable to and from latching engagement therewith and biased to a position disengaged from the door; a prime mover; a duct connecting the prime mover with the oil pressure system of the engine so that oil constitutes the operating medium for the prime mover whenever the engine is running; and means for translating motion of the prime mover under the influence of the operating medium into motion of the latch member to its door engaging position, said means comprising a flexible tension member connected between the prime mover and the latch member.

3. A door locking device for engine driven vehicles having an oil pressure lubricating system comprising: a latch lever for the door; means mounting the latch lever on a part of the vehicle body stationary with respect to the door for pivotal motion toward and from engagement with the door to hold the same locked; means biasing said latch lever to a position disengaged from the door; an expansible member connected with the oil pressure system of the engine so as to be expanded by oil pressure developed by the engine during operation thereof; and a motion transmitting connection between the expansible member and the latch lever comprising a flexible cable adapted to be placed in tension through expansion of the expansible member for moving the latch lever to its door engaging position.

4. A door locking device for engine driven vehicles having an oil pressure lubricating system comprising: a latch lever for the doors; means mounting the latch lever on a part of the vehicle body stationary with respect to the door for pivotal motion toward and from engagement with the door to hold the same locked; means for biasing said latch lever to a position disengaged from the door; an expansible member connected with the oil pressure system of the engine so as to be expanded by oil pressure developed by the engine during operation thereof; a motion transmitting connection between the expansible member and the latch lever including a flexible cable adapted to be placed in tension through expansion of the expansible member for moving the latch lever to its door engaging position; and means under the control of an occupant of the vehicle for rendering the expansible member inoperative.

5. A door locking device for engine powered vehicles having an oil pressure lubricating system comprising: a latch mounted for movement adjacent to a free edge of the door and having one end thereof projectible into a keeper socket in said edge of the door to maintain the door locked; means biasing the latch to unlocked position; a bellows connected with the oil pressure system of the engine so as to be expanded by the pressure of the oil therein whenever the engine is running; and a flexible tension member connected between the bellows and the opposite end of the latch for projecting the first named end of the latch into the keeper socket upon expansion of the bellows.

6. A locking device for engine powered vehicles having an oil pressure lubricating system comprising: a latch mounted for movement adjacent to a free edge of the door and having one end thereof projectible into a keeper socket in said edge of the door to maintain the door locked; means biasing the latch lever to unlocked position; a bellows connected with the oil pressure system of the engine so as to be expanded by the pressure of the oil therein whenever the engine is running; a flexible tension member connected between the bellows and the opposite end of the latch for projecting the first named end of the latch into the keeper socket upon expansion of the bellows; and control means accessible to the operator of the vehicle for rendering the bellows ineffective.

7. A door locking device for engine powered vehicles having an oil pressure lubricating system comprising: a latch for the door; means movably mounting the latch so that one end thereof is projectible into the door opening and engageable with the door to lock the same closed, said latch being biased to unlocked position; latch actuating means responsive to oil pressure in the engine lubricating system whenever the engine is running for moving the latch to its locking position, said latch actuating means including a flexible tension member; and a cam surface on said end of the latch engaged by the adjacent edge of the door during closing motion thereof when the latch is in locked position enabling camming of the latch out of the path of the door during closure thereof.

8. A door locking system for engine driven vehicles having an oil pressure lubricating system comprising: a latch biased to an unlocked position and movable to an operative position holding the door of the vehicle locked; a prime mover connected with the pressure lubricating system of the engine so as to be operated by oil pressure whenever the engine is in operation; and a flexible motion transmitting element connecting the prime mover with the latch adapted to be placed in tension by the prime mover to effect moving the latch to its operative door locking position.

9. In an engine driven vehicle having an oil pressure lubricating system and a door: a movable latch member adjacent to the door normally in an inoperative position permitting opening of the door; unidirectional actuating means responsive to pressure in the engine lubricating system during operation of the engine for moving the latch member into engagement with a door carried part to lock the door closed but incapable of returning the latch member to its normally inoperative position; and means biasing said latching member to its normally inoperative position and operable to return the latch member to said position upon stopping of the engine.

10. In an engine driven vehicle having an oil pressure lubricating system and a door: a movable latch member adjacent to the door normally in an inoperative position permitting opening of the door; a prime mover connected with the oil pressure system of the engine so that oil pressure constitutes the operating medium for the prime mover whenever the engine is running; a unidirectional motion transmitting connection between the prime mover and the latch member operable to move the latch member out of its normally inoperative position and into engagement with a door carried part to lock the door closed upon starting of the engine, and spring means connected with the latch and biasing the same toward its inoperative position to release the door for opening when the engine stops.

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