

Oct. 13, 1942.

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HYDRAULICALLY OPERATED LOCK

Filed Feb. 12, 1941

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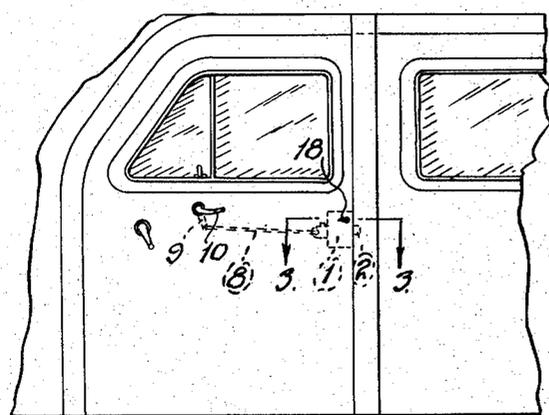


Fig. 1.

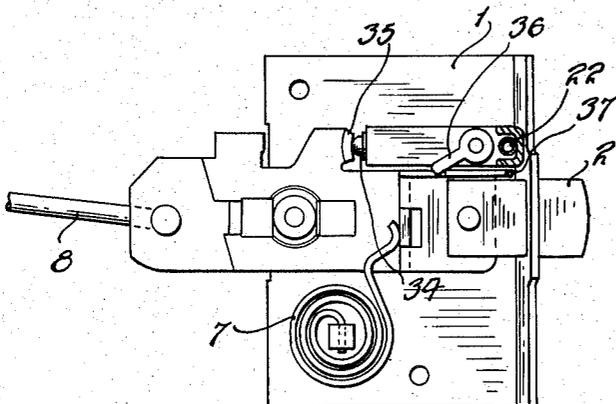


Fig. 2.

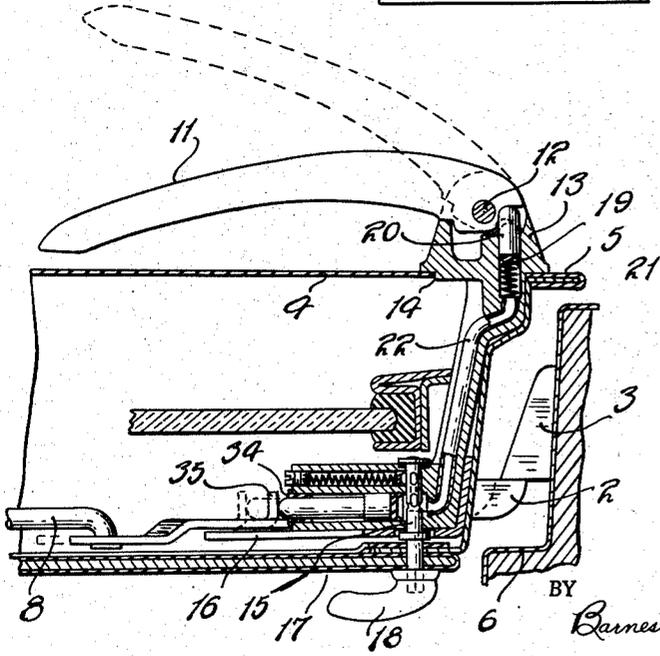


Fig. 3.

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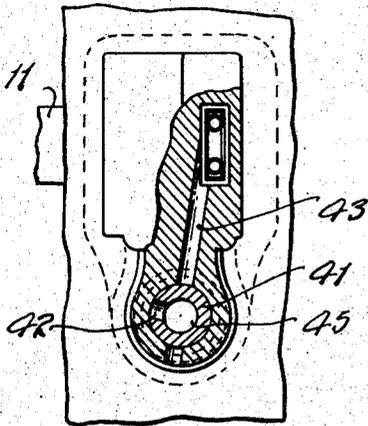
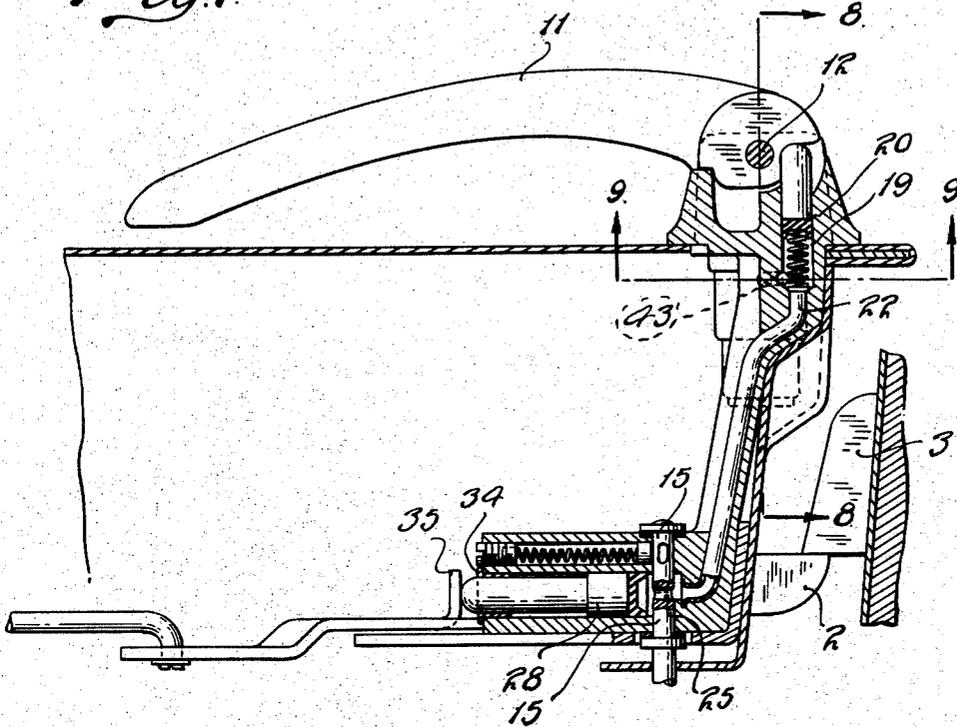
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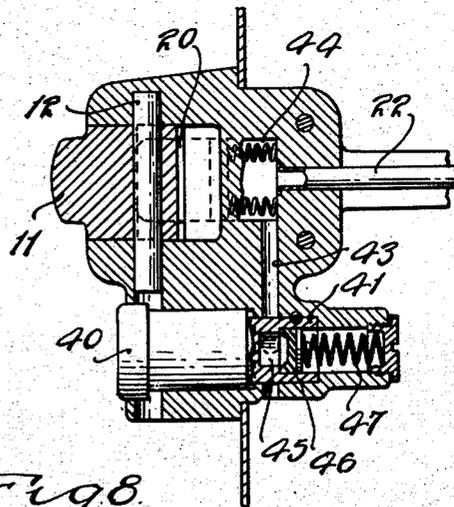
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*Fig. 7.*



*Fig. 9.*

*Fig. 8.*



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# UNITED STATES PATENT OFFICE

2,298,776

## HYDRAULICALLY OPERATED LOCK

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Application February 12, 1941, Serial No. 378,501

8 Claims. (Cl. 292-144)

This invention relates to narrow pillar locks. Narrow pillars, particularly in connection with the modern all-metal body, have been the objective of body builders. A narrow pillar is particularly desirable for the door where it joins the windshield pillar in order to cut down the blind spot for the driver. Doors now seldom open from the front because of the danger of one unwittingly opening a door while the car is traveling with the result that the passing air very often results in disaster when it catches the door and throws it open.

It is also desirable to have the center pillars as narrow as possible. So, all the efforts of the designers have been directed to getting as narrow uprights between the windows as is possible. However, the ordinary lock with the shaft passing through the door cannot be used with a narrow pillar. Hence, various forms of narrow pillar locks have been designed in the last twenty years to pass the operating connections around the sliding window and occupying as small a space as possible.

It is the object of the present invention to provide a narrow pillar lock with this objective and also to provide a lock in which the operating handle may be caused to pivot toward the operator in opening as this is a more natural effort than twisting the handle with the wrist.

In the drawings:

Fig. 1 shows a fragment of a body with my narrow pillar lock in place.

Fig. 2 is an elevation of the lock with the rear plate removed.

Fig. 3 is a section taken on the line 3-3 of Fig. 1.

Fig. 4 is an enlarged fragmentary section showing the operating parts.

Fig. 5 is a similar view showing the parts in a different position.

Fig. 6 is a section on the line 6-6 of Fig. 4.

Fig. 7 is a section through a door showing a key operated lock.

Figs. 8 and 9 are sections on the lines similarly designated in Fig. 7.

The lock plate is designated 1, the sliding bolt 2 and the keeper 3. This keeper is the striker. The door is designated 4, the overlap flange 5 and the door jamb 6. The sliding bolt 2 is normally projected by the clock spring 7. 8 is a remote control connection in the form of a link that connects with the crank 9 which is operated by the inside pull-to handle 10.

The outside handle 11 is pivoted on a vertical pivot 12 on the fixture 13 attached to the outside

of the door adjacent the overlap flange 5. Handle 11 can be swung outwardly, as shown in the dotted lines of Fig. 3. Fixture 13 is a casting which is inserted in the door through the opening 14 in the outer panel of the door. The valve stem 15 is threaded through the lock face plate 16 and the inner door panel 17. The thumb piece 18 screws onto the end of the valve stem 15. The fixture is provided with a cylinder chamber 19 in which reciprocates the hydraulic piston 20. A spring 21 tends to keep the piston in the projected position shown in Fig. 3. Tube 22 leads from the end of the hydraulic cylinder into the other end of the fixture where is located a second hydraulic cylinder 23 and a third hydraulic cylinder 24. The rotary valve 15 has a diametric passage 25 and an oblique passage 26, both of which can register with port 27 at the end of tube 22. The diametric passage 25 can register with cylinder 23 and oblique passage 26 can register with cylinder 24 so that cylinders 23 and 24 can be alternately connected with the tube 22 by a quarter of a turn of thumb lever 18. Cylinder 23 has a piston 28 with a proper packing 29 and cylinder 24 has an idling plunger 30 backed up by coil spring 31. This plunger 30 has packing 32. Piston 28 has a piston rod 33 which passes out the opposite end of the cylinder through a packing sleeve 34. This is arranged to contact the turned out ear 35 of the bolt 2.

The operation is as follows: One desiring to open the door from the inside simply turns down on handle 10. Crank 9 rotates clockwise and, through link 8, withdraws bolt 2. One desiring to enter the car from the outside pulls outside handle 11 from the full line position to the dotted line position in Fig. 3. This depresses plunger 20 and thrusts a column of oil down through tube 22 and, if the valve 15 is in the position shown in Fig. 4, this allows the fluid to push piston 28 to the left (as shown in Fig. 4), thereby retracting the bolt as shown in the dotted lines of Fig. 3. If the valve stem is turned to the position shown in Fig. 5, the oil column thrusts outwardly the idling plunger 30. Nothing happens but the compression of spring 31. The outside handle swings idly. The handle is sometimes called, in connection with present-day locks, a semi-freewheeling handle. This has been found more desirable than to block the movement of the handle as it prevents the breaking of the handle or other parts by one seeking to get into the car illegally. It apprizes the would-be thief that it will not do him any good to try to force the handle as he is up against an inoperative handle. These free-

wheeling handles are almost universally designed on the principle of having a disconnectable connection between the sliding bolt and the outside rollback. This movable clutching member and its proper control introduces somewhat of a complication in levers, rods, etc., to operate it as counterdistinguished from the simple valve arrangement and the idling cylinder provided in the present lock.

In Figs. 7-9 inclusive, an arrangement is shown for locking a door from the outside with a key. The door is provided with the same type of inside lock as already described. A key operated barrel 40 is provided. In the end of this is a valve 41. When the barrel is in the position shown in Fig. 9, the door is not locked from the outside but may be locked from the inside in the same way as already described by turning the shaft 15 by means of the lever 18. With the parts in the position shown in Fig. 7, the door is unlocked from the inside. To lock the door from the outside, the key barrel is turned so that the port 42 registers with the passageway 43 which, in turn, registers with the chamber 19 which is ahead of the piston 20. The port 42 leads to the interior chamber 45 at the end of the barrel in which is located piston 46 held in the left hand position by a weak helical spring 47. If the outside handle 11 is operated, when the key barrel 41 has been turned so that port 42 registers with passageway 43, then the fluid displaced by piston 20 will tend to operate on both the bolt retracting piston 28 and the piston 46 at the end of the key barrel. But, inasmuch as piston 46 is held forward by a weak spring 47, the oil displacement will take place in the chamber at the end of the key barrel and the bolt will not be retracted.

So, it will be seen that the door may be locked either from the inside or outside. These passageways and the valve 46 and the chamber in which it reciprocates constitutes another "idling means" for making the outside handle ineffective to retract the bolt. Of course, it would not be necessary to have the piston in connection with the idling means except that some arrangement must be afforded to return the quantum of oil to the passageways in front of the piston 20.

It is very desirable in locks to have an arrangement that is usually referred to as "automatic undogging," although this is not accurate when applied to freewheeling or semi-freewheeling handles. Some means must be provided to make the outside door handle effective to retract the bolt each time the door is closed from the outside. Otherwise, one may very well get locked out of his car when he carelessly leaves the car and leaves the key in the ignition lock. I secure this result by providing a lever 36 on the valve 15. This is arranged to be struck by a shoulder 37 on the sliding bolt. So, when valve 15 is turned to the position shown in Fig. 5, which connects with the idling plunger and the door is closed, the retraction of the bolt 2 by striker 3 will automatically return the lever 36 to the position shown in Fig. 2 and restore the valve to the position shown in Fig. 4, wherein the hydraulic column is connected with the bolt retracting plunger 28.

What I claim is:

1. In a hydraulic lock particularly adapted for narrow pillars, the combination of a lock casing, a bolt slidable therein, means for retracting the bolt from the inside of the door and outside operating connections of the hydraulic type

comprising a hydraulic transmission passing across the door just inside the jamb face and having means on the inner end for retracting the bolt and having means on the outside end to be actuated by the outside handle and idling means together with a valve that may be alternately turned to put the idling means in communication with the hydraulic fluid to make the outside handle ineffective and to put the retracting means in communication with the hydraulic fluid to make the outside handle effective to retract the bolt.

2. In a hydraulic lock particularly adapted for narrow pillars, the combination of a lock casing, a bolt slidable thereon, means for retracting the bolt from the inside of the door and outside operating connections of the hydraulic type comprising a hydraulic transmission having means on the inner end for retracting the bolt and having means on the outside end to be actuated by the outside handle and idling means together with a rotary valve that may be alternately turned to put the idling means in communication with the hydraulic fluid to make the outside handle ineffective and to put the bolt actuating means in communication with the hydraulic fluid to make the outside handle effective to retract the bolt, said valve having a diametric passageway for directing the hydraulic fluid into the bolt actuating means and an oblique passageway for putting the hydraulic fluid into communication with the idling means, the said passageways being located at angularly spaced points around said rotating valve.

3. In a hydraulically operated lock, the combination with a lock having a casing, a bolt slidable therein and means on the inside of the door for retracting the latch bolt, a hydraulic unit supported in the door and having a cylinder and plunger on the outer end of the unit and a second and third cylinder with a piston in each cylinder, one being an idling piston and a spring for backing the same and the other being an actuating piston with a piston rod arranged to engage with the sliding bolt to retract the same and a valve for controlling the passage of the hydraulic fluid to the idling piston and an outside handle arranged to actuate the plunger at the outer end of the hydraulic unit.

4. In a hydraulically operated lock, the combination with a lock having a casing, a bolt slidable therein and means on the inside of the door for retracting the latch bolt, a hydraulic unit installable in the door and having a cylinder and plunger on the outer end of the unit and a second and third cylinder with a piston in each cylinder, one being an idling piston and a spring for backing the same and the other being an actuating piston with a piston rod arranged to engage with the sliding bolt to retract the same, a valve for controlling the passage of the hydraulic fluid to the idling piston and an outwardly swinging handle swinging on a substantially vertical pivot for actuating the plunger at the outer end of the unit.

5. In a hydraulically operated lock, the combination with a lock having a casing, a bolt slidable therein and means on the inside of the door for retracting the latch bolt, a hydraulic unit installable in the door and having a cylinder and plunger on the outer end of the unit and a second and third cylinder with a piston in each cylinder, one being an idling piston and a spring for backing the same and the other being an actuating piston with a piston rod arranged to

engage with the sliding bolt to retract the same, a valve for controlling the passage of the hydraulic fluid to one or the other of these two last mentioned cylinders and an outside handle arranged to actuate the plunger at the outer end of the hydraulic unit and an automatic device for returning the valve each time the latch bolt is retracted to a position to cause the hydraulic fluid to be in communication with the cylinder and piston that actuates the bolt to retract the same.

6. In a hydraulically operated lock, the combination with a lock having a casing, a bolt slidable therein and means on the inside of the door for retracting the latch bolt, a hydraulic unit insertable in the door and having a cylinder and plunger on the outer end of the unit and a second and third cylinder with a piston in each cylinder on the inside end of the unit, one being an idling piston and a spring for backing the same and the other an actuating piston with a piston rod arranged to engage with the sliding bolt to retract the same, a valve for controlling the passage of the hydraulic fluid to one or the other of these two last mentioned cylinders, an outside handle arranged to actuate the plunger at the outer end of the hydraulic unit and an automatic device for returning the valve each time the latch bolt is retracted to a position to cause the hydraulic fluid to be in communication with the cylinder and piston that actuates the bolt to retract the same, comprising a lever on the valve arranged in the path of a portion of the bolt when the same is retracted and the valve is in a position to put the hydraulic fluid in communication with the idling cylinder.

7. In a hydraulic lock particularly adapted for

narrow pillars, the combination of a lock casing, a spring pressed bolt slidable therein, means for retracting the bolt from the inside of the door and outside operating connections of the hydraulic type comprising a hydraulic transmission having means on the inner end for retracting the bolt and having means on the outside end to be actuated by the outside handle and idling means in the form of a piston pressed outwardly by a spring weaker than the bolt projecting spring, and a valve that may be alternately turned to put the idling means in communication with the hydraulic fluid to make the outside handle ineffective or to put the idling means out of communication with the hydraulic fluid to make the outside handle effective to retract the bolt.

8. In a hydraulically operated lock, the combination with a lock having a casing, a spring-pressed bolt slidable therein and means on the inside of the door for retracting the latch bolt, a hydraulic unit supported in the door and having a cylinder and plunger on the outer end of the unit and a second and third cylinder with a piston in each cylinder, one being an idling piston and a spring for backing the same weaker than the belt spring and the other being an actuating piston with a piston rod arranged to engage with the sliding bolt to retract the same and a valve for controlling the passage of the hydraulic fluid to the idling piston and an outside handle arranged to actuate the plunger at the outer end of the hydraulic unit, the said idling piston reciprocating in a chamber adjacent the outside door handle.

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