United States Patent

Fritsch et al.

[15] **3,705,508**

[45] **Dec. 12, 1972**

[54] **LOCKS**

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[30] **Foreign Application Priority Data**

March 14, 1969 Germany .....G 69 10 308.8
March 14, 1969 Germany .....G 69 10 307.7

[52] **U.S. Cl.** **70/373,** 70/375, 70/455
[51] **Int. Cl.** **E05b 9/04,** E05b 27/08
[58] **Field of Search** ....70/364 A, 370, 371, 372, 373, 70/375, 448, 449, 451, 452, 455, DIG. 43; 292/DIG. 43, DIG. 70

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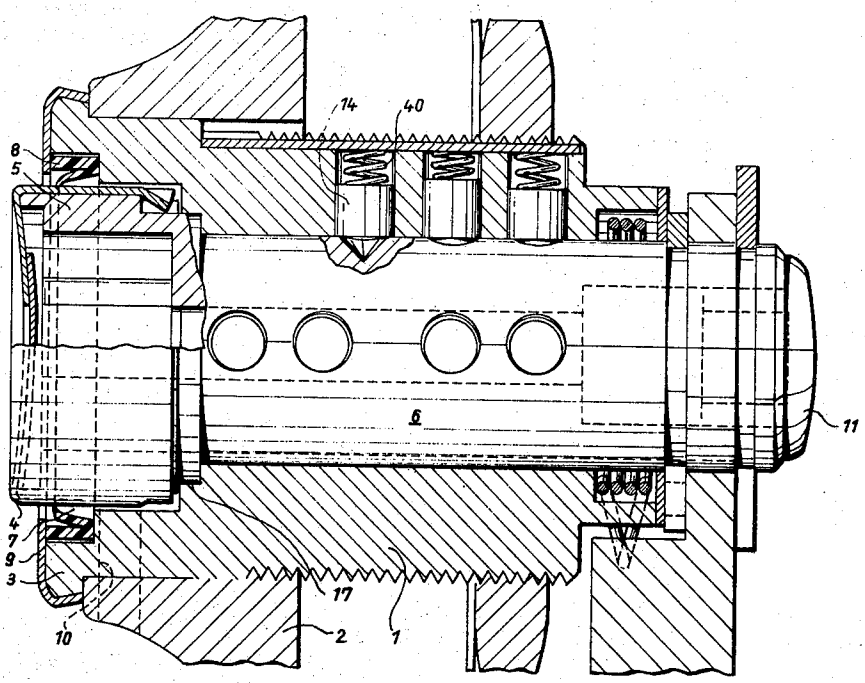
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Attorney—Nolte & Nolte

[57] **ABSTRACT**

A lock comprising a cylinder having a bore, a plug rotatably received in the bore, the bore being of such configuration as to prevent lock freezing.

2 Claims, 10 Drawing Figures



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SHEET 1 OF 7

Fig. 2

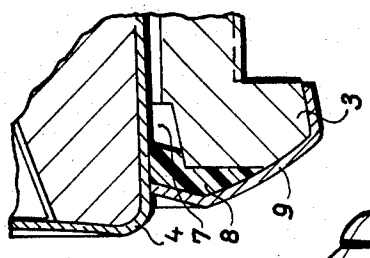
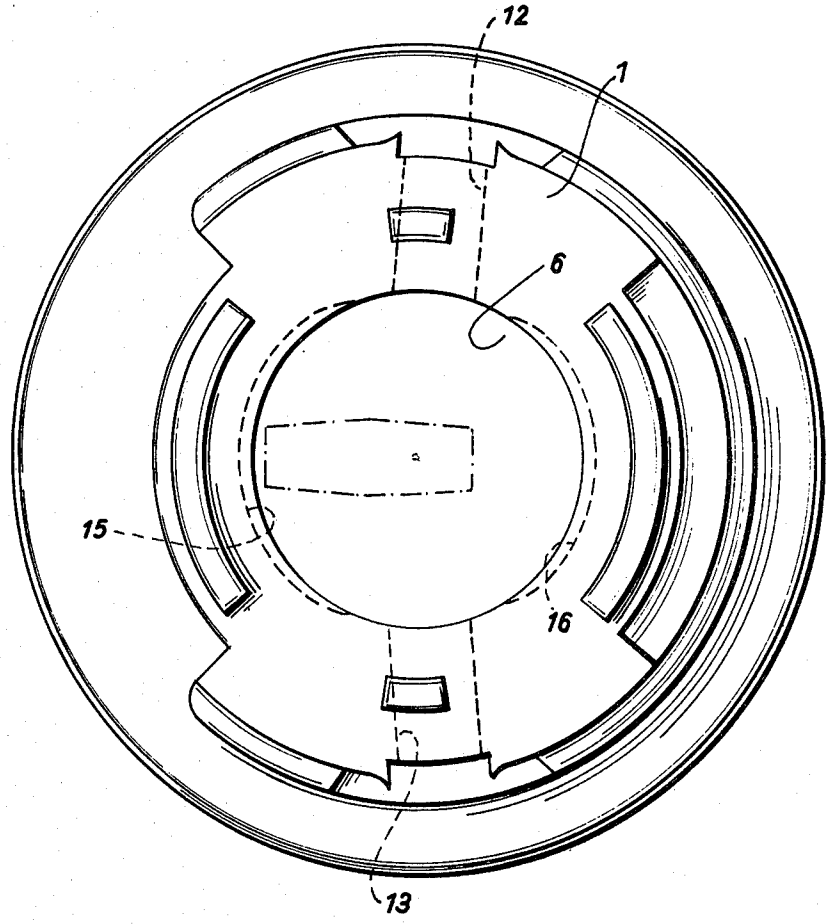


Fig. 1

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Fig. 3



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Fig. 5

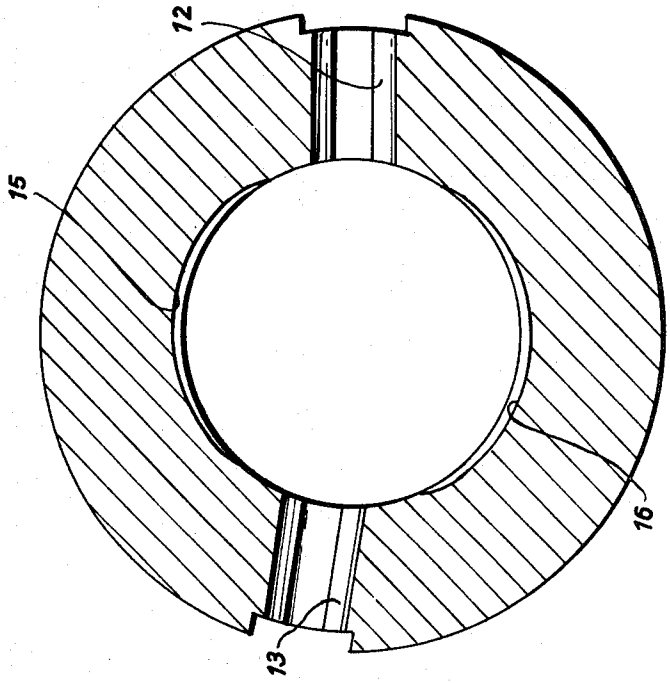
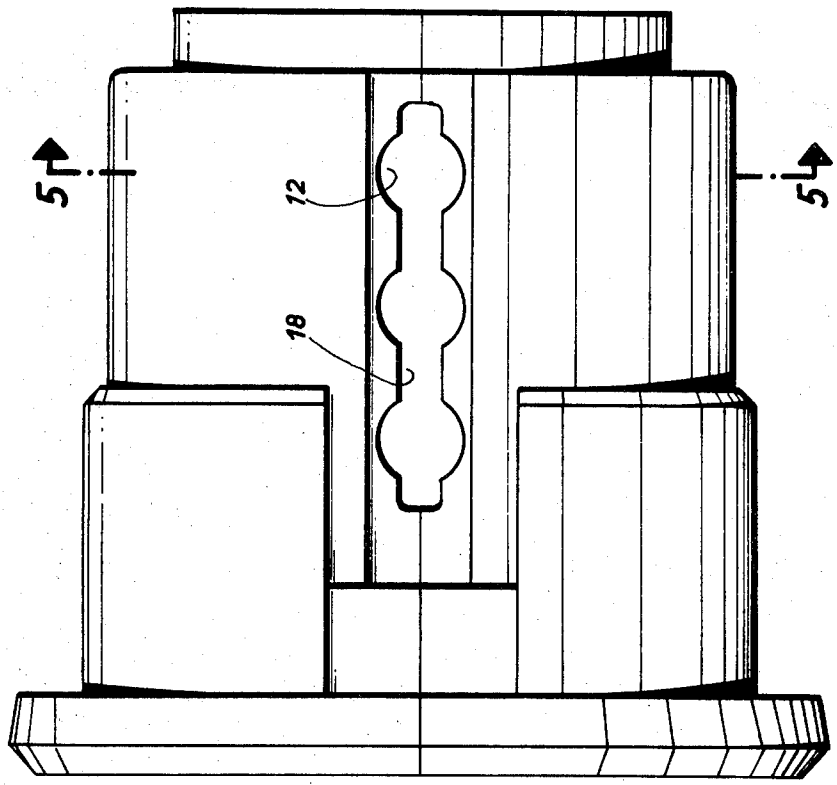


Fig. 4



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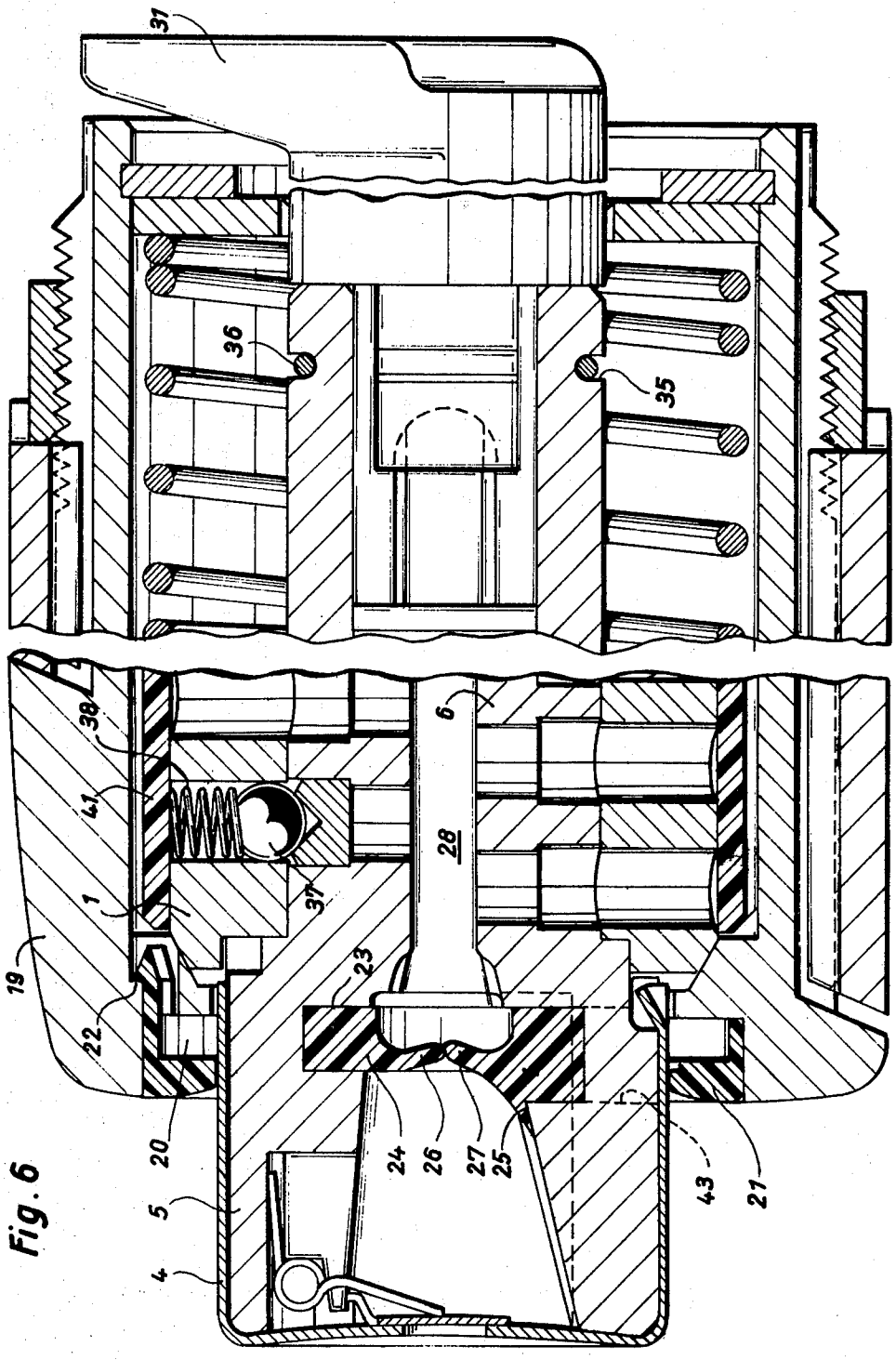


Fig. 6

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Fig. 7

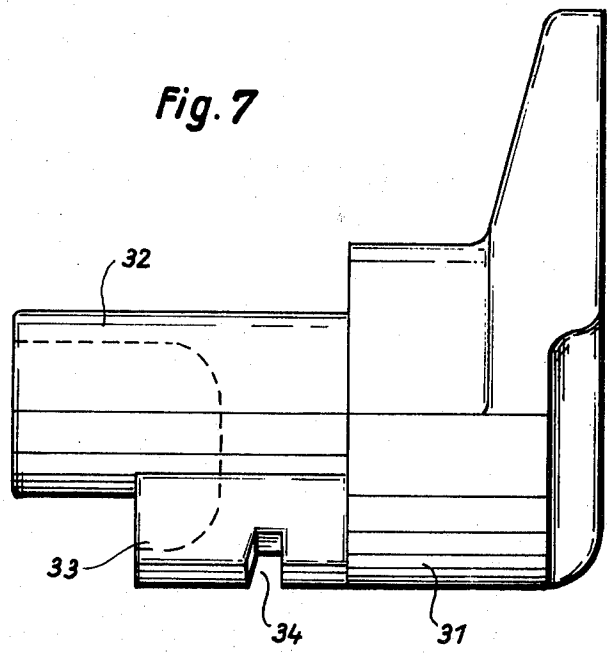
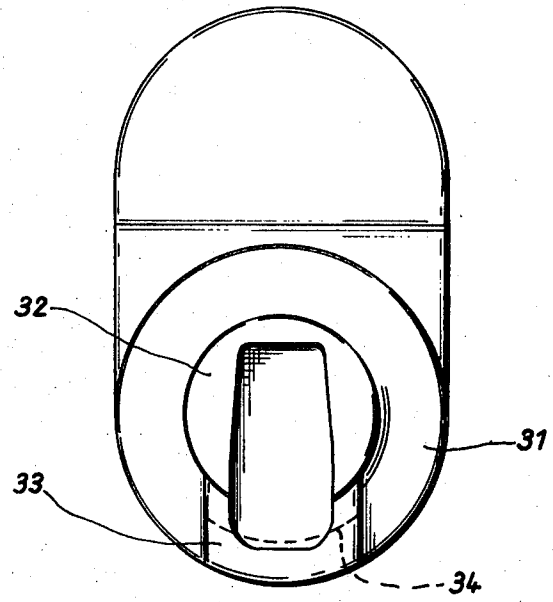


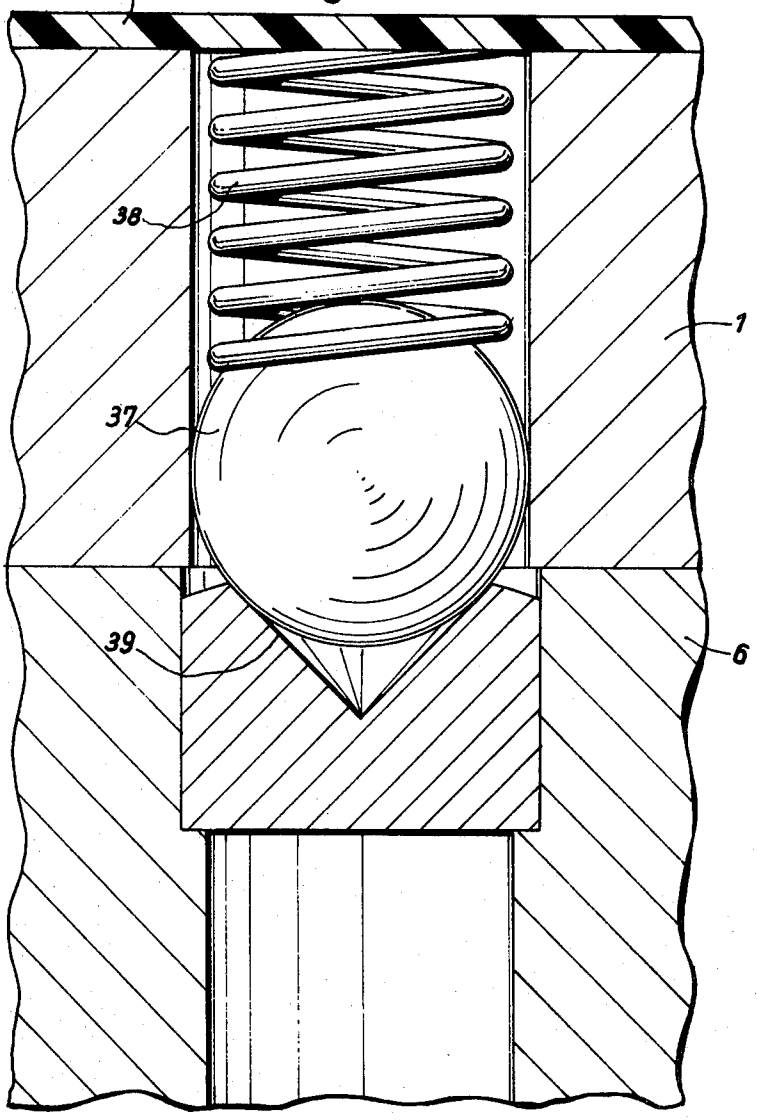
Fig. 8



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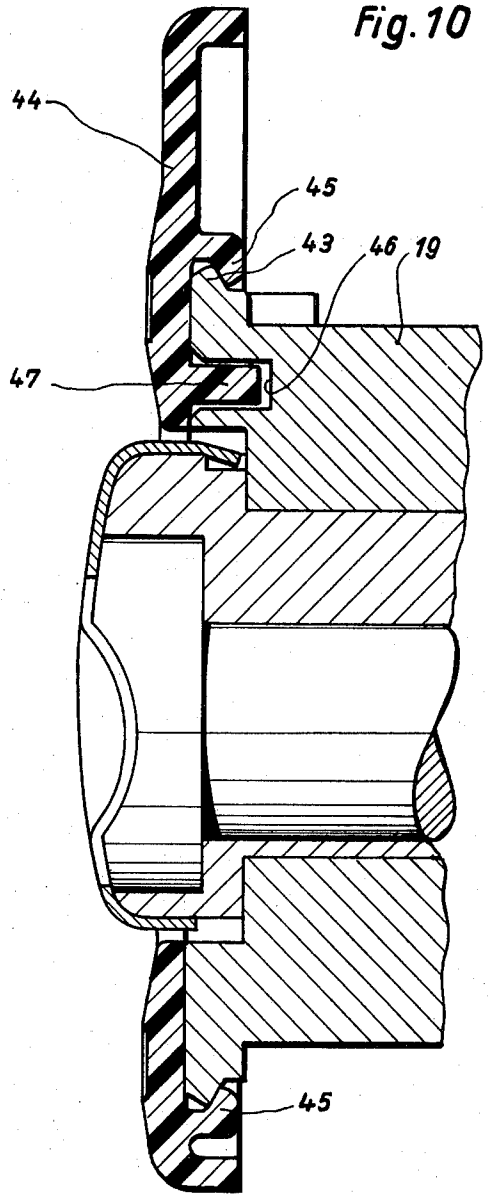
Fig. 9



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Fig. 10



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LOCKS

This invention relates to locks and more particularly to cylinder locks especially suitable for motor vehicle passenger compartment doors and trunk doors and also to cylinder locks especially suitable for mounting on the dashboard of a motor vehicle, such as ignition locks.

It is known that the functioning of a lock in a passenger compartment door or trunk door of an automobile is frequently interfered with by the entrance of dust and moisture into the lock. In cold weather there is accordingly the risk of freezing of the lock. Moreover, the entry of dust into the lock cannot be entirely prevented by the provision of a spring-retained cover over the keyhole.

To prevent the danger of the lock freezing and to insure easy movement of the plug, it is further proposed according to the invention to provide at least one depression in the bore of the cylinder so that the plug is guided in its front portion by means of a cylindrical annular shoulder, in its middle portion only by the cylindrical faces in the zone of the bores for the tumbler pins and at its rear end in the cylindrical bore of the cylinder.

The invention will now be further described with reference to a specific embodiment thereof illustrated in the drawings, in which:

FIG. 1 is an axial longitudinal cross section of a lock according to the invention;

FIG. 2 is a fragment of the same cross section as in FIG. 1 but illustrating an alternative configuration for the front end packing ring;

FIG. 3 is a vertical radial cross section of the cylinder;

FIG. 4 is a side elevation of the cylinder in which the bores for the tumbler pins are shown;

FIG. 5 is a vertical section along 5—5 of FIG. 4;

FIG. 6 is a longitudinal axial cross section of a lock according to the invention provided with a longitudinally displaceable cylinder;

FIG. 7 is a side elevation of the pressure foot of the lock of FIG. 6;

FIG. 8 is a front elevation of the pressure foot of FIG. 7;

FIG. 9 is a detail of longitudinal axial cross section through the cylinder and plug of the lock of FIG. 6; and

FIG. 10 is a fragment of a longitudinal cross section through the lock cylinder and the plastic flange of a lock according to the invention in which it is desired to have a distinctive exposed flange.

Referring to FIG. 1, a cylinder 1 is provided at its front end with an annular ridge 3 partly covering the front face of a collar 2. A plug 6 received in a bore through the cylinder 1 is provided with a head 5 onto which is fitted a covering cap 4. Between the outer cylindrical surface of the cap 4 and the inner cylindrical surface of the annular ridge 3 is defined a cylindrical annular space 7 in which is retained a packing ring 8. A circular annular plate 9 locks the packing ring 8 in the space 7. In cross section, the packing ring 8 has a wider leg and a narrower leg. The free end of the wider leg abuts against the internal face of the annular plate 9.

In the portion of the wall of the cylinder 1 surrounding the head 5 of the plug 6 is provided a drain bore 10 which also extends through the collar 2. A key passage

is provided through the plug 6 which key passage widens into a bore at the rear of the plug 6. This bore is closed by means of a plug 11 for which there may be substituted a covering disc inserted in a recess or a pressure foot 31, the latter as in FIG. 6.

As can be seen from FIG. 3, the bore of the cylinder 1 which receives the shaft of the plug 6 is formed with faces 15 and 16. They desirably extend to near the end of the bore and are shown as jointly occupying an angular extent of at least about 150°. In any event they occupy a major part of the cylinder's inside surface. They are angularly spaced between bores 12 and 13 in which the tumbler pins 14 are received. The faces 15 and 16 are defined by recesses in the cylindrical wall so that the cylindrical plug shaft is guided only by the cylindrical sections lying between the faces 15 and 16 in the zone of the bores 12 and 13. Further guiding occurs on a cylindrical surface 17 defined by an annular shoulder in the bore of the cylinder 1 and at the rear end of the cylinder bore.

Serially arranged individual bores for the tumbler pins may be connected together by a slot 18 (FIGS. 4 and 5), recessed into the outside of the cylinder.

In the embodiment of FIG. 2, the annular space 7 widens outwardly and the packing of ring 8 has an approximately L-shaped cross section the short leg of which is pressed into the annular space and the long leg of which covers a part of the end face of the annular ridge or bead 3 on the stator 1, the annular plate 9 being of such configuration as to define space for the long leg of the L to cover a portion of the front face of the bead 3.

In FIG. 6, the cylinder 1 is mounted for longitudinal displacement with the plug 6 in a lock housing 19. The plug head 5 is of greater axial length than the plug head of the embodiment of FIG. 1 and the cap 4 is of correspondingly greater depth. A cylindrical annular space 20 is defined between the cap 4 and the lock housing 19. In the annular space 20 is positioned a packing ring 21 provided with a rear shoulder 22. Alternatively, element 22 may be in the form of a plurality of lugs rather than a continuous shoulder. Element 22 engages an annular shoulder provided in the lock housing 19. If element 22 is in the form of lugs rather than in a continuous shoulder, the lock housing 19 may correspondingly be provided with individual recesses for engagement with the individual lugs. In the plug head 5 are provided grooves 23. In the plug head 5 is also provided an opening 43 of sufficient width to permit insertion therethrough of a packing plate 24 provided with lugs which engage in the recesses. Alternatively, the recess 23 may be a continuous annular recess 23 and, correspondingly, the lugs on the packing plate may be replaced by a continuous structure. The plate 24 is provided with a projecting barb or lip 25 which engages the inner face of the rotor head 5 and thus supports the plate 24 in the plug head 5. The packing plate 24 is also provided with two contacting elastic lips 27. When a key is inserted into the lock, the key first pushes aside the spring mounted flaps provided at the opening of the cap 4 and then pushes aside the elastic lips 27 whereupon the key enters the key passage 28.

The pressure foot 31 is provided with a stem 32 including a ledge 33 and a groove 34. When the stem 32 is inserted into the plug 6, the groove 34 aligns with a

groove 35 provided on the external face of the plug 6. A snap ring 36 engaging the groove 35 and the groove 34 fixes the pressure foot 31 to the plug 6.

A bore is provided in the stator 1 in which bore is arranged a helical spring 38 and ball 37 (FIG. 9). A detent 39 is provided in the rotor 6 and the ball 37 under the urging of the spring 38 engages the detent 39. Normal manual rotation of the key to rotate the plug 6 is sufficient to disengage the detent 39 from the ball 37. A sleeve 41 slipped onto the cylinder 1 retains the helical spring 38 as well as springs 40 provided for the tumbler pins 14.

In a construction suitable for the dashboard, such as for an ignition lock, the lock housing 19 is provided at its end face with a collar 43 to which there is fastened a flange 44 made of plastic, which flange may be fabricated by injection molding. The flange 44 is provided with gripping claws or lugs 45 which grip the collar 43 from behind. The flange 44 is also provided with a pin 47 engaging a recess 46 provided in the lock housing 19 thus assuring the desired angular alignment of the flange 44 relative to the lock housing 49. On the front of the flange 44 the desired legend may be applied, embossed or molded.

What is claimed is:

1. A lock comprising a cylinder having a main bore, a plug rotatably mounted in the main bore, packing ring means to minimize entrance of humidity and dust between the cylinder and the plug and to assist in the rotatable mounting of the plug; the cylinder having at least one longitudinal row of radial bores, each extending into the main bore; tumbler pins in the radial bores; the cylinder having contact with the plug in mutually facing areas, along the row of radial bores, whereas the cylinder has, remotely from said row, at least one circumferential segment, occupying a major area of the main bore, radially recessed so that the plug is not contacted by the cylinder, in said segment, thereby counteracting freezing of the plug to the cylinder.

2. A lock according to claim 1, also having a slot in the outside of the cylinder interconnecting the radial bores.

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