July 8, 1952 E. N. JACOBI 2,602,319

DUST COVER MOUNTING FOR CYLINDER LOCKS

Filed July 31, 1950 2 SHEETS—SHEET 1

Fig. 1.

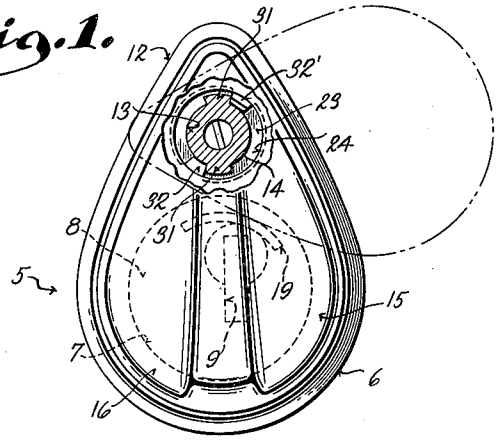


Fig. 2.

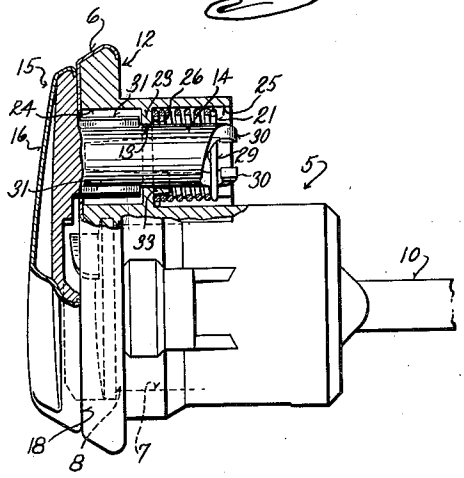


Fig. 3.

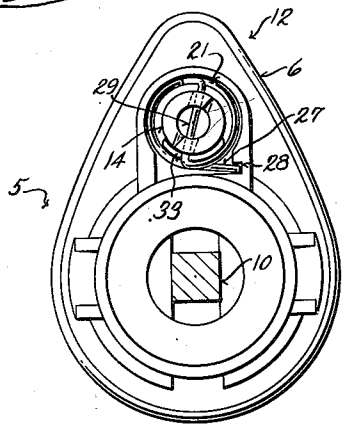
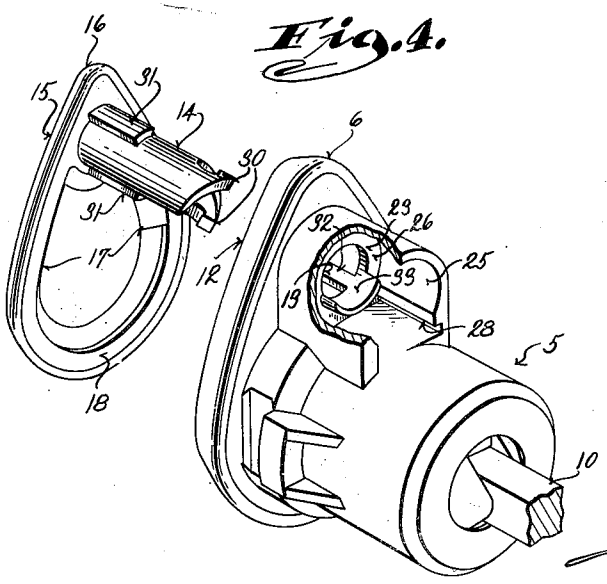


Fig. 4.



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Fig. 5.

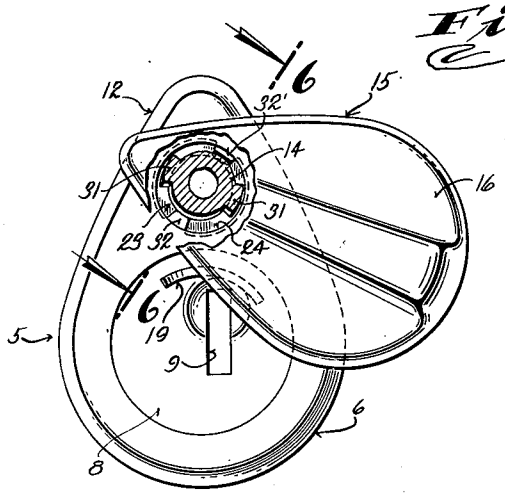


Fig. 6.

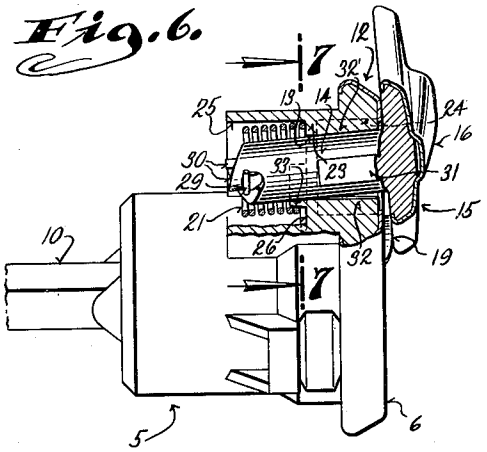
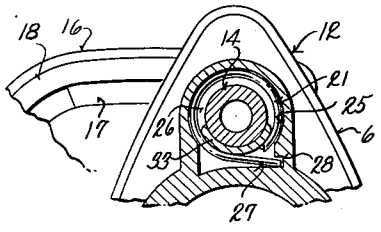


Fig. 7.



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UNITED STATES PATENT OFFICE

2,602,319

DUST COVER MOUNTING FOR CYLINDER LOCKS

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Application July 31, 1950, Serial No. 176,826

5 Claims. (Cl. 70—455)

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This invention relates to locks, and refers more particularly to cylinder locks for automobile door and deck handles. Such locks are ordinarily equipped with dust covers adapted to be swung edgewise toward and from a position covering the exposed end of the lock cylinder and consequently the mouth of the keyway therein.

It is, of course, desirable that the cover be spring biased to closed position and readily movable therefrom by pushing against it with the key.

It is also desirable that the cover be held open, upon being swung to that position, until the cylinder is turned and the key removed. This is accomplished by a cam or detent projecting from the front face of the lock cylinder to engage an edge of the cover and hold the same open against the spring bias which tends to swing it edgewise to its closed position. Upon rotation of the cylinder away from its key-receiving position the holding portion or shoulder of the cam against which the edge of the cover engages is moved out of engagement with the cover, permitting the cover to ride up over a sloping surface on the cam and swing toward its closed position until its edge strikes the key. As the key is withdrawn from the cylinder the cover continues to ride across the cam, swinging all the way to its normal closed position.

Patent No. 2,213,814, issued to Edward N. Jacobi, September 3, 1940, illustrates and claims a dust cover which operates in this manner; and reference may be had thereto for a more detailed explanation of this cam, but from the foregoing brief description it will be seen that the cover must move flatwise forwardly a slight distance during both its opening and closing movements in the course of riding up over the cam.

The spring which biases the dust cover edgewise to its closed position also draws it rearwardly into flatwise engagement with the front of the lock body with considerable force. This spring surrounds the stem or pintle by which the cover is mounted on the lock body. Since the pintle axis is located at some distance from the cam on the lock cylinder, it will be obvious that the camming force by which flatwise forward movement of the cover is effected tends to tilt the cover about the spring as a fulcrum, and thus tends to cant the stem or pintle in its bearing.

Heretofore this tilting tendency caused the stems of dust covers mounted in this manner to cramp or bind in their bearings and thus interfered with the axial sliding of the stem necessary in that construction. This was true even though

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the bearing surfaces and stem were lubricated at the time of assembly, since in time the lubricant disappeared and as the parts became dry the above described conditions became worse.

Another objection to past types of dust cover mountings has resided in the tendency for the spring surrounding the stem or pintle to engage the stem and scrape against it, as a result of radial inward displacement of portions of the coils of the spring due to torsional forces thereon.

With these serious objections to previous types of dust covers in mind, it is an important object of this invention to provide a mounting for a dust cover of the character described which is designed to better accommodate the necessary slight tilting of the dust cover in response to the camming and biasing forces imposed upon it during edgewise swinging motion, to thus permit the cover to readily ride up over the cam on the lock cylinder without causing cramping or binding between the stem and its bearing.

Another object of this invention resides in the provision of a guard on the lock body which will hold the coils of the dust cover spring from engagement with the stem and thereby prevent the wear on the stem which would result from such engagement.

This invention also has as its purpose to generally improve the dust cover mounting and closing mechanism of the aforesaid patent.

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 drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a front view of a lock equipped with the dust cover of this invention, the cover being in its closed position, and a portion thereof being broken away to better illustrate the stops which define the closed portion of the cover;

Figure 2 is a side elevational view of the lock and cover with portions thereof cut away and in section;

Figure 3 is a rear view of the lock;

Figure 4 is an exploded perspective view of the

lock and dust cover in their relative positions for assembly, a portion of the lock body being cut away to show details of the dust cover mounting;

Figure 5 is a view similar to Figure 1 but showing the dust cover partially open and in a position of maximum tilt due to its riding over the high point of the cam or detent;

Figure 6 is a sectional view taken substantially along the plane of the line 6—6 in Figure 5; and

Figure 7 is a fragmentary sectional view taken on the plane of the line 7—7 in Figure 6.

Referring now particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, the numeral 5 designates generally a lock body, which is preferably a die casting having a plated and polished escutcheon cap 6 covering its exposed front end. A bore 7 in the lock body rotatably receives a lock cylinder 8 which is of customary construction, having a keyway 9 in which a proper key (not shown) may be received and by which the tumblers of the cylinder are retracted to release the cylinder for rotation. Rotational motion of the lock cylinder is, of course, transmitted through a stem or shaft 10 to the door latching mechanism.

At its front end the lock body has a lateral extension 12 over which the escutcheon cap also extends. A bore 13 through this lateral extension receives the stem 14 of a dust cover 15. The cover and its stem, like the lock bore, are preferably a die casting with the outer surface of the cover provided with an escutcheon cap 16 of plated and polished sheet metal. The under surface of the cover is hollowed out and has opposite inclined surfaces 17 at the inner edge of its marginal rim 18, which surfaces are adapted to cam the cover forwardly over a cam or detent 19 on the front end of the cylinder.

The cam or detent 19 serves to hold the cover in its open position as the key is inserted into the keyway in the cylinder, and comprises substantially an arcuate wall projecting edgewise from the front face of the cylinder. Its outer edge is curved convexly in the longitudinal direction so that the wall is high enough at its medial portion to project beyond the plane of the front face of the lock body while the ends thereof are flush with or slightly beneath this plane. This curvature of the outer edge of the cam and the arcuate formation of the wall gives the cam an outward radial inclination which, together with the incline 17, enables the rim 18 on the cover to ride up and over the cam or detent during opening of the cover. When the cover is swung to the fully open position its edge engages the detent, and the cover is thus held open as the key is inserted. As the cylinder is rotated in either direction from its locked position the high medial portion or point of the cam is carried away from its position obstructing closure of the cover, and when the cylinder has been rotated far enough the trailing low end of the cam moves under the adjacent edge of the cover, thus allowing the cover to swing across the cam toward its closed position.

The cover is biased flatwise rearwardly into firm engagement with the front of the lock body, and also edgewise toward its closed position covering the mouth of the bore in which the cylinder turns, by means of a single coiled torsion and compression spring 21 which surrounds the stem and reacts between the rear of the stem and the lock body.

Since the rearward biasing force of this spring is exerted at the cover pivot axis and counteracts the forward camming force exerted by the detent 19 as the cover swings between its open and closed positions, it will be seen that a force couple is created by the spring and the detent which together tend to tilt the cover with respect to its normal position and thus also tilt the stem in the bore. Heretofore the cover stem was made to fit the bore 13 quite closely for a substantial portion of its length, so that the stem was constrained to sliding motion with the result that its tendency to tilt caused it to cramp and bind.

The mounting of the present invention, however, specifically accommodates and provides for limited tilting of the stem in the bore, with the result that such cramping and binding is virtually impossible. This tilting displacement can occur because of the fact that the actual bearing between the stem and the lock body comprises essentially a narrow, bulkhead-like circumferential rib 23 extending completely around the bore intermediate its ends. This rib may be considered as being defined by "counterbores" 24 and 25, opening, respectively, to the front and rear of the lock body, although these "counterbores" are not exactly circular in cross section, as will be seen presently, and are formed by appropriate coring during the die casting operation.

The rear face of the rib 23 provides a shoulder or abutment 26 against which the front coil of the spring 21 reacts. This end of the spring extends tangentially as at 27 and engages under a ledge 28 defined by a longitudinal slot in the side of the rearwardly opening "counterbore" 25. The opposite end portion 29 of the coiled spring is bent inwardly to extend diametrically across the spring for securement to the rear of the stem. A pair of oppositely extending helical arms or lugs 30 on the rear of the stem provide a double bayonet-slot in which the spring end 29 is received. The torsional force of the spring maintains the inwardly turned end 29 of the spring hooked under the arms 30 and urges the cover edgewise toward its closed position; while the axial thrust of the spring reacts against the forward faces of the arms 30 to urge the stem rearwardly and thereby draw the cover down onto the front face of the lock body. The structure just described comprises an improved embodiment of that described and claimed in the copending application of Edward N. Jacobi for Cover for Door Lock, Serial No. 141,271, filed January 30, 1950, which resulted in Patent No. 2,562,038.

A pair of short longitudinal ribs 31, extending along the front portion of the stem at diametrically opposite sides thereof, cooperate with similar ribs 32 and 32′ projecting into the forwardly opening "counterbore" 24 in the lock body to provide rotation stops defining the open and closed positions of the dust cover.

The inner surface of the longitudinal rib 32 is transversely concave and flush with the inner diameter of the circumferential rib 23, and comprises a straight extension of the inner surface of the rib 23 and parallel to the cylinder bore 7, while the opposite rib 32′ has its inner surface tapered with respect to the cylinder bore 7. This condition is best illustrated in Figure 6. In this manner a smooth running fit is provided between the cover stem and its bearing and the necessity for axial sliding of the stem is obviated since, as shown in Figure 6, the stem is free to tilt the full extent required to enable the cover to ride over the holding cam or detent 19. To permit such tilting of the cover stem the longitudinal

ribs 31 are radially short enough to provide adequate clearance between their outer convexly curved surfaces and the side of the forwardly facing counterbore 24. Also, the rearwardly opening counterbore 25 is considerably larger than the diameter of the cover stem.

During the tilting of the cover and its stem as depicted in Figure 6, the spring 21 is tipped slightly with the result that the frontmost coil of the spring tends to wedge against the side of the stem and into the corner defined by the stem and the shoulder 26. If permitted, this would result in excessive wear of the stem and would also interfere with smooth opening and closing of the cover. To preclude such binding engagement an arcuate rib-like guard 33 projects rearwardly from the circumferential rib 23 between the stem and spring encircling it. The inner concavely curved surface of this guard is flush with the inner diameter of the circumferential rib 23 but is tapered slightly to accommodate the tilt of the stem as clearly shown in Figure 6. Since this guard extends past the foremost coils of the spring it precludes the objectionable binding or wedging engagement between the spring and the stem and in coaction with the diametrically extending end 29 of the spring serves to hold the spring spaced from the stem throughout the full length of the spring.

From the foregoing description, together with the accompanying drawings, it will be readily apparent that this invention provides a mounting for an automatically closing dust cover of a lock of the character described, which mounting will permit the stem of the dust cover to tilt to a limited degree in the bore of the lock body, thereby obviating the need for axial sliding of the stem in its bearing and precluding cramping or binding between the bearing surfaces about which the dust cover pivots.

What I claim as my invention is:

1. In a lock of the type having a bored body and a cylinder rotatable therein with its front end exposed at the front of the body: a lateral extension on the lock body having a bore parallel to the axis of the lock cylinder; a dust cover of a size to cover the exposed front end of the cylinder with a part thereof overlying said lateral extension on the body; a stem extending rearwardly from the cover and received in said bore in the extension, said stem being smaller in diameter than the bore; an axially short annular constriction in the bore intermediate the ends thereof providing a close fitting but axially short bearing for the stem by which the stem is guided for rotation to enable edgewise swinging motion of the dust cover toward and from its operative position overlying the exposed front end of the cylinder while allowing the same to tilt with respect to the axis of the bore to enable the dust cover to ride over a part projecting from the front of the lock cylinder and beyond the front of the lock body, without causing binding between the stem and the bore, said annular constriction also providing a rearwardly facing shoulder in the bore; a forwardly facing spring abutment on the rear end portion of the stem; and a coiled compression and torsion spring surrounding said stem and reacting between said shoulder and spring abutment to bias the dust cover rearwardly into firm engagement with the front face of the lock body and edgewise toward its operative position.

2. In a lock of the type having a lock body and a dust cover mounted for edgewise swinging motion across the front of the lock body toward and from a position covering the mouth of a bore in the lock body in which a lock cylinder is rotatably mounted: a mounting stem for the dust cover extending rearwardly therefrom and received in a second bore in the lock body parallel to the first named bore, said stem having a diameter less than that of said second bore; means providing a closely fitting axially short bearing for the stem intermediate the ends thereof to journal the stem in a manner enabling the same to be tilted a limited degree with respect to the axis of said second-named bore to thus enable the dust cover to ride over a cam projecting from the front of the lock cylinder and beyond the front of the lock body, without causing binding between the stem and the bore; and means yieldingly biasing the dust cover edgewise toward said position and rearwardly into firm engagement with the front of the lock body.

3. The structure set forth in claim 2 further characterized by the provision of: companion longitudinal ribs on the stem and the side of the second named bore providing rotation limiting stops, one of said longitudinal ribs on the side of the bore having a concavely curved inner surface facing the first named bore and tapered to provide a bearing surface for the stem in its tilted position.

4. In a lock of the character described: a lock cylinder; a lock body having a bore opening to its front in which the lock cylinder is rotatably mounted and having a second bore parallel to said first named bore, said second bore having counterbores opening to the front and rear of the lock body to define a bearing of relatively short length therebetween and defining a rearwardly facing shoulder; a dust cover of a size to substantially cover the front of the lock body; a mounting stem for the cover extending rearwardly therefrom and journaled in said bearing to pivotally mount the dust cover for edgewise swinging motion across the front of the lock body toward and from an operative position covering the mouth of said first named bore and, by reason of the short axial length of the bearing, permitting the stem to be readily tilted with respect to the axis of the bore to enable the dust cover to ride over a cam projecting from the front of the lock cylinder, beyond the front of the lock body, without causing binding between the stem and the bore; a coiled torsion and compression spring surrounding the stem and reacting against said shoulder and an abutment on the rear of the stem to bias the cover rearwardly into firm engagement with the front of the lock body and edgewise toward operative position; and a guard projecting rearwardly from said shoulder and interposed between the stem and the spring to prevent the coils of the spring from rubbing against the stem in consequence to tilting of the stem and radial force on said coils.

5. In a lock of the type having a lock body and a dust cover mounted for edgewise swinging motion across the front of the lock body, toward and from a position covering the mouth of the bore in the lock body in which a lock cylinder is rotatably mounted: a tubular mounting stem for the dust cover extending rearwardly therefrom and received in a second bore in the lock body parallel to the first-named bore; a pair of helical arms at the rear of said tubular stem defined by helical slots opening to the rear of said stem and providing forwardly facing abutments; and a coiled compression and torsion spring surrounding said stem and having its free rear end por-

tion engaged between said arms and reacting against said abutments and having its front end portion reacting against the rear of the lock body to bias the dust cover rearwardly into firm engagement with the front face of the lock body and edgewise toward its operative position.

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