April 17, 1962 E. N. JACOBI 3,029,626

LEVER TUMBLER SIDE BAR LOCK WITH DUST COVER

Filed July 11, 1960 3 Sheets-Sheet 1

Fig. 1.

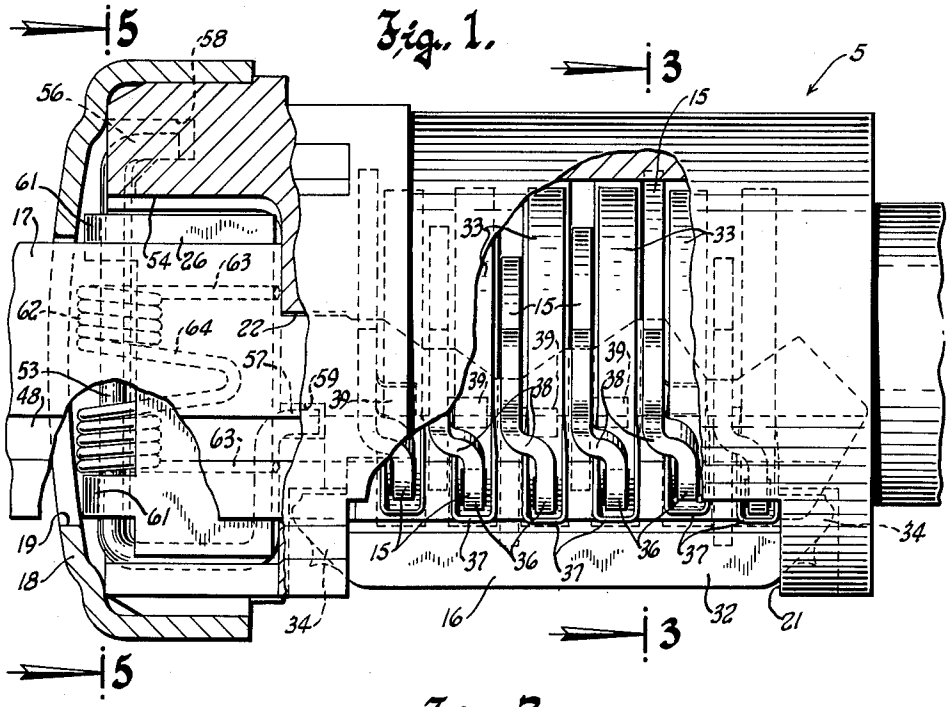
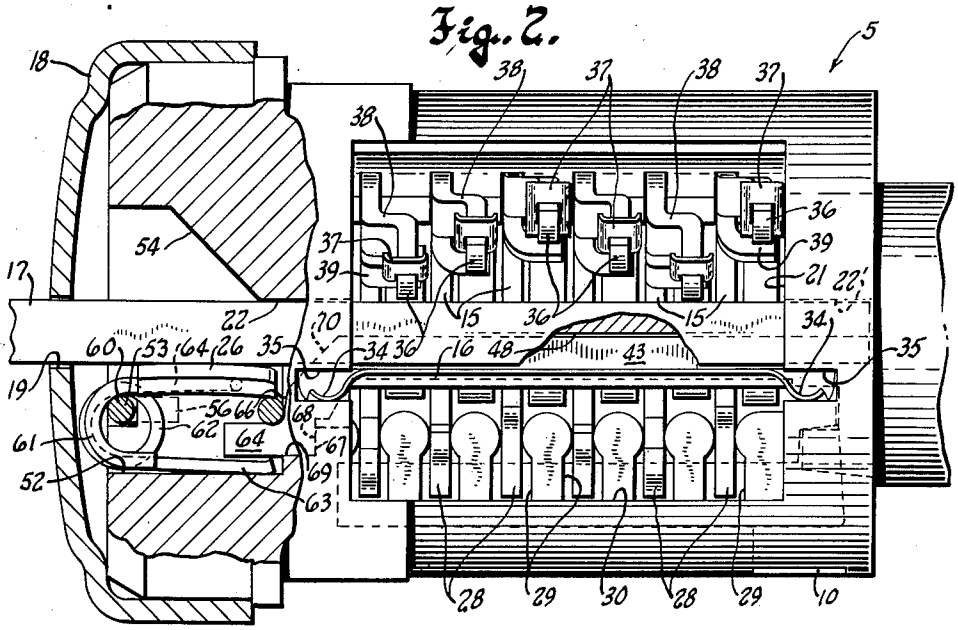


Fig. 2.



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Fig. 3.

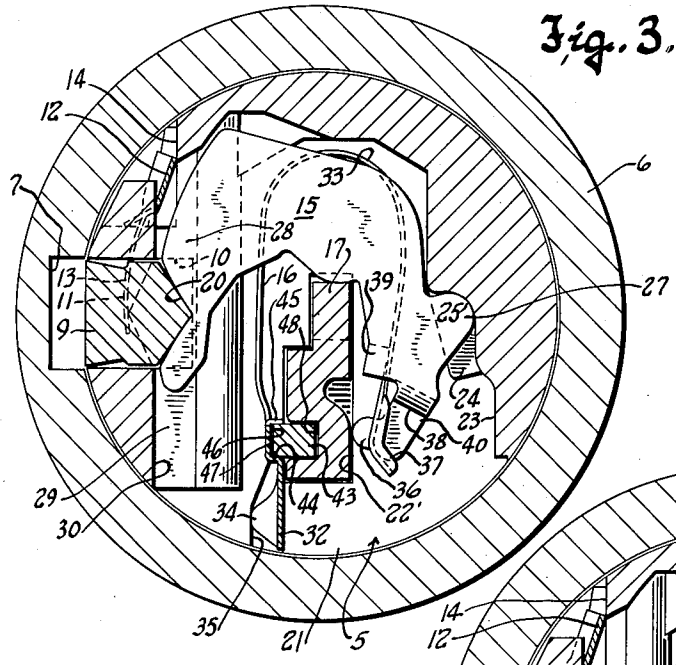


Fig. 4.

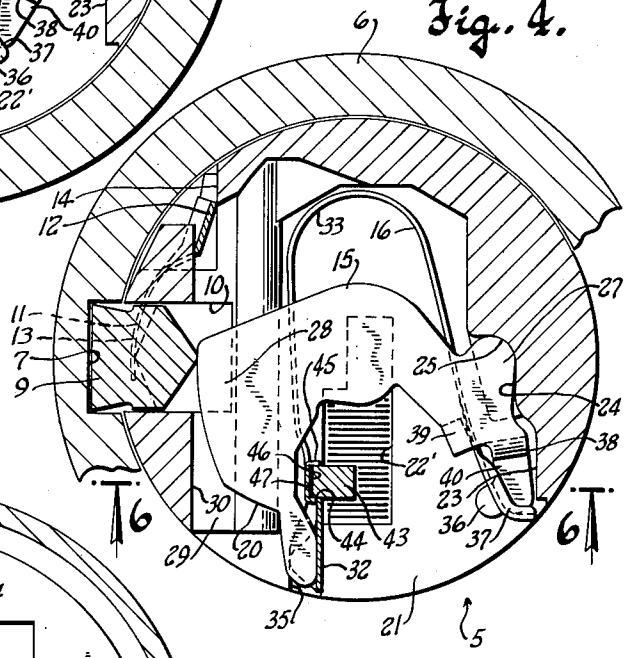
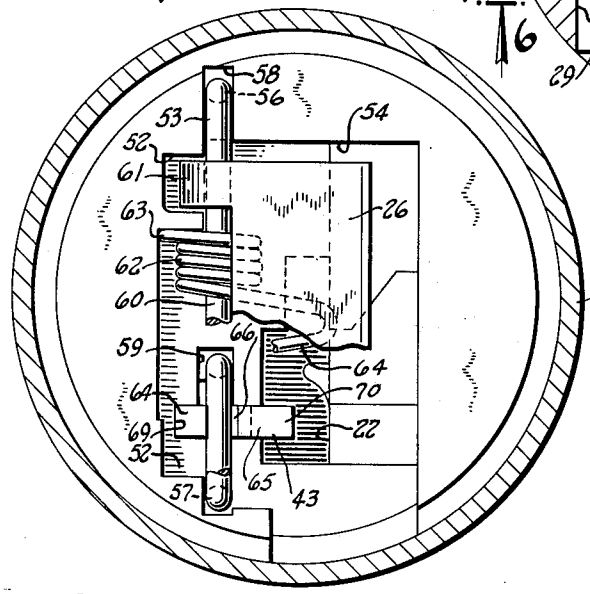


Fig. 5.



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LEVER TUMBLER SIDE BAR LOCK WITH DUST COVER

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Fig. 6.

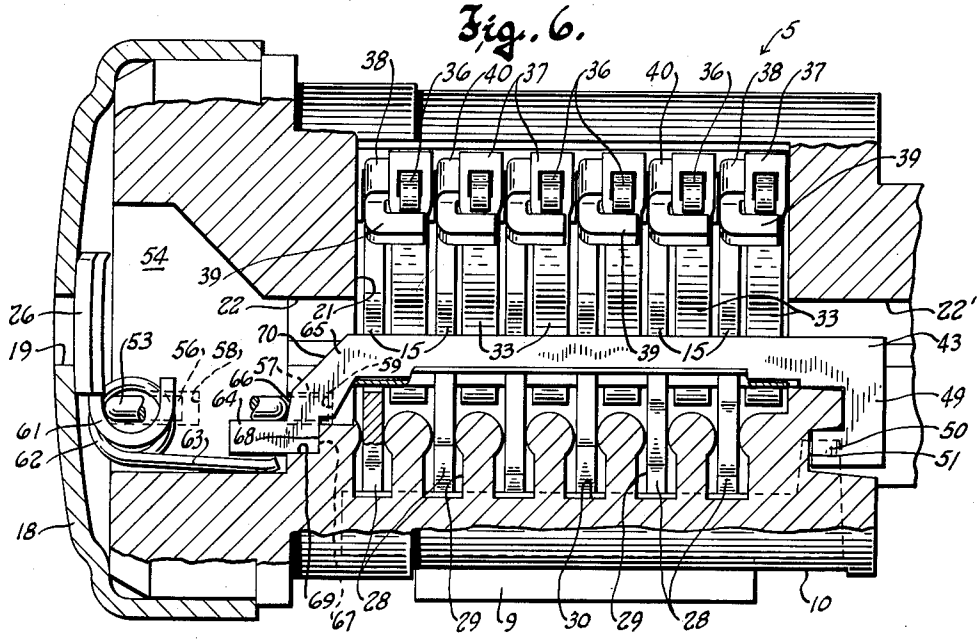


Fig. 9.

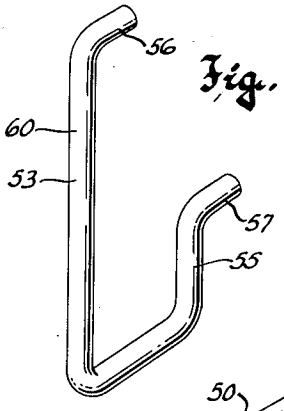


Fig. 7.

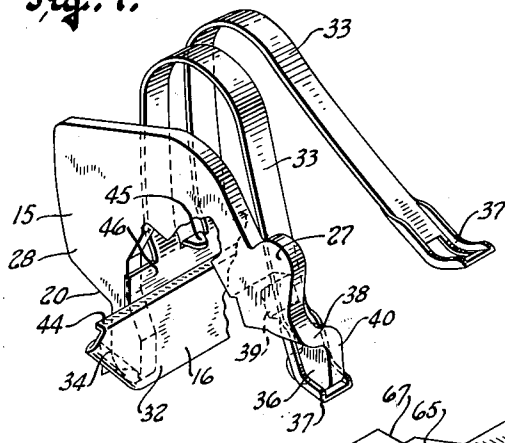
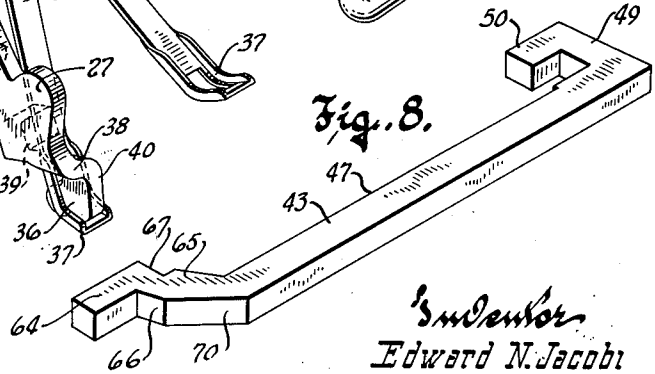


Fig. 8.



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United States Patent Office 3,029,626 Patented Apr. 17, 1962

3,029,626
LEVER TUMBLER SIDE BAR LOCK WITH DUST COVER

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Filed July 11, 1960, Ser. No. 42,028
7 Claims. (Cl. 70—366)

This invention relates to cylinder locks and has more particular reference to improvements in cylinder locks of the rocking tumbler side bar type like that disclosed in Patent No. 2,808,717, issued to Edward N. Jacobi, October 8, 1957.

In a lock of this type the cylinder is normally prevented from rotating in its casing by means of a locking bar on the side of the cylinder, held in a radially projected position engaging in a locking recess in the lock casing by means of lever tumblers in the cylinder that are yieldingly biased to locking positions. The insertion of a proper key into the cylinder, however, causes the tumblers to be rocked to unlocking positions in which notches in one edge of the tumblers align with the locking bar and allow it to be retracted from the locking recess under spring bias, thus freeing the cylinder for key propelled rotation in its casing.

In the lock of the aforesaid Jacobi patent, the tumblers were rockable about abutments on the cylinder and were biased to their locking positions by means of a spring element carried in the cylinder and comprising a base plate extending lengthwise in the cylinder and a spring blade for each tumbler, integral with the base plate and extending laterally from one longitudinal edge thereof, connected at its outer end with the tumbler. The cylinder, as is conventional in such locks, had a cavity opening to one side thereof and intermediate its front and rear end portions, in which the spring element and tumblers were received, and had lengthwise aligned key slots in its end portions which opened to said cavity. To afford guidance to a key inserted from the front of the cylinder, as it was moved through the cavity, the base plate of the spring element was bent to provide a ridge extending along its length and which projected laterally part way into the keyslots. Thus the base plate of the spring element was exposed in the key slots in the lock cylinder, where it was accessible to a person attempting to pick the lock.

By contrast, it is an object of this invention to provide a rocking tumbler side bar lock of the character described having a plurality of lever tumblers and a unitary spring element which cooperates with all of the tumblers to bias them to their locking positions, wherein the tumblers and spring element may be assembled with one another prior to their insertion into the lock cylinder, as in the lock of the aforesaid Jacobi patent, but wherein the spring element is not exposed in the key slots of the cylinder, but is, instead, securely confined in the cylinder by means of a key guiding bar which extends lengthwise through the cylinder in engagement with the base plate of the spring element and projects laterally part way into the key slots in the cylinder to afford guiding engagement to a key being inserted into the cylinder.

Another object of this invention resides in the provision of a rocking tumbler side bar lock of the character described having a key guiding bar that extends lengthwise through the lock cylinder to afford guidance to a key inserted thereinto, and having a closure or dust cover at the front of the cylinder by which precipitation and foreign matter is prevented from entering the cylinder, wherein the shutter of the key hole closure is swingably supported upon a hinge member that cooperates with the

key guiding bar to confine the latter against displacement relative to the cylinder.

It is a further object of this invention to provide a rocking tumbler side bar lock of the character described which is extremely difficult to pick by reason of the provision of a key guiding bar that extends lengthwise through the cylinder and projects laterally part way into the key receiving slots in the cylinder, and which cooperates with portions of the cylinder to obstruct access to the spring member that biases the tumblers to their locking positions, and to confine said spring member against displacement relative to the cylinder.

Still another object of this invention resides in the provision of a rocking tumbler side bar lock of the character described having a key guiding bar which extends lengthwise through the cylinder and is exposed in the key slots thereof to afford guidance to a key being inserted into the cylinder, and wherein the key guiding bar is partly held in place by its cooperation with elements of a dust cover or closure at the front of the lock cylinder.

It is also an object of the invention to provide, in a lock of the character described, a novel hinge member upon which the shutter of a closure or dust cover is swingably mounted, and which hinge member is simple and inexpensive in itself and can be assembled onto the lock with unusual ease and rapidity.

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 herein disclosed 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 side elevational view of the cylinder of a rocking tumbler side bar lock embodying the principles of this invention, with portions cut away and shown in section;

FIGURE 2 is a bottom view of the cylinder, with portions cut away and shown in section;

FIGURE 3 is a sectional view of the lock, taken on the plane of the line 3—3 in FIGURE 1;

FIGURE 4 is a view similar to FIGURE 3 but showing the lock with the key removed therefrom;

FIGURE 5 is a sectional view taken on the plane of the line 5—5 in FIGURE 1, but showing the lock with the key removed therefrom;

FIGURE 6 is a longitudinal sectional view of the cylinder taken on the plane of the line 6—6 in FIGURE 4;

FIGURE 7 is a fragmentary perspective view of the spring element and one of the tumblers in the lock of this invention;

FIGURE 8 is a perspective view of the key guiding bar; and

FIGURE 9 is a perspective view of the hinge member.

Referring now more particularly to the accompanying drawings, the numeral 5 generally designates the cylinder of a lock embodying the principles of this invention, and the numeral 6 designates a casing or lock body in which the cylinder is rotatably received. The casing, which may be of tubular construction as indicated in FIGURES 3 and 4, has a longitudinal recess 7 opening to its bore in which a locking bar 9 is received when the cylinder is in its locked condition (illustrated in FIGURE 4) to preclude rotation of the cylinder in the casing. The locking bar 9 is urged radially inwardly, out of the recess 7 and into a longitudinal slot 10 in the

side of the lock cylinder, by means of a biasing spring clip 11 that comprises a body portion 12 seated in a recess 14 opening to one side of the cylinder and to the locking bar slot 10, and integral spring fingers 13 that extend from the body portion 12 and engage end portions of the locking bar. For a more complete description of the spring clip 11, and the manner in which it is seated in the cylinder and cooperates with the locking bar, reference may be made to the aforesaid Jacobi Patent No. 2,808,717.

The locking bar 9 is controlled by a series of tumblers 15 of the lever type, and a spring element 16 which normally urges the tumblers toward locking positions (shown in FIGURE 4) in which the tumblers hold the locking bar projected radially outwardly from its longitudinal slot 10 in the side of the lock cylinder and engaged in the longitudinal recess 7 of the casing. Insertion of a proper key 17 rearwardly into the cylinder causes the tumbler 15 to be rocked about their axes to unlocking positions, shown in FIGURE 3, in which notches 20 in the peripheries of the tumblers align with the inner edge of the locking bar 9 to allow the locking bar to be retracted from the recess 7 in the casing under the force of the biasing spring clip 11. The tumblers 15 and the spring element 16, which are described in more detail hereinafter, are generally on the order of those disclosed in the aforementioned Jacobi patent.

A cap 18 is secured on the front end portion of the cylinder for rotation therewith and is provided with a key aperture 19 through which the key 17 can be inserted into the cylinder. To prevent the entry of dirt, water and other foreign matter into the cylinder mechanism the key aperture 19 is normally closed by a dust cover which comprises a shutter 26.

The cylinder 5 has a relatively large and deep cavity 21 opening generally to its underside, intermediate its ends, in which are housed the tumblers 15 and the spring element 16. Key slots 22 and 22' in the front and rear end portions of the cylinder open to this cavity and are of course lengthwise aligned with one another.

Referring now to FIGURES 3 and 4, which show the cross sectional shape of the cavity 21, it will be noted that the wall portion 23 thereof, which faces the locking bar 9 and is substantially diametrically opposite the same, has a series of slits or grooves 24 therein, equally spaced along its length and having concave bottoms 25. The centers of curvature of the bottoms 25 of these slits lie in a common plane containing the axis of the cylinder and passing centrally through the locking bar 9. The slits 24, with their concave bottoms 25, define bearing sockets which open downwardly and inwardly, generally toward the mouth of the cavity 21 and the opposite side of the cylinder, in which portions of the tumblers 15 may be received to provide fulcrums for the tumblers.

The tumblers 15 are stamped from sheet metal and are generally arcuate or crescent shaped. Each tumbler is received in the cavity 21 with its flat sides substantially normal to the axis of the cylinder and all of the tumblers of course extend transversely across the bottom of the cavity 21. Each tumbler has a bearing projection 27 near one end portion, received in the socket 25 provided by one of the slits 24 of the wall portion 23 of the cylinder; and the opposite end portion 28 of each tumbler, which has the locking bar notch 20 in its outer periphery, is received in a groove 29 in the side wall 30 of the cavity that is remote from the wall portion 23.

The bearing projections 27 on the tumblers have rounded ends which seat on the concave bottoms 25 of the bearing sockets defined by the grooves or slits 24, so that the tumblers are supported by the cylinder for edgewise rocking motion between their locking positions seen in FIGURE 4 and their unlocking positions illustrated in FIGURE 3. It will be noted that the outer end portions of the tumblers are guided for such edgewise rocking motion by their engagement in the slits 24 at one side of the cavity and the grooves 29 at the opposite side of the cavity.

The spring element 16, to which the tumblers are preassembled before they are inserted into the cavity in the cylinder, and by which they are biased to their locking positions of rocking motion, is best seen in FIGURE 7. It is stamped and formed from a single sheet of spring metal and comprises an elongated substantially flat base plate 32 and a plurality of bowed blades 33 extending laterally from one longitudinal edge of the base plate. The base plate extends longitudinally through the cavity 21 in the cylinder, edgewise with respect to and near the mouth of the cavity, and it is spaced to one side of the key slots 22 and 22' in the end portions of the cylinder. It is held in the cylinder by having its end portions 34, which project beyond the endmost spring blades, received in slot-like recesses 35 in the cylinder, that open to the cavity 21 and to the bottom of the cylinder. As best seen in FIGURE 2, the end portions 34 of the base plate are curvingly bent out of the plane of the remainder thereof so as to engage substantially snugly in the recesses 35.

Each of the spring blades 33 is inwardly bowed relative to the cavity 21 and extends across the bottom portion of the cavity, transversely to the cylinder axis. Each spring blade edgewise overlies one flat face of one of the tumblers and accordingly the tumblers and the spring blades are arranged alternately along the cylinder axis.

Each of the tumblers 15 is connected with one of its flatwise adjacent spring blades by means of a hook-like lug 36 on that end portion 40 of the tumbler which is remote from the lock bar notch 20 therein, which lug is engaged in an apertured enlargement 37 on the outer end of the spring blade. To dispose said lug in the plane of the spring blade with which it is engaged the tumbler is bent, as at 38, to offset its end portion 40 laterally to one side of the plane of the tumbler body, and this offset portion is held in engagement with the outer face of the spring blade by the hook 36. Each of the tumblers also has a tab 39 thereon, bent to one side of the body of the tumbler between the offset end portion 40 and the bearing projection 27, which tab engages under the inner surface of the spring blade.

Since the spring blade tends to resiliently resist bowing, the spring force of the blade urges the bearing projection 27 on the tumbler into its cooperating fulcrum socket 25, and at the same time tends to rock the tumbler about its fulcrum toward its locking position illustrated in FIGURE 4. When a proper key 17 is inserted into the key slots, its bitting engages the central portion 41 of the tumbler, at its inner periphery (see FIGURE 3), rocking the tumbler about the fulcrum provided by the socket 25 and exerting a bowing flexing couple upon the spring blade through the tab 39 and the offset end portion 40 of the tumbler.

When the bearing projections 27 on the tumblers are not engaged in their fulcrum sockets 25, and the tumblers are in their locking positions, the biasing force of the spring blades tends to hold the end portions 28 of the tumblers engaged against that face of the base plate 32 which is remote from the free ends of the spring blades, as shown in FIGURE 7. Hence the tumblers can be preassembled with the spring element, and the entire resultant unit can then be readily inserted into the cylinder cavity, all as more fully described in the aforesaid Jacobi Patent No. 2,808,717, which also brings out in greater detail the peculiar manner in which the spring blades are flexed by the tumblers upon their engagement with the fulcrum sockets 25 in the cylinder to effect biasing of the tumblers to their locking positions.

To securely hold the base plate 32 of the spring member against displacement in the cylinder, and to block access to the spring member by a person attempting to pick the lock, a key guiding bar 43 (shown in FIGURE 8) extends lengthwise along the base plate 32 and projects

part way into the key slots 22 and 22' to also afford guidance to a key being inserted into the cylinder. Cooperating means on the end portions of the key guiding bar and on the cylinder hold the bar in place, as hereinafter described in detail.

Spaced below the upper longitudinal edge of the base plate 32, from which the spring blades extend, is a ledge 44 defined by lengthwise extending right angle bends in the base plate and which provides an upwardly facing shoulder that extends along the entire length of the base plate. Opposing the ledge 44 are downwardly facing shoulders which are provided by tabs 45 bent from the upper edge of the base plate at intervals along the length thereof. Between the shoulder defining means 44 and 45 the base plate has a flat upright portion 46 which flatwise overlies that surface 47 of the key guiding bar which faces away from the key slots 22 and 22', while the shoulders 45 and 44 on the base plate engage against the upper and lower faces of the key guiding bar, adjacent to its surface 47. By such engagement with the base plate, the key guiding bar cooperates with the recesses 35 in the end portions of the cylinder to securely hold the base plate against displacement relative to the cylinder, and at the same time the bar obstructs access to the base plate from the key slots, as may be seen from FIGURES 3, 4 and 6.

The key 17 is provided with a longitudinally extending slot 48 opening to one side surface thereof, in which is received that portion of the key guiding bar which projects laterally into the key slots. Bearing in mind that a key in the cylinder is directly supported only by the front and rear end portions of the cylinder, it will be apparent that the key guiding bar also performs an important function in guidingly supporting the key as it is moved rearwardly through the cavity 21 in the cylinder.

At its rear the key guiding bar has a hook-like portion comprising a lateral arm 49 that projects away from the key slot 22', across the rear end surface of the cylinder. A forward projection 50 from the lateral arm 49 is received in a well 51 opening to the rear end of the cylinder to prevent lateral displacement of the rear portion of the key guiding bar.

The front end portion of the bar is held against lateral displacement by means of a hinge member 53, shown in FIGURE 9, which also serves to hold the bar against lengthwise movement and performs the further function of carrying the shutter 26 for swinging motion toward and from a closed position overlying the rear surface of the cap 18, across the key aperture 19 therein. The shutter, the hinge member 53 and the front end portion of the key guiding bar are all located in a shutter chamber 54 at the front of the cylinder, defined by a forwardly opening well in the cylinder which is closed by the cap 18.

The hinge member 53, which can be bent from hard wire, has a pair of substantially parallel legs 56 and 57 connected by a bight portion 60, and it can therefore be regarded as substantially U-shaped, although its lower leg 57 has an offset portion 55. The legs of the hinge member project rearwardly into substantially loosely fitting wells 58 and 59 in the cylinder that open forwardly to the bottom of the shutter chamber well 54. The wells 58 and 59 are spaced to that side of the key slot 22 at which the key guide bar 43 is located, and are respectively spaced above the level of the top of the key slot and below the level of is bottom. The bight portion 60 of the hinge member, upon which the shutter 26 is carried, extends transversely to the cylinder axis and lies directly behind the cap 18, alongside the key aperture 19. The shutter is connected to the hinge member by means of integral hooks 61 projecting laterally from one edge of the shutter, near its top and bottom (as best seen in FIGURE 1), and which are bent to an arc so that they loosely embrace the bight portion of the hinge member (see FIGURES 2 and 6). The shutter is kept well centered with respect to the key opening 19 in the cap by reason of the fact that the remote edges of the shutter hooks are in close proximity to adjacent side surfaces of sockets 52 in the front of the cylinder into which the hooks project, and by which motion of the shutter lengthwise of its hinge axis is limited; and the hinge pin holds the hooks with their convex outer surfaces closely adjacent to the bottom surfaces of these sockets to limit shifting of the shutter in a direction normal to its hinge axis.

Also embracing he bight portion 60 of the hinge member, between the hinge hooks 61 of the shutter, are the coils 62 of a torsion spring by which the shutter is yieldingly biased to its closed position. The straight end portions 63 of the torsion spring project rearwardly in the shutter chamber and lie alongside radially inwardly facing surfaces on the cylinder, while the medial portion of the spring is bent to form a U-shaped arm 64 which projects radially from the coils 62 and flatwise overlies the inner surface of the shutter. It will be seen that the arms 63 and 64 of the torsion spring, in reacting between the cylinder and the shutter, exert sideward and forward biasing force which impose opposite reaction forces upon the coils 62, causing the latter to urge the hinge member rearwardly and keep its legs engaged in the wells 58 and 59.

The hinge member cooperates with the key guiding bar to hold the latter in place by reason of the provision, on the front of the key guiding bar, of a forward extension 64 which is laterally offset relative to the main portion of the bar and is connected thereto by an integral laterally extending arm 65 which provides opposite forwardly and rearwardly facing shoulders 66 and 67. The offset portion 55 of the hinge member occupies the inner corner defined by the junction of the forward extension 64 and the laterally extending arm 65, and the hinge member thus blocks both forward and lateral movement of the key guiding bar.

Moreover, the rearward biasing force upon the hinge member is utilized to prevent the key guiding bar from rattling in the cylinder. In bearing against the forwardly facing shoulder 66 on the key guiding bar, the hinge member urges the bar rearwardly to maintain the rearwardly facing shoulder 67 thereon in firm abutting relationship with a forwardly facing surface 68 on the cylinder. Lateral biasing force is exerted upon the key guiding bar by reason of the fact that the forwardly facing shoulder 66 on the key guiding bar is disposed somewhat obliquely, facing slightly toward the key slot, so that the offset portion 55 of the hinge member, in being urged rearwardly, exerts a camming or wedging action on said shoulder by which the front end portion of the bar is urged laterally away from the key slot and the outer side surface of the forward extension 64 is held firmly engaged against a radially inwardly facing surface 69 in the shutter well portion of the cylinder.

Attention is directed to the fact that the wells 58 and 59 in the cylinder in which the legs 56 and 57 of the hinge member are engaged are deep enough so that the ends of the legs can not engage their bottoms, thus assuring that the rearward biasing force exerted upon the hinge member by the torsion spring will be transmitted to the key guiding bar to hold the latter against rattling.

To guide the key into engagement with the key guiding bar as it is inserted through the aperture 19 in the cap, the key guiding bar has an obliquely inclined surface 70 extending from the shoulder 66 to the inner face of its main portion, which surface faces forwardly and toward the line of the key slot.

In assembling the lock of this invention the tumblers 15 are first preassembled with the spring element 16, and the resultant unit is inserted into the cavity 21 in the cylinder, taking care that the end portions 34 of the spring element base plate 32 are securely engaged in the slot-like recesses 35 in the cylinder. The key guiding bar is then inserted through the key slots in the cylinder from the

front thereof, rotated relative to its assembled position in the cylinder to substantially align its offset end portions with the longer cross-sectional dimension of the slots. After the key guiding bar has been moved endwise to a position in which its entire offset rear end portion clears the rear end of the cylinder, it is rotated about its axis to align the forward projection 50 with the rearwardly opening well 51 in the cylinder. In this position of the key guiding bar the laterally extending arm 65 on the front end portion of the bar projects a substantial distance laterally into the front key slot 22. The key guiding bar is then moved forwardly to engage the forward projection 50 in the well 51, and its front end can be simultaneously moved laterally away from the key slot to dispose the key guiding bar in its final assembled position.

The hinge member 53, with the shutter 26, and torsion spring 62 in place thereon, is then assembled to the cylinder by inserting its legs 56 and 57 rearwardly into the wells 58 and 59. Securement of the cap 18 to the front of the cylinder completes the assembly.

From the foregoing description taken together with the accompanying drawings it will be apparent that this invention provides a rocking tumbler side bar lock having a key guiding bar which cooperates with portions of its cylinder to maintain the tumbler biasing spring element firmly and securely seated in the cylinder and which blocks access to the tumbler biasing spring through the key slot, and wherein the key guiding bar is retained in place by cooperating means on it and on the cylinder, including a novel hinge member which supports the shutter of a dust cover or closure for the front of the cylinder and the biasing spring by which said shutter is urged to its closed position.

What is claimed as my invention is:

1. In a lock of the character described: a rotatable lock cylinder having a cavity intermediate its end portions which opens to one side of the cylinder and having longitudinally aligned key receiving slots in its end portions opening to said cavity so that a key inserted into said slots from the front of the cylinder is directly supported only by the end portions of the cylinder; a plurality of tumblers in said cavity movable, by a proper key inserted into the cylinder, from locking to unlocking positions; a spring member in said cavity biasing the tumblers to their locking positions and including an elongated base portion extending lengthwise through the cavity and having its end portions confined in recess in the end portions of the cylinder; a key guiding bar extending lengthwise through the cylinder, projecting laterally partway into the key slots at one side thereof to afford guidance to a key inserted into the cylinder, and engaged with the base portion of the spring member along a substantial part of the length thereof to cooperate with the end portions of the cylinder in precluding displacement of said base portion, said key guiding bar having a hook portion at its rear which is engaged in a recess in the rear portion of the cylinder to hold the rear end of the key guiding bar against lateral displacement, and having a forwardly projecting portion at its front which is laterally offset to said side of the key receiving slot in the front end portion of the cylinder; a cap fixed on the front end portion of the cylinder and cooperating therewith to define a shutter chamber, said cap having a key aperture lengthwise aligned with the key slots in the cylinder; a hinge member in the shutter chamber having a pair of substantially parallel legs which project rearwardly into closely fitting forwardly opening wells in the front end portion of the cylinder, a substantially straight hinge portion connected with both of said legs and extending transversely to the cylinder axis, inwardly adjacent to the cap and alongside of the key aperture, and a portion which engages the offset front portion of the key guiding bar to cooperate with the hook portion at the rear of the key guiding bar in precluding lateral displacement of the latter; a shutter mounted on the hinge portion of the hinge member for swinging motion toward and from a closed position overlying the rear surface of the cap, across the key aperture therein; and means yieldingly biasing the shutter to its closed position.

2. In a lock of the type having a rotatable cylinder with a cavity intermediate its end portions which opens to one side thereof and longitudinally aligned key receiving slots in its end portions opening to said cavity so that a key inserted from the front of the cylinder is directly supported only by the end portions of the cylinder, tumblers in said cavity movable from locked to unlocked positions by a proper key inserted into the cylinder, and spring means in the cavity biasing the tumblers to their locked positions: a key guiding bar extending lengthwise through the cylinder and projecting laterally into the key slots from one side thereof to afford guidance to a key inserted into the cylinder as it is moved rearwardly through the cavity, said key guiding bar having a portion at its front end which projects forwardly from the cylinder and is offset to said side of the key slots; a member secured to the cylinder at the front thereof and having a portion engaged with said offset portion of the key guiding bar, at the side thereof adjacent to the key slot, to prevent lateral displacement of the front portion of the key guiding bar; means, including a cap secured on the front of the cylinder and provided with a key aperture aligned with the key slots, for preventing access to said member; and cooperating abutment means on the rear portion of the key guiding bar and the rear portion of the cylinder for preventing lateral displacement of the rear portion of the key guiding bar.

3. The lock of claim 2, wherein said abutment means for preventing displacement of the rear portion of the key guiding bar comprises a hook-like portion on the key guiding bar engaged around a portion of the cylinder at the rear end thereof and projecting into a rearwardly opening recess in the cylinder.

4. In a lock of the type having a rotatable cylinder with a tumbler cavity intermediate its end portions which opens to one side thereof and longitudinally aligned key receiving slots in its end portions opening to said cavity so that a key inserted from the front of the cylinder is directly supported only by the end portions of the cylinder: means on the front end portion of the cylinder defining a shutter chamber, said means including a cap having a key aperture aligned with the key slots in the cylinder; a hinge member having a pair of substantially parallel legs projecting rearwardly into substantially closely fitting forwardly opening wells in the front of the cylinder, a susbtantially straight hinge portion connected with both legs and which extends transversely to the cylinder axis, closely behind the cap and alongside of the key aperture, and an offset portion substantially parallel to the hinge portion and which is located to one side of the key slots, axially intermediate said hinge portion and a forwardly facing surface on the cylinder; a shutter hingedly mounted on said hinge portion of the hinge member for swinging motion in the shutter chamber toward and from a position overlying the rear surface of the cap and closing the key aperture therein; means yieldingly biasing the shutter to its said position; a key guiding bar extending lengthwise through the cylinder and projecting laterally part way into the key slots from said one side thereof to afford guidance to a key inserted into the cylinder as the key is moved rearwardly through the cavity; and a forwardly and laterally projecting extension on the front of the key guiding bar confined between the offset portion of the hinge member and the cylinder and thereby held against lateral and axial displacement.

5. In a lock of the type having a rotatable cylinder with a tumbler cavity therein intermediate its ends and opening to one side thereof, and with axially aligned key slots in the front and rear end portions of the cylinder opening to said cavity so that a key inserted into said

slots from the front of the cylinder is directly supported only by the end portions of the cylinder, a cap fixed on the front of the cylinder for rotation therewith and cooperating with the front portion of the cylinder to define a shutter chamber, and a shutter in said shutter chamber swingable to and from a closed position overlying the inner surface of the cap, across a key aperture in the cap which is aligned with the key slots: a key guiding bar extending lengthwise through the cylinder, projecting laterally part way into the key slots at one side thereof to afford guidance to a key inserted into the cylinder, said key guiding bar having portions at its front and rear ends which are laterally offset to said side of the key slot and which provide opposing lengthwise facing shoulders cooperable with end portions of the cylinder to hold the key guiding bar against lengthwise movement; means on said offset rear portion of the key guiding bar and on the rear of the cylinder providing opposed laterally facing abutments by which the rear portion of the bar is held against lateral movement; a hinge member in the shutter chamber upon which the shutter is swingably mounted and which has a portion engaged with said laterally offset front portion of the key guiding bar to confine the front end of the bar against lateral movement; and cooperating means on said hinge member and on the front of the cylinder securing the hinge member to the cylinder.

6. In a lock of the type having a rotatable cylinder with a tumbler cavity therein intermediate its ends and opening to one side thereof, and with axially aligned key slots in the front and rear end portions of the cylinder opening to said cavity so that a key inserted into said slots from the front of the cylinder is directly supported only by the end portions of the cylinder, a cap fixed on

the front of the cylinder for rotation therewith and cooperating with the front portion of the cylinder to define a shutter chamber, a hinge member in the shutter chamber, fixed to the front of the cylinder, and a shutter swingable on the hinge member to and from a closed position overlying the inner surface of the cap, across a key aperture in the cap which is aligned with the key slots: a key guiding bar extending lengthwise through the cylinder, projecting laterally part way into the key slots at one side thereof to afford guidance to a key inserted into the cylinder; cooperating means on the rear portion of the key guiding bar and on the rear of the cylinder, spaced to said side of the key slots, providing opposed laterally facing abutments by which the rear portion of the bar is held against lateral movement; and means on the front portion of the key guiding bar providing abutments cooperable with the hinge member and with portions of the cylinder at the front thereof to hold the front portion of the bar against lateral and lengthwise movement.

7. The lock of claim 2, further characterized by: a shutter swingable toward and from a position flatwise overlying the rear surface of the cap, across the key aperture therein; and further characterized by the fact that said member secured to the cylinder has a portion which supports the shutter for such swinging motion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,047,966	Jacobi	July 21, 1936
2,655,031	Jacobi	Oct. 13, 1953
2,690,071	Jacobi	Sept. 28, 1954
2,808,717	Jacobi	Oct. 8, 1957