

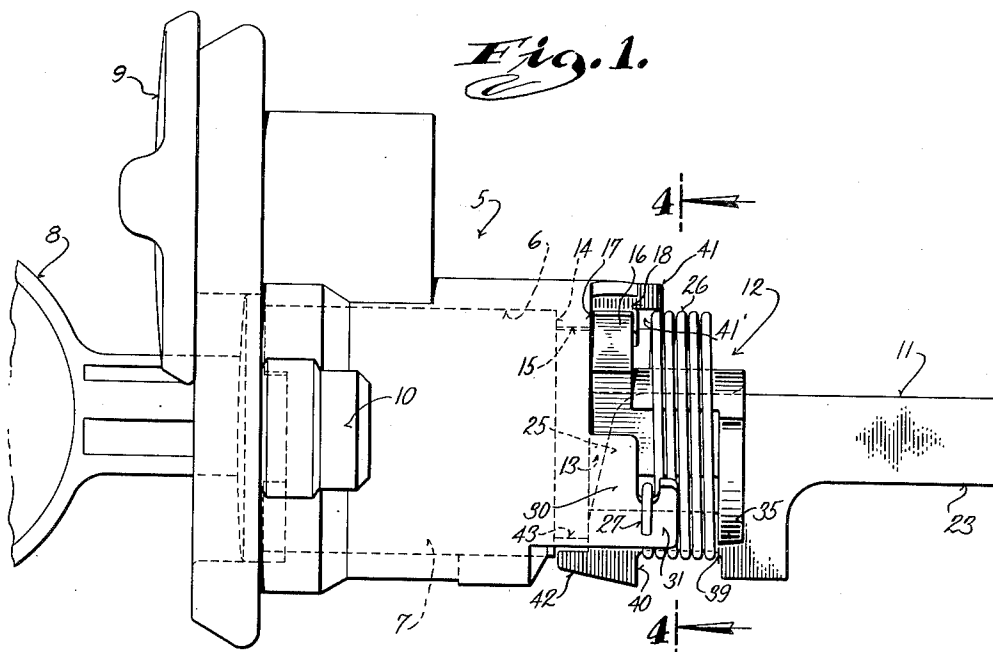
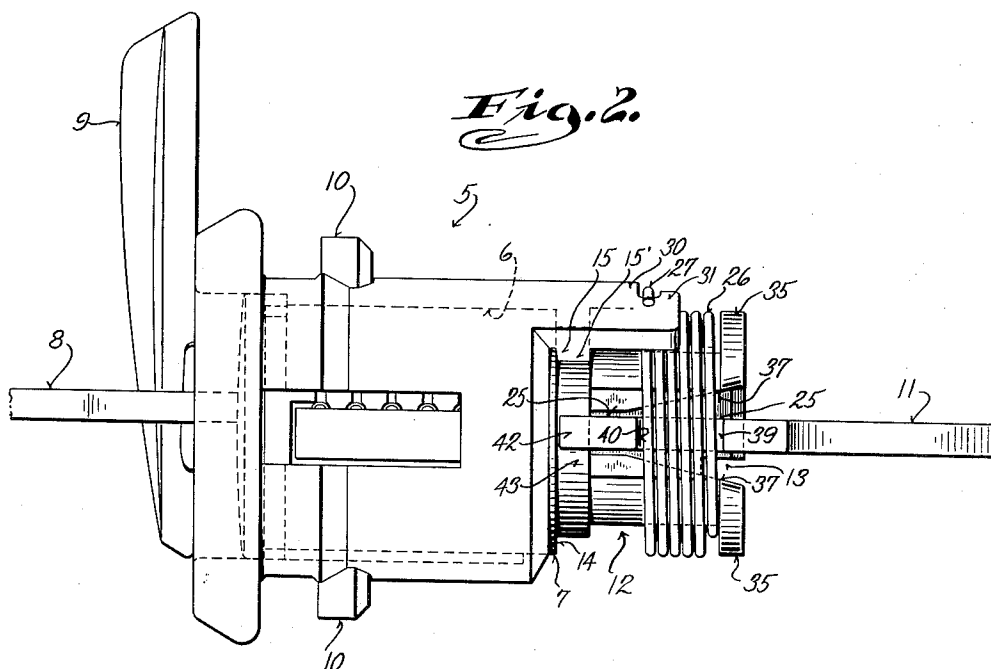
Oct. 13, 1953

E. N. JACOBI
REAR COMPARTMENT LOCK

2,655,028

Filed June 5, 1950

4 Sheets-Sheet 1



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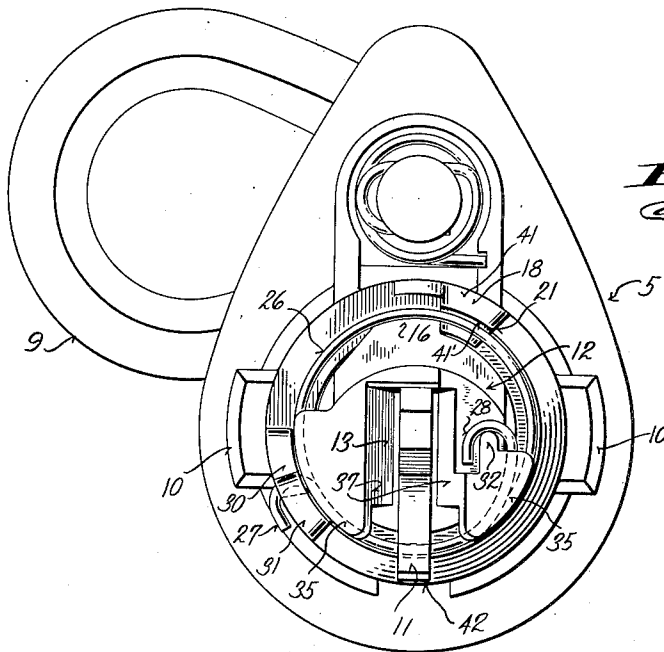


Fig. 3.

Fig. 4.

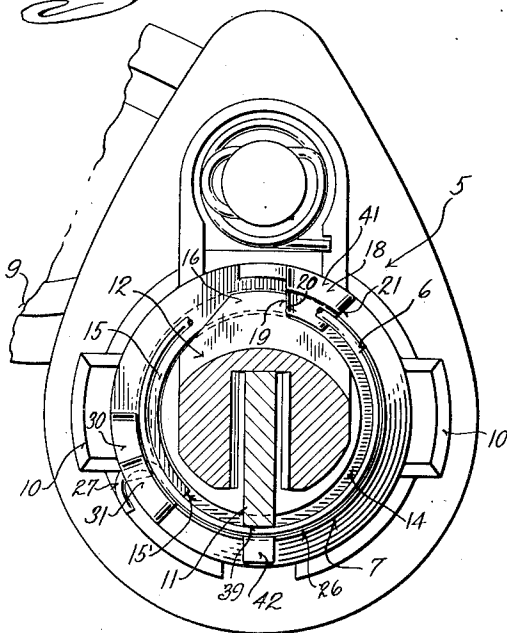
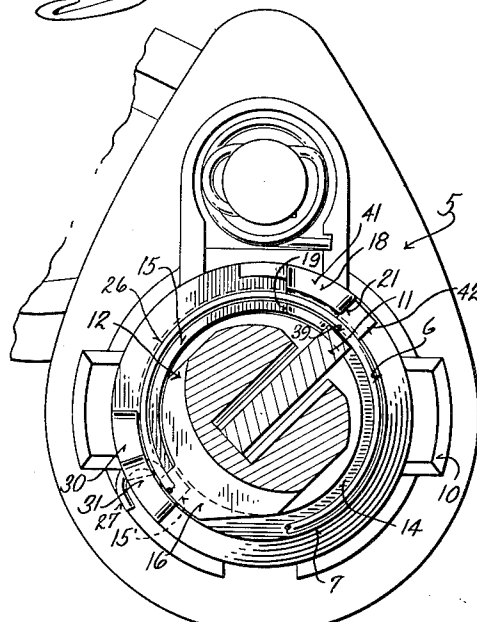


Fig. 5.



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Fig. 6.

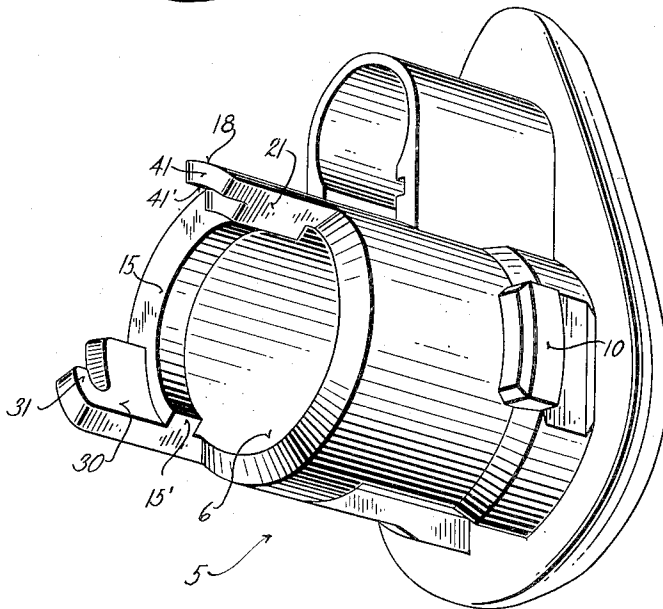
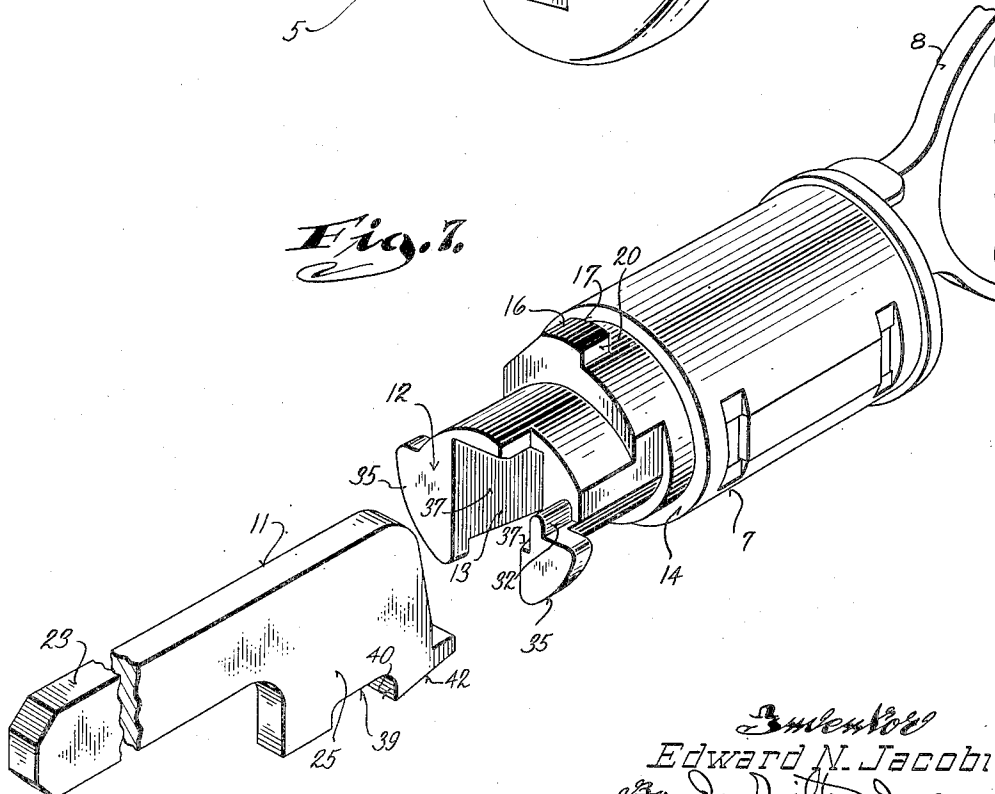


Fig. 7.



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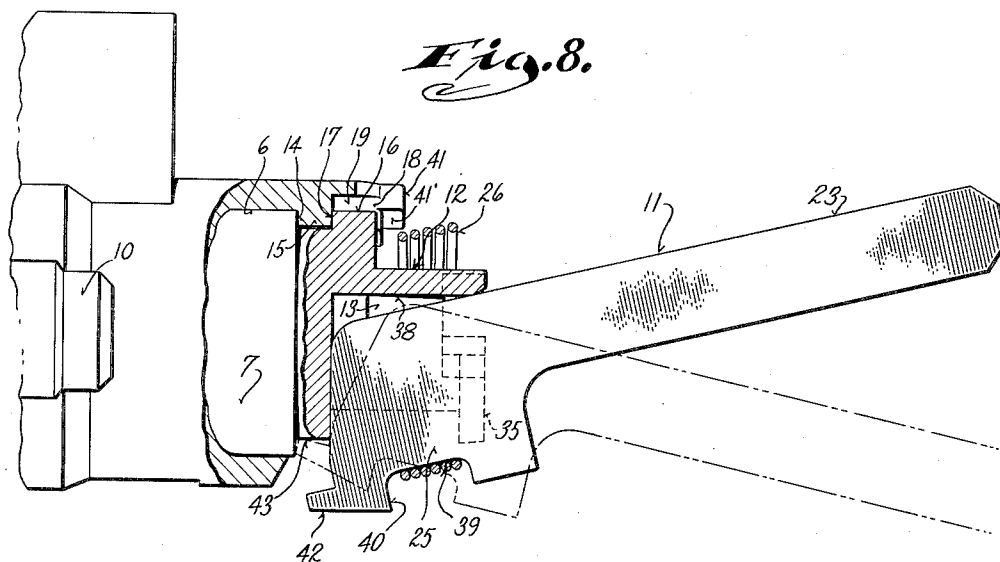
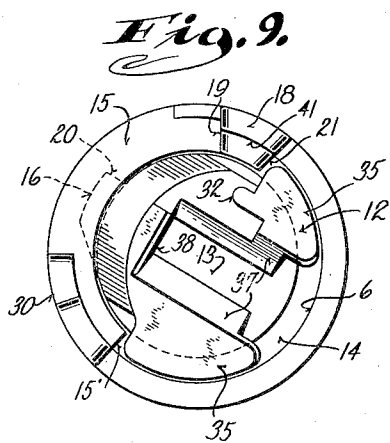
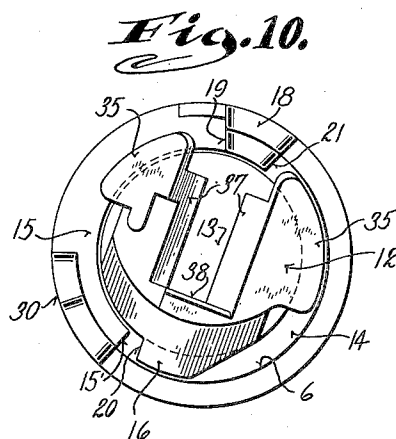
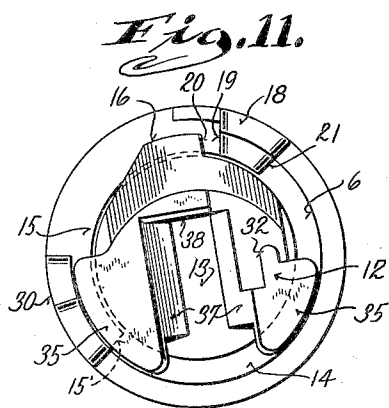
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4 Sheets-Sheet 4



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2,655,028

REAR COMPARTMENT LOCK

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Application June 5, 1950, Serial No. 166,088

16 Claims. (Cl. 70-367)

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This invention relates to locks and refers more particularly to automobile door locks of the type known as pillar locks.

The characteristic feature of a pillar lock resides in the provision of a driving or operating shaft which is coupled with the lock cylinder and projects axially rearwardly therefrom to transmit rotation of the cylinder to a door latch mechanism to be actuated. In most instances it is very desirable to so connect the lock cylinder with the driving shaft as to afford the shaft a limited degree of universal motion to thus enable it to compensate for misalignment between the lock casing and the latch mechanism on the door.

Relatively simple connections between the driving shaft and the lock cylinder have heretofore been devised which embody provision for such universal motion, but the drive shafts of such structures have heretofore had to be fabricated by other than a stamping operation since they were relatively complex in shape and could not be formed as a flat or strip-like member. An example of the previous type of driving shaft of this character is to be found in the copending application of Edward N. Jacobi, Serial No. 113,952, filed September 3, 1949, now Patent No. 2,605,631.

It is therefore an object of this invention to provide a pillar lock having its driving shaft fabricated as an extremely simple and inexpensive stamping but nevertheless providing a connection between the driving shaft and the lock cylinder which affords a degree of universal motion to the driving shaft.

Another object of this invention resides in the provision of a pillar lock having a universal joint connection between the lock cylinder and the driving shaft and wherein the portion of the connection associated with the lock cylinder may be formed as a very simple die casting which is integral with the lock cylinder and does not necessitate complicated coring.

A further object of this invention is to provide a connection between the driving shaft and the lock cylinder of a pillar lock which connection will be held operative by means of a coiled spring which also serves to bias the lock cylinder to its neutral or key-receiving position of rotation.

Still another object of this invention resides in the provision of a pillar lock having a connection between the lock cylinder and the driving shaft whereby the shaft will be yieldably held coaxial with the cylinder, extending straight rearwardly therefrom, to facilitate its installation, but will be capable of a limited degree of universal

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motion, to thus compensate for any misalignment between the lock mechanism and the latch mechanism to be actuated thereby.

Another object of this invention resides in the provision of a pillar lock in which the lock cylinder is held against axial displacement by means of a bayonet connection and in which rotation of the lock cylinder to a position at which the bayonet connection becomes disengaged is precluded by means of a part of the driving shaft.

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 in accordance with 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 a pillar lock embodying the principles of this invention; Figure 2 is a bottom view of the Figure 1 pillar lock;

Figure 3 is a rear elevational view of the pillar lock of Figure 1;

Figure 4 is a view in section taken on the plane of the line 4-4 in Figure 1 with the lock cylinder in its neutral or key receiving position;

Figure 5 is a view similar to Figure 4 but with the lock cylinder rotated through its normal travel to the latch locking or unlocking position;

Figure 6 is a perspective view of the lock casing of this invention;

Figure 7 is a group perspective view of the driving shaft and lock cylinder;

Figure 8 is a side view, partially in section, showing the universal connection between the driving shaft and the lock cylinder of this invention; and

Figures 9, 10 and 11 are rear views of a portion of the lock casing with the cylinder therein in the several successive positions which it occupies during its assembly into the casing.

Referring now more particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, the numeral 5 designates generally a lock casing having a bore 6 therethrough in which a lock cylinder mechanism 7 is rotatably received. The lock

cylinder mechanism may be of any conventional type, that illustrated being the well-known side locking bar type which is freed for rotation upon the insertion of a key 8 therein. The key receiving slot in the lock cylinder is, of course, accessible at the front of the casing and may be covered by a dust cover 9, if desired, to preclude the entry of rain and foreign matter into the lock mechanism. The casing may be mounted in a door handle or on the lid of an automobile rear compartment in any suitable manner, and for this purpose is provided with radial ears 10 or other appropriate mounting means.

Rotation of the lock cylinder is transmitted to a latch mechanism (not shown) by means of a driving or operating shaft 11. The connection between the lock cylinder and the driving shaft comprises an axial rearward extension 12 at the rear of the lock cylinder having a rearwardly and laterally opening cavity 13 in which the front portion of the driving shaft is received. This extension is integral with and thus comprises a part of the lock cylinder, and the front portion of the cylinder, comprising the lock mechanism, will be referred to herein as the cylinder body.

As best seen in Figure 7, this extension is substantially coaxial with the cylinder body and has a smaller diameter than the cylinder body to thus define a rearwardly facing shoulder 14 on the rear of the lock cylinder body. The cylinder is insertable into the casing bore from its front, in a manner to be described presently, and the shoulder 14 cooperates with a circumferential rib 15 which extends part way around the bore of the case, at the rear thereof (see Figure 6), to preclude axial rearward displacement of the cylinder out of the casing.

Axial forward displacement of the lock cylinder out of the casing is prevented by a bayonet lug 16 which projects radially from the extension on the lock cylinder and has its front face 17 spaced from the shoulder 14 a distance equal to the width of the rib 15. Since the rib 15 extends only part way around the circumference of the case bore, it will be seen that the rib and the bayonet lug 16 cooperate to define a bayonet connection between the lock cylinder and casing. As will be later described in greater detail, after the lock cylinder has been moved into its assembled position in the casing, defined by engagement of the shoulder 14 with the front face of the rib, establishment of the bayonet connection involves rotation of the cylinder in one direction (counterclockwise as seen from the front of the lock in the embodiment illustrated) past the free end 15' of the rib to engage the lug over the rear face thereof.

A stop lug 18 projects rearwardly from the back of the case at the other end of the rib, and one of the longitudinal faces 19 of the stop lug cooperates with a face 20 of the bayonet lug 16 to define the limit of counterclockwise rotation of the lock cylinder.

As will be seen presently, the other longitudinal face 21 of the stop lug 18 cooperates with a part on the driving shaft to provide a stop defining the limit of clockwise rotation of the lock cylinder to preclude its rotation to a position at which the bayonet connection is disengaged.

The lock cylinder is biased to its counterclockwise limit of rotation, which constitutes its neutral or key-receiving position, by means of a coiled torsion spring 26 which surrounds the extension 12 and the front end portion of the driving shaft

11 to thus also retain the shaft in position in the cavity 13 in the extension.

The spring comprises several concentric loops of steel wire. Its end portions are bent into an outwardly curved hook 27 and an inwardly curved hook 28, on its front and rear loops respectively. An arm 30, extending rearwardly from the case, has a hook 31 at its rear end, and the outwardly bent hook 27 on the spring engages therein, while the inwardly bent hook 28 at its other end engages around a tit-like lug 32 on the rear of the extension 12. The hook 31 on the case and the tit-like lug 32 on the rear of the cylinder extension are circumferentially spaced at opposite sides of the lateral opening of the cavity so that the torsional tension of the spring also tends to draw it toward the side of the cylinder extension to which the cavity opens.

Short flanges 35 at the rear of the extension, adjacent the rearward opening of the cavity 13, provide forwardly facing shoulders against which the rearmost coil of the spring engages to preclude rearward displacement of the spring. These flanges, together, extend only part way around the circumference of the extension, to enable them to clear the rib 15 as the lock cylinder is inserted into the case, as will be explained in detail hereafter.

The driving shaft 11 comprises a flat substantially L shaped member which may be readily fabricated as a stamping. The stem 23 of the L extends rearwardly from the extension toward the latch mechanism to be actuated and is normally held substantially coaxial with the lock cylinder, but it is obviously desirable that the connection between the driving shaft and the lock cylinder be such as to permit the rear of the shaft to swing in any direction to a limited extent to compensate for any misalignment between the lock mechanism and the latch mechanism to be driven thereby. To this end the connection between the driving shaft and the lock cylinder comprises a slot or cavity 13 in the extension on the lock cylinder, which cavity opens to the rear and radially to one side of the extension and in which the front end portion 25 of the driving shaft, comprising the cross member of the L, is received.

The longitudinal or side walls 37 of the cavity are spaced farthest apart at the rear of the extension and converge forwardly, being substantially parallel to one another at the front of the cavity, where they are spaced apart a distance slightly greater than the thickness of the driving shaft, so that the front portions of the cavity side walls constrain the driving shaft to rotate with the lock cylinder. The divergent rear portions of these walls (best seen in Figure 2) enable the driving shaft to be rocked flatwise from side to side. The bottom wall 38 of the cavity is substantially straight and parallel to the lock cylinder axis, as best seen in Figure 8, and since it is normally engaged by the straight adjacent side edges of the shaft, the latter is held in a position in which its stem extends straight rearwardly from the lock cylinder, the depth of the cavity being such that the center line of the stem substantially coincides with the axis of the lock cylinder when the driving shaft is in its normal position.

The front end portion of the driving shaft is deep enough to project radially out of the cavity a substantial distance, and has a shallow slot 39 in its projecting portion, the bottom of the slot being parallel to the axis of the shaft and

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its axial length being such as to snugly accommodate the coils of the spring 26. The front of the slot defines a rearwardly facing shoulder 40 which engages against the front coil of the spring to preclude axial displacement of the driving shaft out of the slot.

Since the spring surrounds the extension and lies across the driving shaft, in the slot 39 therein, radial displacement of the shaft out of the cavity is also blocked by the spring, although its resilience permits the above described swinging motion of the shaft. In this connection it will be noted that the extension has a reduced diameter in the neighborhood of the cavity opening to enable the spring to seat firmly in the bottom of the slot 39 in the driving shaft. It will also be observed that the stop lug 18 has its rear end notched, as at 41, to clear the spring and to provide a ledge 41' which overlies the spring to steady it to a certain extent.

A forwardly extending foot 42 on the front portion of the driving shaft overlies a ledge 43 on the extension, immediately behind the shoulder 14 on the lock cylinder body, and engages the ledge to limit edgewise swinging motion of the shaft about the transverse bottom wall of the cavity as a fulcrum (in the direction indicated by the broken line in Figure 8) to thus prevent the shaft from being cocked to a position in which the front coil of the spring can ride up over the shoulder 40 and thus permit the shaft to be inadvertently withdrawn from the cavity. Normally, of course, the spring presses the front portion of the shaft against the straight bottom wall 38 of the cavity, to hold it against drooping of its own weight, and thus facilitates guiding the shaft into the coupling on the latch mechanism, which it actuates, during installation of the lock.

The radial projection on the shaft which defines the shoulder 40 and which carries the foot 42 also serves as an abutment which cooperates with the face 21 of the stop lug opposite to that engaged by the bayonet lug to define the limit of clockwise rotation of the lock cylinder and thus prevents rotation of the cylinder to a position in which the bayonet connection between it and the case is disengaged.

Assembly of the lock of this invention is extremely simple. The cylinder is inserted at the front of the case with the flanges 35 at the rear of the extension held in the position shown in Figure 9 relative to the case, i. e. out of alignment with the rib 15 so as to clear the same as the cylinder is moved rearwardly. As the cylinder is inserted into the case in this position, the bayonet lug 16 eventually engages the front face of the rib 15, and at this point the cylinder is rotated clockwise (as viewed from the front) to enable the bayonet lug to be passed around the free end 15' of the rib. The cylinder may then be moved rearwardly until the shoulder 14 on the rear of the cylinder body engages the front face of the rib, after which the cylinder is rotated counterclockwise to engage the bayonet connection. It will of course be understood that the key is left in the cylinder during this operation to retract the side bar of the cylinder and to facilitate rotation thereof. Next, the front portion of the driving shaft is slipped into the cavity and the ends of the spring are then hooked into place on the lug 32 on the extension and the hook 31 on the arm 30, respectively, to complete the assembly of the lock.

From the foregoing description, taken together

with the accompanying drawings, it will be readily apparent that this invention provides an unusually simple pillar lock having a driving shaft which is connected with the lock cylinder in a manner providing a degree of universal motion, to thereby accommodate any misalignment between the lock and latch mechanism to be actuated thereby. It will also be seen that the lock of this invention is extremely inexpensive to manufacture by reason of the fact that the driving shaft may be fabricated as a stamping; because both the casing and the cylinder may be made as relatively simple die castings which do not involve complicated coring; and also because assembly of the lock may be very readily accomplished without special tools.

What I claim as my invention is:

1. In a lock of the type having a bored casing and a key actuated lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key: a rearward extension comprising the rear portion of the lock cylinder projecting behind the casing and having a cavity opening to the rear and radially to one side of the extension; a driving shaft having its front end portion received in said cavity to establish a driving connection between the driving shaft and the lock cylinder, with the driving shaft extending rearwardly from the extension, said front end portion of the driving shaft having a rearwardly facing shoulder extending radially beyond the surface of the extension; means on the rear of the extension defining a forwardly facing shoulder; and a coiled torsion spring surrounding the rear of said extension and the front end portion of the driving shaft with its rear-most coil abutting said shoulder on the extension to preclude rearward displacement of the spring and its foremost coil abutting said shoulder on the driving shaft to preclude rearward and radial displacement of the shaft out of the cavity while permitting limited angular displacement of the shaft with respect to the axis of the cylinder, said spring having its ends connected with the case and with the extension to thereby bias the lock cylinder in one direction of rotation.

2. A lock mechanism comprising: a bored casing; a lock cylinder rotatable in the casing; cooperating means on the casing and the lock cylinder precluding withdrawal of the cylinder from the casing except upon rotation of the cylinder to a predetermined position; a driving shaft; a connection between the driving shaft and the cylinder constraining the driving shaft to rotate with the cylinder; and cooperating abutments on the driving shaft and the casing for precluding rotation of the cylinder to said predetermined position to thus preclude withdrawal of the cylinder from the casing as long as the shaft remains operatively connected with the cylinder.

3. In a lock of the type having a bored casing and a key actuated lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key: cooperating means on the casing and on the lock cylinder providing a bayonet connection between the cylinder and the casing precluding forward axial displacement of the cylinder out of the casing except upon rotation of the cylinder in one direction to a predetermined position with respect to the casing; cooperating radial shoulders on the cylinder and the casing providing a stop to define

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the limit of rotation of the cylinder in the other direction; a rearward extension comprising the rear portion of the lock cylinder projecting behind the casing and having a cavity therein opening to the rear and radially to one side of the extension; a driving shaft having its front end portion nonrotatably received in said cavity in the extension to establish a driving connection between the driving shaft and the cylinder and projecting rearwardly from the extension; a lug on said front end portion of the driving shaft extending radially beyond the surface of the extension; a rotation stop on the case with which said lug on the driving shaft is engageable during rotation of the lock cylinder in said first named direction to preclude such rotation of the cylinder to said predetermined position in which it may be withdrawn axially forwardly from the casing as long as the shaft is drivingly connected with the cylinder; and means securing the driving shaft in said cavity in the extension.

4. In a lock of the type having a bored case and a key actuated lock cylinder rotatable in said case and accessible at the front thereof for insertion of a key: cooperating means on the case and on the lock cylinder defining a bayonet connection precluding axial withdrawal of the lock cylinder forwardly out of the case except in a predetermined position of rotation of the cylinder relative to the case; a rearward extension comprising the rear portion of said lock cylinder projecting behind the case and having a cavity opening to the rear and to one side of the extension; an elongated driving shaft having its front end portion nonrotatably received in said cavity to establish a driving connection between the lock cylinder and the driving shaft and projecting rearwardly from the extension; means on said front portion of the driving shaft and on the case defining cooperating abutments engageable upon rotation of the lock cylinder toward said predetermined withdrawing position thereof to stop such rotation of the cylinder before it reaches said predetermined withdrawing position, whereby the cylinder is held against forward axial withdrawal as long as the shaft remains connected to the cylinder; and means securing the driving shaft in said cavity in the cylinder extension.

5. In a lock of the type having a bored casing and a key actuated lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key: a rearward extension comprising the rear portion of the lock cylinder having a cavity opening to its rear and to one side thereof, and substantially rectangular in cross section; a driving shaft having a substantially rectangular front end portion substantially loosely received in said cavity in the extension to establish a rotation transmitting connection between the lock cylinder and the shaft, which connection affords the shaft a degree of universal motion relative to the cylinder; a radial projection on said front portion of the driving shaft providing a shoulder extending from the side of the cavity and facing rearwardly; a forwardly facing abutment on the side of the extension at the rear thereof; and a coiled spring surrounding said extension and interposed between said abutment thereon and said shoulder on the driving shaft to thereby preclude rearward displacement of the driving shaft while permitting the driving shaft to be swung a limited degree about its front end portion to compensate for

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misalignment between the lock casing and a part to be driven by the driving shaft.

6. The lock of claim 5, further characterized by the fact that said spring is connected with the extension and with the lock casing and biases the lock cylinder in one direction of rotation.

7. The lock of claim 5, further characterized by the fact that said spring yieldingly urges a straight longitudinal edge on the driving shaft into flatwise engagement with a wall of the cavity to thereby normally hold the driving shaft coaxial with the lock cylinder but enabling it to be swung about its front end portion.

8. In a lock of the type having a bored casing and a lock cylinder rotatable in the casing: a driving shaft; a circumferential rib on the casing extending part way around the casing bore at the rear thereof; said lock cylinder including a rearward extension, said extension having a diameter smaller than that of the body of the lock cylinder so as to define a rearwardly facing shoulder on the back of the lock cylinder body and having a radial projection spaced rearwardly from said shoulder and cooperable therewith and with the rib on the casing to preclude axial displacement of the cylinder in the casing; a connection between the driving shaft and the extension constraining the shaft to rotate with the cylinder; cooperating stop means on the cylinder and casing precluding rotation of the cylinder in one direction beyond one end of said rib; and means on the driving shaft cooperable with a part on the casing to preclude rotation of the cylinder in the other direction to a position at which said radial projection on the cylinder extension is carried beyond the other end of said rib.

9. In a lock of the type having a bored casing in which a key actuated lock cylinder is rotatable and accessible at the front thereof for insertion of a key: a circumferential rib on the casing extending part way around the casing bore at the rear thereof; a rearward extension comprising the rear portion of the lock cylinder, the junction of the body of the cylinder and said extension defining a rearwardly facing shoulder engageable with the front face of said rib to preclude rearward displacement of the lock cylinder; an outward radial projection on the side of said extension spaced from said shoulder and cooperable with the rear face of said rib to define a bayonet connection between the lock cylinder and the casing precluding forward displacement of the cylinder from the casing as long as said projection remains behind said rib; an abutment fixed on the casing and engageable by said projection to limit rotation of the lock cylinder in the direction to carry said projection beyond one end of said rib; an operating shaft including a part nonrotatably received in a radially opening well in said extension and projecting radially from the lock cylinder; means defining a second abutment on the casing engageable by said part to preclude rotation of the lock cylinder in the direction to carry said projection beyond the other end of said rib; and means for retaining said part in position in said well in the extension.

10. In a lock of the type having a bored casing and a key actuated lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key: cooperating means on the casing and on the lock cylinder providing a bayonet connection between the cylinder and the casing precluding axial displacement of the cylinder out of the casing except in one position of rotation of the cylinder; cooperating radial should-

ders on the cylinder and the casing providing a stop to define the limit of rotation of the cylinder in one direction; an operating shaft including a part nonrotatably secured to the lock cylinder and projecting therefrom; and means on the case defining an abutment against which said part engages to provide a stop defining the limit of rotation of the lock cylinder in the opposite direction, said limits of rotation of the lock cylinder being so disposed that the bayonet connection between the lock cylinder and the case is engaged at all positions of lock cylinder rotation.

11. In a lock: a bored casing open at its front and rear ends; a lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key, said cylinder having a cavity opening to its rear and radially to one side; a driving shaft having its front end portion received in said cavity; a rotation transmitting connection in said cavity between the lock cylinder and the front end portion of the driving shaft; means torsionally biasing the lock cylinder in one direction of rotation comprising a coiled torsion spring encircling the rear end portion of the lock cylinder and having its end portions connected with the cylinder and the casing and its coils encircling the front end portion of the shaft to preclude lateral displacement thereof from the cavity in the rear of the cylinder; means on the lock mechanism to preclude rearward displacement of the spring; and means on the front end portion of the shaft projecting laterally out of the cavity and engaging a part of said spring to preclude rearward displacement of the shaft.

12. In a lock: a bored casing open at its front and rear ends; a lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key, said cylinder having a cavity opening to its rear and radially to only one side; means torsionally biasing the lock cylinder in one direction of rotation comprising a coiled torsion spring encircling the rear end portion of the lock cylinder and having its end portions connected with the lock cylinder and the casing and its coils larger than the diameter of the portion of the cylinder which it encircles and extending across the lateral opening of the cavity, the connections between the end portions of the spring and the cylinder and casing being so disposed that torsional bias of the spring tends to pull its coils toward the side of the lock cylinder to which the cavity opens; a driving shaft having its front end portion received in said cavity and having a side portion projecting laterally from the cavity and holding the coils of the spring spaced from the adjacent portion of the cylinder so that the spring blocks lateral displacement of the shaft out of the cavity; and a rotation transmitting connection in said cavity between the lock cylinder and the front end portion of the driving shaft.

13. In a lock: a bored casing open at its front and rear ends; a lock cylinder rotatable in the casing bore and accessible at the front thereof for insertion of a key, said cylinder having a cavity opening to its rear and radially to only one side; a coiled torsion spring encircling the rear end portion of the lock cylinder, the coils of said spring being larger than the diameter of

the portion of the cylinder which it encircles; cooperating means on the front convolution of the spring and on the casing, circumferentially spaced to one side of the radial opening of the cavity in the cylinder, anchoring one end of the spring to the casing; cooperating means on the rear convolution of the spring and on the cylinder, circumferentially spaced to the other side of said radial opening, anchoring the other end of the spring, under tension, to the cylinder, so that the spring biases the cylinder in one rotational direction and so that the coils of the spring tend to be pulled toward the side of the lock cylinder to which the cavity opens; a driving shaft having its front end portion received in said cavity and having a side portion projecting laterally from the cavity and holding the coils of the spring spaced from the adjacent portion of the cylinder so that the spring blocks lateral displacement of the shaft out of the cavity and so that said projecting side portion of the shaft holds the spring with its convolutions coaxial and with its axis parallel to that of the cylinder; and a rotation transmitting connection in said cavity between the lock cylinder and the front end portion of the driving shaft.

14. The lock of claim 13 further characterized by axially spaced opposed abutments on said projecting side portion of the shaft engaging the front and rear convolutions of the spring to define a laterally opening notch in which the coils of the spring are received to further stabilize the spring in a position in which its coils are coaxial and its axis is parallel to that of the cylinder, and so that the spring precludes axial displacement of the shaft out of the cavity.

15. The lock of claim 13 further characterized by a rearwardly facing abutment at the front of said projecting side portion of the shaft against which the front convolution of the spring engages and a forwardly facing abutment at the rear of the cylinder against which the rear convolution of the spring engages and which cooperates with the anchored rear end of the spring to preclude rearward displacement of the spring and thus preclude rearward displacement of the shaft.

16. The lock of claim 13, further characterized by the fact that the cavity in the cylinder has a flat longitudinal wall and the front portion of the driving shaft has a flat side surface, opposite said projecting side surface, which is held in flatwise engagement with said flat longitudinal wall of the cavity by the force of said spring to thus yieldingly hold the shaft axially aligned with the cylinder.

EDWARD N. JACOBI.

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