July 10, 1934. E. N. JACOBI 1,965,941

LOCK

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Fig. 1.

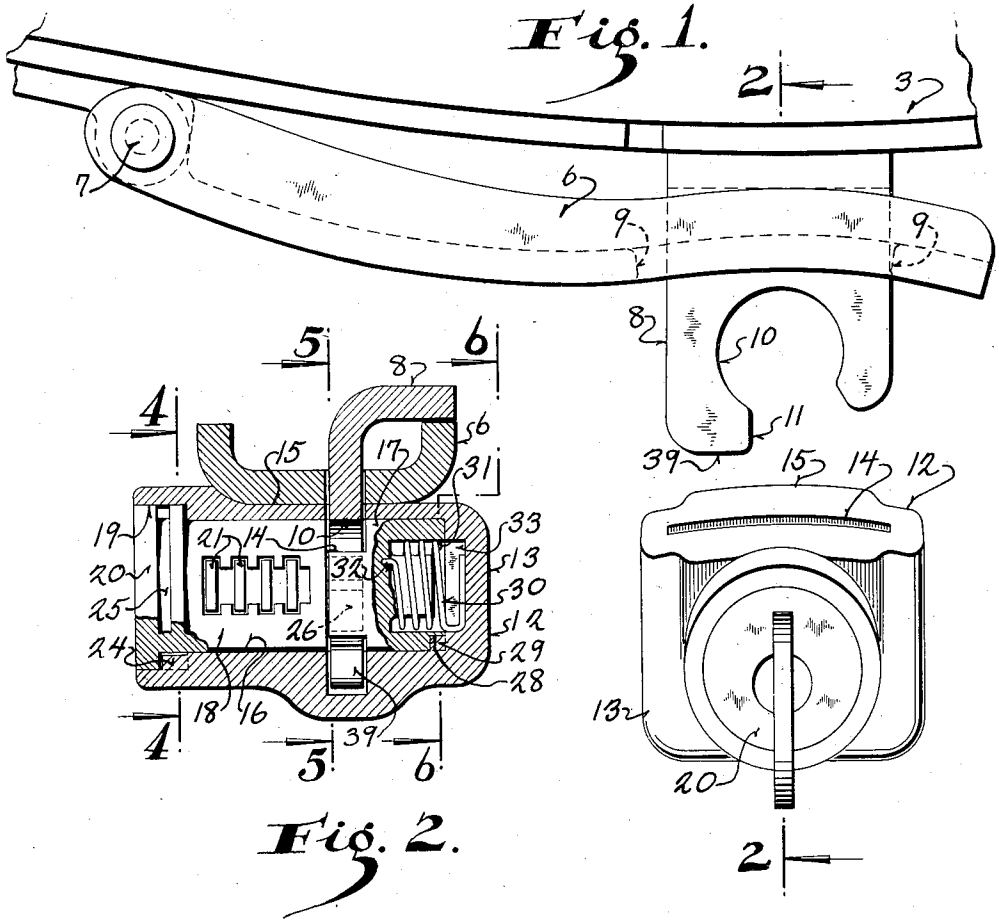


Fig. 2.

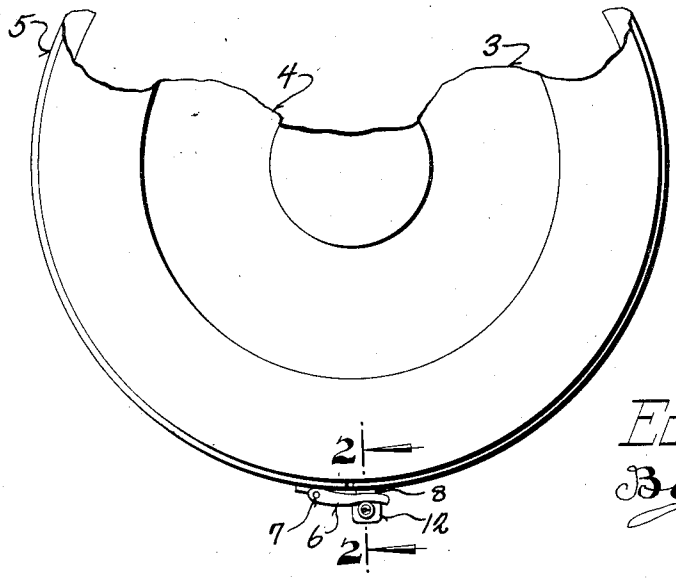


Fig. 3.

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Fig. 4.

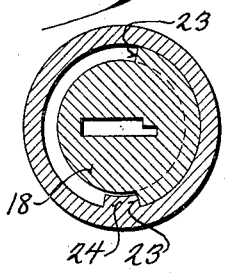


Fig. 5.

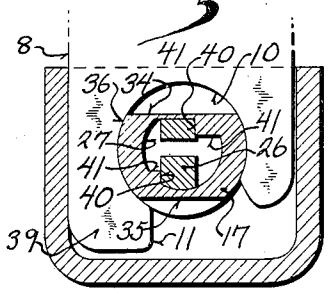
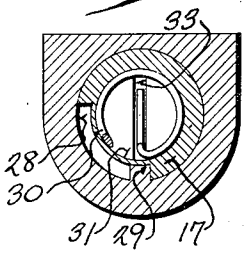


Fig. 6.



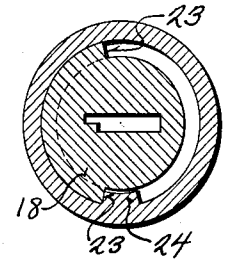


Fig. 7.

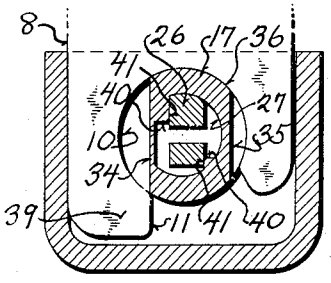


Fig. 8.

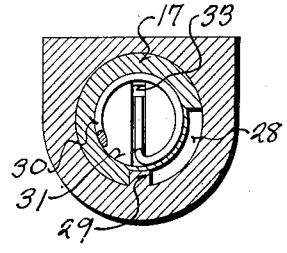


Fig. 9.

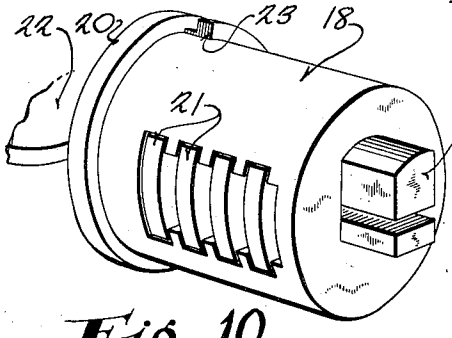


Fig. 10.

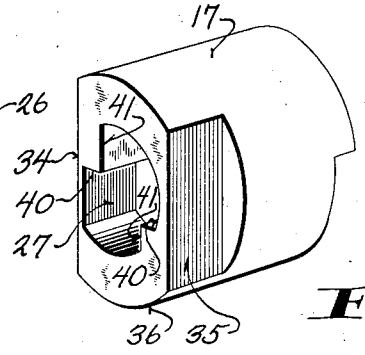


Fig. 11.

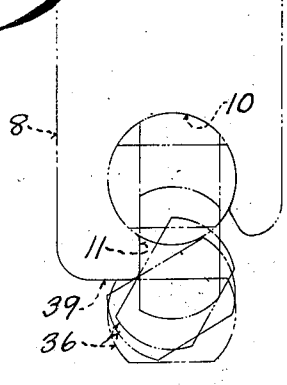


Fig. 12.

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UNITED STATES PATENT OFFICE

1,965,941

LOCK

Edward N. Jacobi, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Milwaukee, Wis., a corporation of Delaware

Application November 3, 1933, Serial No. 696,466

7 Claims. (Cl. 70—46)

This invention relates to improvements in locks and refers more particularly to locks for spare tire covers.

Modern tire covers are generally stamped from sheet metal and usually comprise a main body in the form of a solid sheet metal disc suitably shaped, and a rear portion which is made like a split ring so that it can be opened for engagement over the tire and then clamped about the outer extreme edge of the main body at the center line of the tire tread.

This split ring has a small toggle lever handle by which the sections of the ring may be forced closed and held in closed position. The outer end of the lever is perforated for the reception of an apertured member or staple fastened to the other end of the split ring. Closing the toggle lever down over the staple accordingly clasps the split ring around the tire to hold the cover in position.

Heretofore, the lever handle has been held against disengagement from the staple merely by means of a conventional padlock, and it is the purpose of the present invention to provide a novel self-contained lock structure to be used in place of the conventional padlock and thus afford more secure protection with improved appearance.

Another object of this invention is to provide a lock for the purpose described, which when in operative position, is secured against movement so as to preclude the possibility of rattles and loose wearing parts.

Another object of this invention is to provide a lock suitable for use as described and incorporating a rolling bolt which is spring urged to its operative position and is rotatable to an inoperative or released position by means of a lock cylinder, and in which the connection between the cylinder and the bolt is such that the lock may be applied to the staple without requiring actuation of the cylinder, by pressing the same onto the staple.

With the above and other objects in view which will appear as the description proceeds, my 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.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a view showing the lower portion of a metal tire cover illustrating the latching handle engaged with its staple, and with the lock device in perspective and in position to be applied to the staple;

Figure 2 is a section view through the lock device applied to the staple and securing the handle lever in closed position, said view being taken on the plane of the line 2—2 of Figure 1;

Figure 3 is a general view of the tire cover shown on a reduced scale and illustrating the position of the latch and its lock;

Figure 4 is a cross section view taken through the front end of the lock on the plane of the line 4—4 of Figure 2;

Figure 5 is a cross section view taken through the connection between the cylinder and the rolling bolt taken on the plane of the line 5—5 of Figure 2;

Figure 6 is a cross section view through the innermost end of the lock showing the rolling bolt and its spring means taken on the plane of the line 6—6 of Figure 2;

Figures 7, 8 and 9 are cross section views similar to Figures 4, 5 and 6, but showing the position of parts with the rolling bolt unlocked or released;

Figure 10 is a perspective view of the lock cylinder;

Figure 11 is a perspective view of the rolling bolt; and

Figure 12 is a diagrammatic view illustrating the manner in which the bolt engages the staple member.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 3 designates a metal tire cover composed of a circular body portion 4 and an outer split rim or ring 5. The rim 5 is adapted to be spread to permit the engagement of the cover over a spare tire and its two sections are held closed by means of a lever 6 hingedly mounted as at 7 from one section of the split rim and engageable over a staple 8 attached to the other section, the outer free end of the lever handle 6 being apertured as at 9 to receive the staple. The staple 8 has a circular hole 10 and a restricted opening 11 leading from the outer end of the staple into the hole.

The lever handle 6 is secured against detachment from the staple 8 by a lock structure 12, which particularly forms the subject matter of the present invention.

The lock structure 12 comprises an outer casing or body 13 having a slot or recess 14 opening to one outer face 15 thereof, for the reception of the outer end portion of the staple 8. The surface 15 of the lock body engages the lever when the lock body is positioned on the staple. Intersecting the slot or recess 14 is a longitudinal bore 16 in which a rolling bolt 17 and a lock cylinder

18 are disposed, the bolt 17 being located in the closed inner end of the bore 16 and the cylinder 18 closing the outer end of the bore. At the mouth of the bore 16, the lock body is counterbored as at 19 to receive the head 20 of the lock cylinder.

The lock cylinder is provided with the customary tumblers 21, which are yieldably urged to project into a tumbler groove (not shown) formed in the body in communication with the bore 16, the tumblers being retractable from said groove upon the insertion of a proper key 22 to free the cylinder for rotation.

The inner wall of the lock cylinder head 20 is cut down throughout a portion of its circumference to provide two shoulders 23 arranged to collide with a stop 24 formed as an integral part of the casing to limit and define the rotation of the cylinder to one hundred and eighty degrees. A pin (not shown), but carried by the lock body, projects into a groove 25 in the cylinder head, to retain the cylinder in the casing.

Projecting from the inner end of the cylinder is a driving cam 26, which, as best shown in Figure 10, is substantially rectangular in cross section. The slot shown in the driving cam is the extension of the key-way in the cylinder. The driving cam 26 projects into a recess or pocket 27 in the adjacent end of the rolling bolt 17 to enable the bolt to be turned to its unlocked or releasing position through the medium of the lock cylinder.

The shape of the recess or depression 27 is such that the connection between the cylinder and the bolt has ninety degrees of lost motion. In other words, the rolling bolt is permitted ninety degrees of rotation without necessitating any turning movement of the cylinder. The purpose of this ninety degrees of lost motion in the connection between the cylinder and the bolt will be hereinafter more fully described.

As stated, the rolling bolt is received in the innermost closed end portion of the bore 16 with its inner end abutting the bottom of the bore. At its extreme inner end, the bolt has a segmental groove 28 to receive a stop lug 29 formed as an integral part of the lock casing. The angular extent of the groove 28 and the width of the stop lug 29 are such that the bolt is permitted ninety degrees of rotation. The ends of the groove colliding with the opposite sides of the stop lug define and limit the rotation of the bolt.

A torsion spring 30 received in an annular recess 31 in the inner end of the bolt with one end anchored to the bolt as at 32 and its other end received in a cross slot 33 in the bottom of the bore 16, serves to yieldingly maintain the bolt at one of its limits of rotation.

When the bolt is in its normal position of rotation to which it is urged by the torsion spring 30, its outer end portion, which has its opposite sides flattened as at 34 and 35 to provide a staple engaging locking section 36, is disposed in a position with its major axis perpendicular to the axis of the slot or recess 14. This is the locking position of the bolt. With the bolt turned to its other position against the action of its torsion spring and which position is ninety degrees from its locked position, the locking section 36 is in its unlocked position.

The manner in which the bolt engages the staple upon the application of the lock structure is diametrically illustrated in Figure 12. The hole 10 in the outer end of the staple is slightly greater in diameter than the bolt and the restricted entrance opening 11 leading to the circular hole 10 is wide enough to permit the locking portion 36 of the bolt to pass therethrough endwise but will not allow sidewise disengagement of the bolt from the hole 10.

Inasmuch as at the normal position of the bolt, the major axis of the locking section 36 is perpendicular to the axis of the recesses 14 and consequently the staple, or in other words, is disposed sidewise with respect to the restricted opening 11, upon initial engagement of the lock with the staple, the outer end portion 39 of the staple which forms one side of the restricted opening 11 and projects beyond the other side thereof, strikes the flat side 34 of the locking section 36 to one side of a plane perpendicular to the axis of the bolt.

If then the lock is forced onto the staple, the bolt cams itself about the corner of the outer end portion 39 until the locking section 36 stands endwise with respect to the opening 11. In this position, the lock may be applied to the staple and when moved far enough to align the axes of the bolt and the hole 10, the bolt will be free to snap back to its locked position under the action of its torsion spring 30. Consequently, the lock automatically secures itself to the staple.

During the application of the lock to the staple, the cylinder is in its locked position, and as brought out hereinbefore, the lost motion connection between the driving cam 26 and the recess in the bolt permits the required movement of the bolt during its engagement in the hole 10.

With the lock applied to the staple and the bolt in its locked position, the relationship of the cylinder and the bolt and the connection therebetween is as shown in Figures 4, 5 and 6. The cylinder is at one limit of its rotation with the tumblers projecting into their tumbler receiving groove, and the bolt is in its locked position of rotation to which it is yieldably urged by the torsion spring 30.

The driving cam 26 stands with its major axis parallel to the major axis of the staple and perpendicular to the planes of the flat sides of the locking section 36 of the bolt. In this position, the driving cam engages with shoulders 40 in the recess or pocket 27. From this position, the lock cylinder may be turned only in a counterclockwise direction, which is permitted only after the key is inserted to retract its tumblers.

It is apparent from Figure 5 that during the first ninety degrees of counter-clockwise rotation of the cylinder, the rolling bolt will not be turned. Only the lost motion in the connection between the cylinder and the bolt will be taken up until the opposite faces of the driving cam engage abutments 41 in the recess or pocket 27. The bolt remains stationary and in engagement with stop lug 29 during this first ninety degrees of rotation.

As the driving cam engages the abutments 41 in the bolt recess, continued rotation in a counter-clockwise direction turns the bolt against the action of the spring 30 to its released or unlocked position shown in Figure 8. The lock structure may then be withdrawn from the staple.

If desired, a second tumbler receiving groove may be provided in the casing of the lock to enable withdrawal of the key in the unlocked position shown in Figures 7, 8 and 9, but it is preferable to prevent the withdrawal of the key in the unlocked position. Without the second tumbler receiving groove, the parts will remain in unlocked position only as long as the key is held against turning

for immediately upon its release, the torsion spring 30 will act to retract the parts back ninety degrees.

At this point, however, the key cannot be withdrawn, so it is necessary to retract the cylinder back to its fully locked position as shown in Figure 4. In this position, the lost motion in the connection between the cylinder and the bolt accommodates the turning of the bolt during the application of the lock to the staple as hereinbefore described.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art, that this invention provides a novel and compact lock mechanism which while particularly adapted to secure metal tire covers in place, is very well suited to use in conjunction with any hasp and staple type of fastening, or any other similar structure.

What I claim as my invention is:

1. In a lock of the character described, a bored casing, a rolling bolt having a locking portion movable to and from an operative position upon rotation of the bolt, a spring to yieldingly hold the bolt in a position of rotation at which its locking portion is operative, a key controlled lock cylinder rotatably mounted in the casing bore, and a connection between the lock cylinder and the bolt whereby the bolt is movable against the action of said spring to dispose its locking portion in an inoperative released position upon turning of the lock cylinder.

2. A lock structure attachable to an apertured member to effect a locking function comprising, a bored casing having an opening intersecting its bore to receive said apertured member with the aperture of said member in line with the bore, a rolling bolt disposed in the bore and having a locking portion engageable in the aperture of said member, said locking portion and the aperture in said member being of such relative configurations that in one position of rotation of the bolt, said locking portion is engageable and disengageable from said aperture, and in another position it is prevented from disengagement from the aperture, means to yieldably urge the bolt to said other position, and a key controlled lock cylinder rotatably mounted in said bore to turn the bolt to said first mentioned position at which it is disengageable from the aperture.

3. A lock structure attachable to an apertured member to effect a locking function comprising, a bored casing having an opening intersecting its bore to receive said apertured member with the aperture of said member in line with the bore, a rolling bolt disposed in the bore and having a locking portion engageable in the aperture of said member, said locking portion and the aperture in said member being of such relative configuration that in one position of rotation of the bolt said locking portion is engageable and disengageable from said aperture, and in another position it is prevented from disengagement from the aperture, means to yieldably urge the bolt to said other position, a key controlled lock cylinder rotatably mounted in said bore, and a lost motion connection between the lock cylinder and the rolling bolt to enable turning of the bolt independently of the lock cylinder and also by the lock cylinder.

4. In combination with two interengaging members, one of which has a hole therethrough with a restricted opening leading thereto, a lock structure engageable with said designated member to lock said members against disengagement comprising, a bored body member having an opening intersecting its bore to receive said designated member with its hole substantially in line with the bore, a rolling bolt disposed in said bore and engageable in the hole of said designated member to secure the body member against retraction from said designated member, and a key controlled lock cylinder rotatably mounted in the bore and operable to release the locking engagement between the rolling bolt and said designated member.

5. In combination with two interengaging members, one of which has a hole therethrough with a restricted opening leading thereto, a lock structure engageable with said designated member to lock said members against disengagement comprising, a bored body member having an opening intersecting its bore to receive said designated member with its hole substantially in line with the bore, a rolling bolt rotatably mounted in said bore and having a locking portion adapted to pass through said restricted opening of the designated member in one position of rotation and to have a locking engagement in the hole of said designated member in another position of rotation of said rolling bolt, means to yieldingly urge the bolt to said other position of rotation, a rotatable key controlled lock cylinder in the bore, and a connection between the lock cylinder and the rolling bolt whereby the bolt may be turned by the lock cylinder against the action of its urging means to release its locking portion from the hole in said designated member, said connection having a degree of lost motion to enable independent turning of the rolling bolt so as to enable engagement of the lock structure with said designated member without necessitating actuation of the key controlled cylinder.

6. In a lock structure of the character described, a bored casing, a rolling bolt rotatably disposed in the bore and having a locking portion which moves from an operative to a released position during a predetermined number of degrees of rotation of the rolling bolt, means to define the limits of rotation of the bolt to said predetermined number of degrees, a spring to yieldably urge the bolt to one of its limits of rotation, a key controlled lock cylinder rotatably mounted in said bore, and a driving connection between the lock cylinder and said bolt, said driving connection having a degree of lost motion equivalent to the range of turning movement of the rolling bolt, whereby said bolt is free to turn throughout its complete range of movement independently of the lock cylinder.

7. In a lock of the character described, a casing having a bore, a rolling bolt rotatably mounted in said bore and having a locking portion which is in an operative locking position at one position of rotation of the bolt and in an inoperative unlocking position at a second position of the bolt substantially a quarter of a turn from said first position, means to define the limits of rotation of said bolt, a spring to yieldably urge the bolt to one of its limits of movement, a key controlled lock cylinder rotatably mounted in the bore, means to limit the rotation of said lock cylinder to substantially one-half a turn, and a lost motion driving connection between the lock cylinder and said rolling bolt whereby the bolt may be turned by the cylinder throughout the entire range of movement of the bolt and the bolt is free to move independently of the cylinder.

EDWARD N. JACOBI.