United States Patent

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[33] **Italy**
[31] **7437 A/67**

[54] **CYLINDER PADLOCKS**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **70/38,** 70/339
[51] **Int. Cl.** **E05b 67/24,** E05b 35/12
[50] **Field of Search** ..... 70/31, 32, 33, 34, 35, 38, 38 A, 38 B, 38 C, 337, 339, 265

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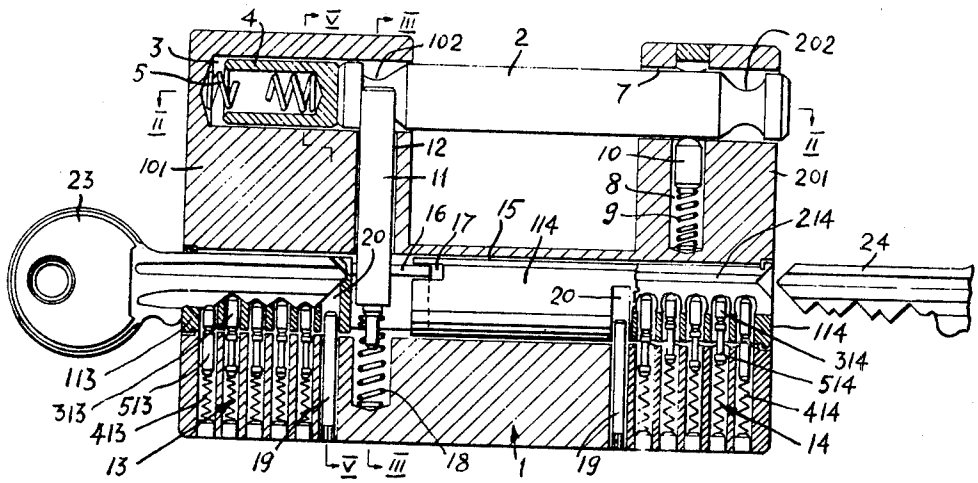
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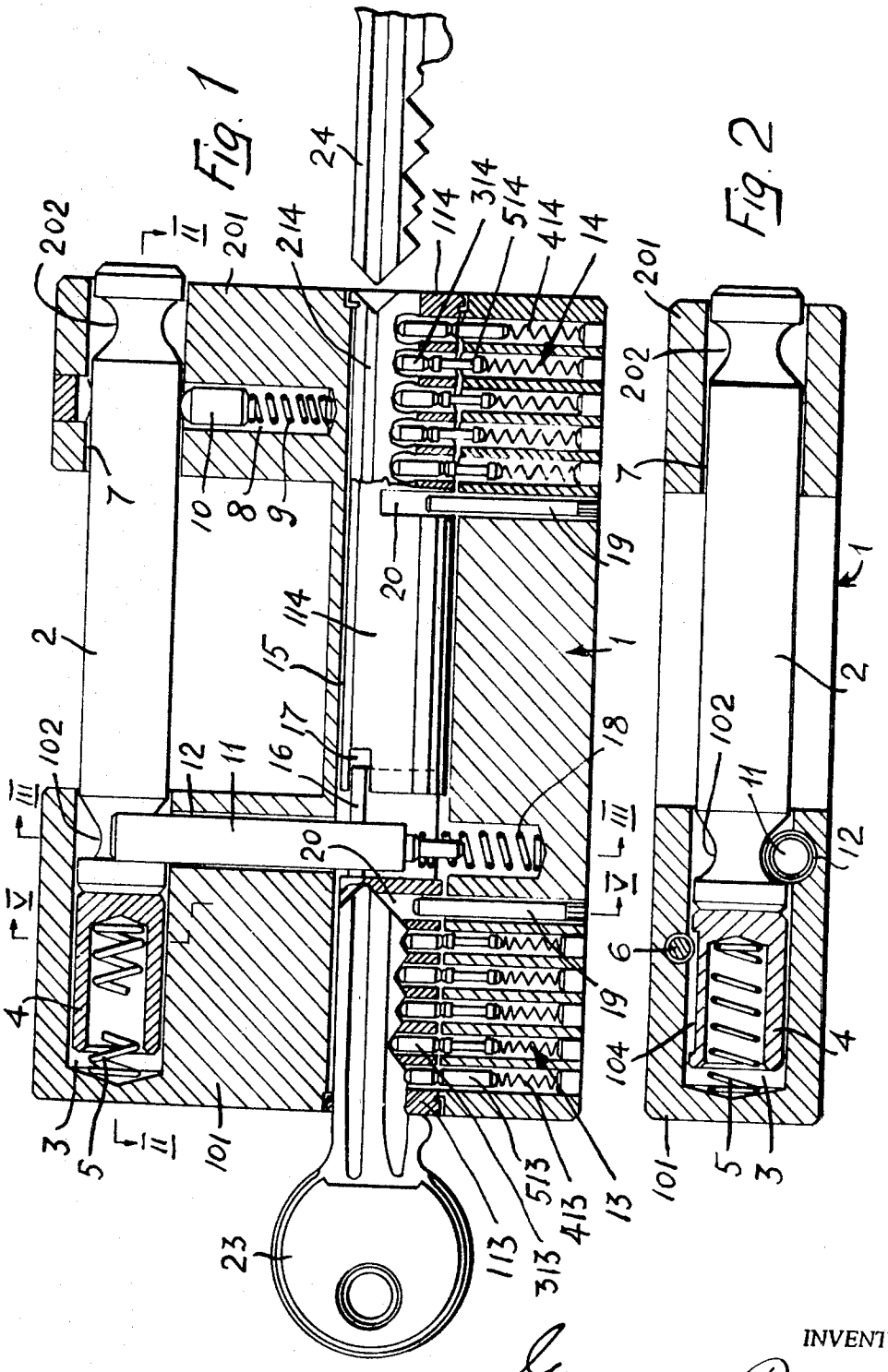
ABSTRACT: This invention relates to cylinder padlocks, and has for an object such a padlock which cannot be opened by a single key and one person. Accordingly, the invention provides such a padlock with two coaxial locking cylinders of differing locking characteristics. These cylinders have cores that are connected so as to rotate together and they are coupled to a latching bar for locking a shackle for the padlock.



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SHEET 1 OF 2



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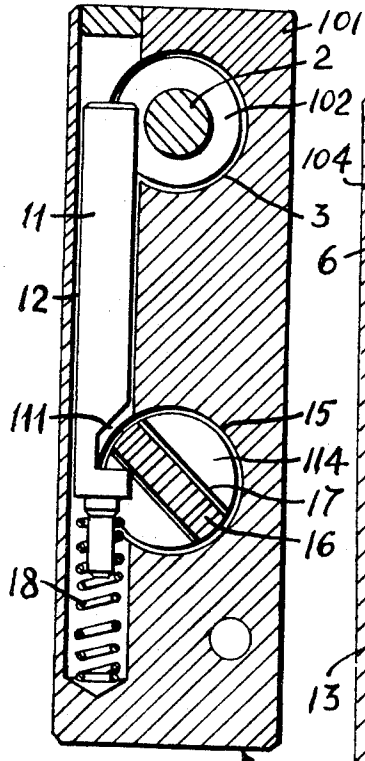


Fig. 3

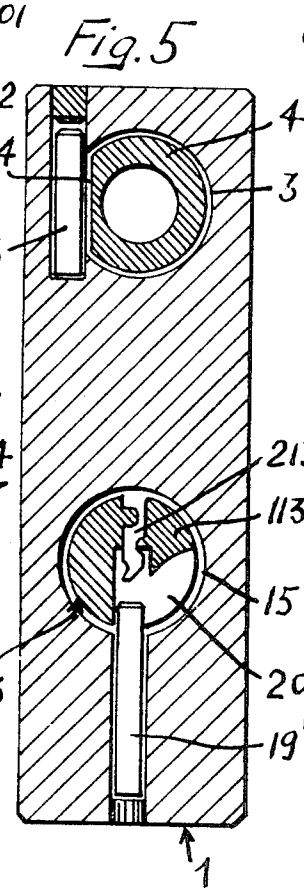


Fig. 5

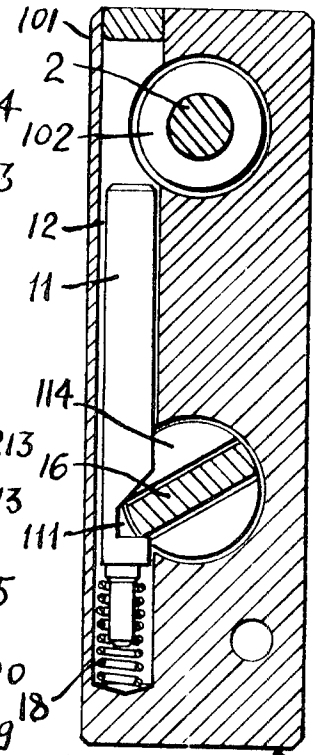


Fig. 4

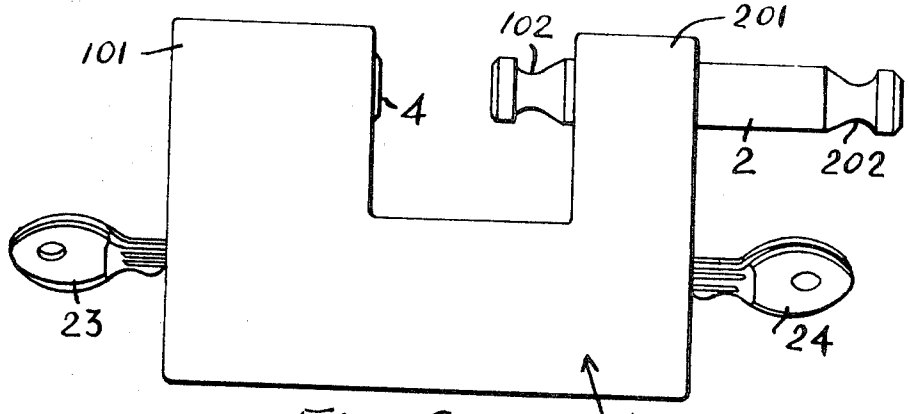


Fig. 6

CYLINDER PADLOCKS

The present invention relates to padlocks having locking cylinders.

Known padlocks of this type have a single locking cylinder and consequently can be opened by a single person with the appropriate key. In many cases, for example, in safety or security padlocks for storeroom doors, roller shutters or the like, it is desirable that the padlock can only be opened in the presence of two people.

It is an object of the invention to provide a padlock of the above-named kind that can only be opened by the simultaneous introduction of two different keys and, consequently, in the presence of two persons, each having one of the keys.

To this end, the invention proposes a cylinder padlock having two coaxial locking cylinders of differing locking characteristics, i.e. operable by different keys, said cylinders having cores that are connected so as to be rotatable together and are coupled to a latching member of a lock shackle. In this construction of padlock, the cylinder cores of the two coaxial locking cylinders with different locking characteristics, connected to rotate together, can then only be turned for actuating the shackle latch of both locking cylinders are freed by the introduction of the appropriate keys. The rotation of the two cylinder cores can be effected by one of the two keys, whilst the other key is simple placed in the locking cylinder allocated thereto and is rotated therewith by its cylinder core.

It is immaterial for the invention whether the padlock, the two locking cylinders and the latching member of the shackle are constructed as a unit. Thus, for example, the shackle of the padlock can be constructed in known fashion as a pivoted or sliding shackle or as a straight, i.e. boltlike shackle or a bent, i.e. U-shaped shackle. The latching of the shackle can also be effected in known fashion with the aid of a latching bar or the like or directly by the cylinder core of at least one of the two locking cylinders. The locking cylinders may be constructed with one or more rows of tumblers, or with pin or plate tumblers.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show one embodiment thereof, and in which:

FIG. 1 shows a longitudinal section through a padlock with a straight, boltlike sliding shackle, in the closed position,

FIG. shows a longitudinal section along the line II–II of FIG. 1,

FIGS. 3 and 4 show cross sections along the line III–III in the locking and open positions of the locking bar for the shackle,

FIG. 5 shows a section along the live V–V of FIG. 1 and

FIG. 6 shows a side view of the padlock according to FIG. 1, in the open position.

Referring now to the drawings, the padlock shown, is provided in particular for connecting the lower end of closed roller shutters to the holder ring or the like anchored in the threshold or window sill. This padlock consists of a substantially U-shaped body 1, whose sides 101, 201 may be connected together by a straight, cylindrical, bolt-shaped shackle 2. Said shackle 2 is constructed to slide, that is to say, it is mounted in the arms 101, 201 of the U-shaped locking member 1 so as to be longitudinally movable.

One end of the shackle 2 provided with a continuous annular groove 102 that engages in a blind bore 3 of the corresponding side 101 of the body and cooperates with an ejection plunger 4 arranged to move coaxially thereto in the bore 3. The plunger 4 is urged outwardly by a spring 5, i.e. against the shackle 2, but is prevented from being completely ejected from the bore 3 under the effect of spring pressure. For this purpose there is provided a stop pin 6 housed in the side 101 of the body near the bore 3 and directed transversely to the axis of the ejection plunger, said pin 6 partly engaging in the bore 3 and in a flat side section 104 of the plunger 4 and, in combination with the end parts of this section or this flat portion 104, limits the longitudinal displacement of the plunger 4 in the bore 3.

The other end of the shackle 2 engages in a continuous bore 7 in the second side 201 of the body 1 and is preferably also

provided with a continuous annular groove 202, which, however, is not absolutely necessary. There is movably mounted in a bore 8 of the side 201 of the body directed transversely to the bore 7 for the shackle 2, a pin or barrel-shaped detent 10 which engages in the bore 7 of the side 201 of the body 1 and is urged by a spring 9 against the cylindrical outer jacket of the shackle 2.

When the padlock is in the closed position shown in FIGS. 1 to 3, both ends of the shackle 2 engage in the corresponding bores 3, 7 of the sides 101, 201, of the body 1 and said shackle is locked by a latching bar 11. This latching bar 11 is mounted to be longitudinally displaceable in a bore 12 of the side 101 of the body directed transversely to the shackle 2 and arranged laterally nearby. The bore 12 for the insertion of the latching bar 11 intersects the bore 3 for the engagement of the shackle 2.

When it is in the locked position, moved towards the shackle 2, i.e. upwardly in FIG. 1, the latching bar 11 engages in the annular groove 102 of the shackle and thereby locks the shackle 2 in the closed position, as may be seen in particular in FIG. 3. In its released position, moved in the opposite direction, i.e. downwardly in FIG. 1, the latching bar 11 moves out of the annular groove 102 of the shackle 2 and thereby releases said shackle 2, as is illustrated in particular in FIG. 4. The released shackle 2 is thrust by the biased compression spring 5 via the ejection plunger 4 out of the corresponding bore 3 of the side 101 of the body 1, said shackle being displaced in the continuous bore 7 of the other side 201 of the body and, if necessary, being movable by hand into a further withdrawn open position, as is illustrated in FIG. 6. The complete withdrawal of the shackle 2 from the continuous bore 7 of the sides 201 of the body 1 is prevented by the spring-loaded detent 10 housed in this side, which engages in the annular groove 102 of the shackle 2 and thereby prevents the further withdrawal of the shackle 2.

The latching bar 11 is actuated by two locking cylinders 13 and 14 arranged coaxially in the web part of the U-shaped body 1. Each locking cylinder 13 or 14 consists of a corresponding cylinder core 113 or 114 having a channel 213 or 214 for the key and pin tumblers 313 or 314. The two cylinder cores 113, 114 are rotatably mounted in a continuous bore 15 of the body 1 parallel to the shackle 2. The body 1 itself, which has the corresponding pin bores 413, 414 with the spring-loaded pin tumblers 513, 514 serves as the outer cylinder, i.e. as housing for the two locking cylinders 13, 14.

The core bore 15 of the body 1 laterally overlaps the bore 12, directed transversely thereto, for the introduction of the latching bar 11, said latter extending up to the core bore 15 and beyond, as is shown in particular in FIGS. 1 to 4. The cylinder cores 113, 114 of the two locking cylinders 13, 14 extends as far as the latching bar 11, and they terminate on both sides thereof at a distance from one another and are connected so as to rotate together. To this end, one cylinder core 113 has a flat, link-shaped attachment 16 projecting in axial direction at the top, which engages in a suitable top recess 17 of the other cylinder core 114. The connecting link 16 engages moreover in a side notch 111 in the latching bar 11 so that said latter may be shifted longitudinally by rotating the pair of cores 113, 114 and the corresponding connecting link 16, that is to say, may be brought into the locked position (FIG. 3) and into the released position (FIG. 4) of the shackle 2. The shifting of the latching bar 11 into the locked position, i.e. upwardly in FIGS. 1, 3 and 4, is assisted by a compression spring 18. The rotation of the coupled cylinder cores 113, 114 is limited by radial stop pins 19 which are arranged in the body 1 and which engage in segment-shaped lateral recesses 20 in the cylinder cores 113, 114.

The two locking cylinders 13, 14 are constructed with different locking characteristics, that is to say, they have different pin tumbler combinations and may be actuated by corresponding, differently notched keys 23, 24. Consequently, it is possible to rotate the two cylinder cores 113, 114 connected to rotate together and to adjust the latching bar 11 only when

the blocking of both cylinders **13**, **14** is removed by the insertion of the corresponding keys **23**, **24** as is shown in FIG. **1** for the left-hand locking cylinder **13**. The padlock may, therefore, be opened only after the two different keys **23**, **24** have been inserted, the two cylinder cores **113**, **114** connected to rotate together being rotated, and consequently the latching bar **11** being actuated with the aid of either of two keys **23**, **24**, while the other key is simply placed in the locking cylinder concerned and is rotated therewith by its cylinder core. If two persons only have one of the two different keys **23**, **24** of the padlock each, this padlock can only be opened in the presence of these two persons.

Of course, the invention is not limited to the embodiment illustrated, but several solutions which are different in particular from the constructional point of view, are possible within the general scope of the invention. In particular, the cylinder cores **113**, **114** of the two coaxial locking cylinders **13**, **14** with different locking characteristics may not only be manufactured separately and connected so as to rotate together by any coupling, but may also be constructed in one piece. Moreover, it is possible to connect the two cylinder cores **113**, **114** by an intermediate piece. The two locking cylinders **13**, **14** may have not only different key notchings but also a different number of pin or plate tumblers. Moreover, the two locking cylinders **13**, **14** may have a different number of rows of tumblers or a different construction, perhaps one locking cylinder being constructed with pin tumblers and the other with plate tumblers. On the other hand, all features which may be derived from the drawing and the description, including the constructive details, may be combined in any manner according to the invention.

I claim:

1. A locking mechanism comprising a body, a movable shackle carried by said body, first stop pin means carried in one wall portion of said body and cooperating with said shackle, said body further including a plurality of coaxial aligned separate cores, locking cylinders having aligned pin tumblers in each of said cores, plural second stop pin means arranged in said body for cooperation with said locking cylinders to limit rotation thereof, latching bar means in another wall portion under control of at least one of said cores and arranged to control said shackle.

2. A locking mechanism as claimed in claim **1**, wherein one of said cores includes axially extending notched means and the other of said cores includes axially extending link means arranged to engage into said notched means, said link means further including an edge portion adapted to operate said latching bar.

3. A locking mechanism as claimed in claim **1**, wherein said plural stop pins are spaced from and in alignment with said pin tumblers.