June 16, 1936. E. W. HITE 2,044,529

PADLOCK

Filed Jan. 10, 1936

Fig.1.

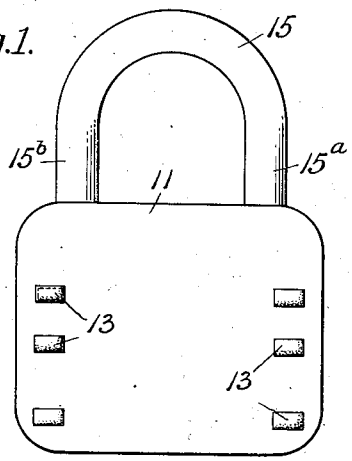


Fig.2.

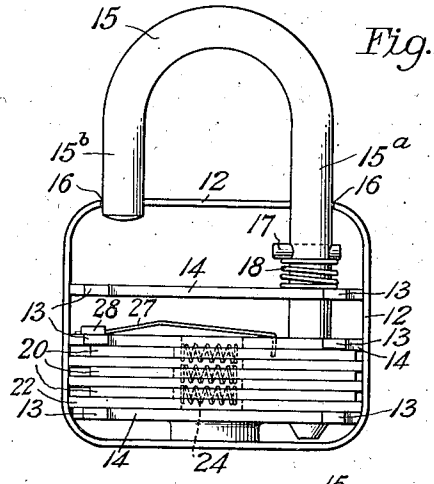


Fig.3.

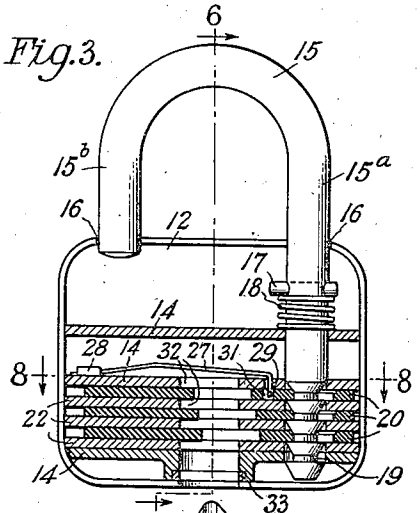


Fig.5.

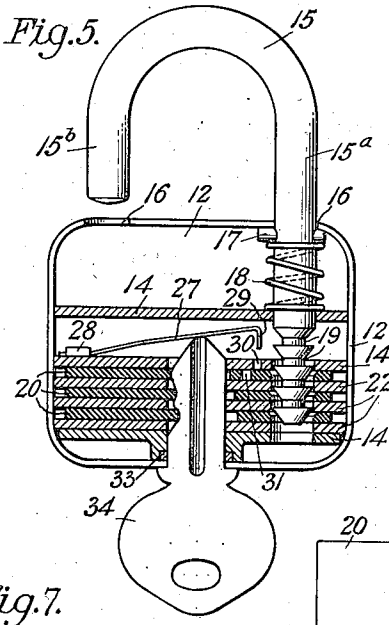


Fig.6.

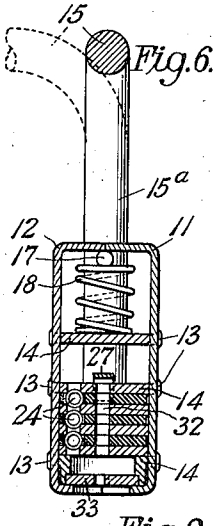
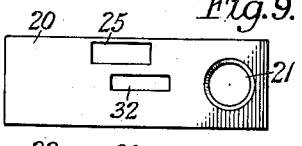


Fig.9.



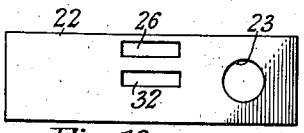


Fig.10.

Fig.7.

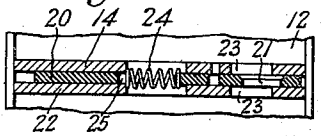
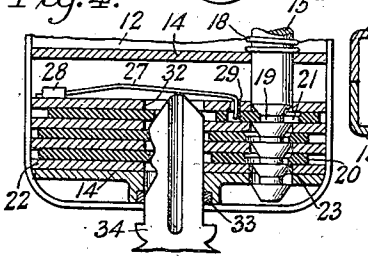


Fig.4.



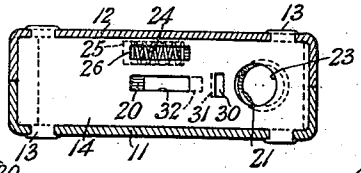


Fig.8.

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PADLOCK

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Application January 10, 1936, Serial No. 58,580

12 Claims. (Cl. 70—107)

This invention relates to locks and more particularly to padlocks, with reference to the type embodying sliding tumblers generally identified as "sliding shackle" locks.

A primary object of the invention is to provide a lock of simplified and improved construction that can be manufactured and sold cheaply.

Another principal object is to produce a strong and secure lock which will be substantially pick-proof as well as difficult to break, and will at the same time be positive in its action of holding the shackle member in place until properly released by an opening key.

A further object is to provide a lock which is opened by the insertion of a key without turning in the same, and to prevent opening until a properly fitted key has been inserted the full extent into the casing.

Other important objects, in addition to the general concept and particular advantages of the invention, will be revealed by the following description with reference to an illustrative embodiment of the invention shown in the attached drawing.

In said drawing:

Fig. 1 is a side elevation of a padlock formed in accordance with the invention;

Fig. 2 is a similar view of the padlock with one side of the casing removed to reveal the interior mechanism;

Fig. 3 is a similar view with the interior mechanism shown sectionally, illustrating the positioning of the parts prior to the insertion of an unlocking key;

Fig. 4 is a fragmentary similar view illustrating the positioning of the mechanism with the key partly inserted;

Fig. 5 is a like full view illustrating the positioning of the parts with the key inserted the full way;

Fig. 6 is an end sectional view taken on the line 6—6 of Fig. 3;

Fig. 7 is a fragmentary view sectionally representing one of the tumbler members between guide parts;

Fig. 8 is a sectional plan view taken on the line 8—8 of Fig. 3, omitting the shackle;

Fig. 9 is a top plan view of one of the tumbler members; and

Fig. 10 is a similar view of one of the spacer and guide members.

In the illustrated construction, the padlock casing is formed by opposite flanged plate sections 11 and 12. These are secured together by rivets 13, formed in this instance by lateral lug projections of inner partition and reenforcing plates 14, which bear against the walls of the casing plates so as to rigidify and strengthen them against collapse from outward pressure or blows. These partition and reenforcing plates are held in place within the casing at suitable spacing from one another by said rivets formed as lug projections thereof as stated, and these rivets are, of course, upset on the outer side of the casing plates through which they extend.

A J-shaped member comprising the shackle 15 is slidable in said casing through apertures 16 formed in the top. The longer arm 15a of this shackle extends through one of said openings and through the aforesaid partition and reenforcing plates (14) substantially to the bottom of the casing, and the shorter arm 15b thereof enters only a short distance into the other of said apertures, in the conventional manner. Said longer arm is anchored in the casing by a cross-pin 17 therein, limiting its outward movement but permitting it to rotate upon its axis so as to swing the shorter arm around in either direction after extrusion from the casing. A spring 18 applied on its shank between said cross-pin (17) and the uppermost of said partition and reenforcing plates serves to impel the shackle outwardly upon release. Said longer arm is also formed with a series of annular notches 19, in this instance at the end, by which to engage the same for locking in the casing.

Said notches of the shackle are engaged in the locking position by a plurality of sliding tumblers 20, through which the shackle arm extends by means of openings 21 in their ends, registerable with the openings in the aforementioned partition and reenforcing plates (14). These tumblers are arranged in this instance between the intermediate and lowermost of said partition and reenforcing plates, with spacer plates 22 applied therebetween, which together with the partition and reenforcing plates form guides for the tumblers as well as to space them properly from each other, and are formed with openings 23 likewise registering with the openings in said partition and reenforcing plates, through which the shackle arm extends. It will be observed that an extra one of these spacer plates (22) is inserted between the lowermost tumbler and the lowermost partition and reenforcing plate, which serves as a filler to compensate for any excess spacing and provide the proper looseness or play between the other parts to assure free movement of the tumblers. No such extra spacer is applied between the uppermost tumbler and intermediate parti-

tion and reenforcing plate because it is not necessary, although it may be done if desired. Said tumblers are engageable with the notches of the shackle at opposite sides in opposite directions of slide movement, as will more clearly appear hereinafter, but both the partition and reenforcing plates (14) and the spacers (22) are fixed and have no engagement with the shackle, which simply extends therethrough by means of the openings provided in the same for such purpose, said openings in the latter being always in register so as to permit the shackle arm to slide free either way.

Said tumblers are yieldingly or retractibly projected individually toward the notched shackle arm, by coil springs 24, in this instance fitting in slot openings 25 in the tumblers and extending laterally into like but narrower openings 26 in the guides, formed by the spacer plates 22 and partition plates 14, on opposite sides (see Figs. 6, 7 and 8). Being of a diameter greater than the thickness of the tumblers, these springs are retained in place by the confines of the narrower slots at opposite sides so that no other fastening is required and said springs simply "float" within the spaces therefor with bearing against the slot ends in action upon the tumblers. This means of applying yieldable advance action to the tumblers is considered particularly novel and expedient, but might, of course, be done in some other way, either by individual springs or by a single spring common to all. One of the chief advantages resides in the rapidity and facility with which the mechanism can be assembled, without need of attaching the spring elements. They can simply be dropped into place as the tumblers and spacers are arranged one upon the other.

The topmost tumbler is held normally continually engaged with the shackle arm by a latch member 27 affixed on the top of the intermediate partition and reenforcing plate, as indicated at 28. This member comprises simply a spring arm having an end 29 extending through a slot 30 in said plate into a like slot 31 in the subjacent tumbler (see Fig. 3), when the latter is in the engaging position. Said latch member is lifted against its spring action to free the tumbler for movement to release position by a key inserted in the lock through the tumblers and interposed spacers or guides.

A key passage through said parts is provided by slots 32 formed alike in the tumblers, the spacer plates (22) and enclosing partition plates (14), said slots being in register only when the tumblers are retracted to position for release of the shackle, although those of the spacer and partition plates are, of course, always in alinement due to these parts being fixed. In other words, the key slots of the tumblers are in the same relation to the shackle openings (21) therein as the corresponding slots and openings in the spacer and partition plates, so that when said slots and openings of the several parts are brought into respective register, the shackle will be released to open, but will otherwise be engaged to prevent extrusion or withdrawal. A key guard 33 is advantageously provided in the lowermost partition and reenforcing plate (14) to restrict the form of key which can be inserted into the passage formed through the lock mechanism.

A key 34 properly fitted to the lock is alone adapted to bring the aforesaid openings of the operative parts into register as stated. Fig. 3 illustrates the key about to be inserted into its passage, with the tumblers of the lock in position engaging the shackle arm and the latch member retaining the topmost tumbler in engaging position. Fig. 4 illustrates the key partly inserted into the passage, with the lower tumblers moved partly out of engagement with the shackle by pressure of the key edge against the ends of the slots therein, and the topmost tumbler still in retained engagement. Fig. 5 illustrates the key fully inserted into its passage, with the tumblers moved to release position and the latch member lifted by its end to release the topmost tumbler. It will be understood that any key which is not fitted to the lock will not move the tumblers to the positions illustrated in Fig. 5, although it may lift or release the latch member of the uppermost tumbler. The adaptability of the tumblers to engage the shackle notches at opposite sides causes them to engage one side or the other thereof unless their openings 21 are brought into absolute register with the corresponding openings of the spacer plates and of the intermediate partition member, so as to give the shackle free movement in the passage commonly formed thereby. It thus follows that any key that does not bring the openings so into register will not open the lock and only a key properly fitted thereto can perform this function.

The latch member retains the uppermost tumbler in engaging position until the key has been inserted nearly full-way into the passage and releases said tumbler only momentarily or an instant before the key has been inserted the full way. This affords an added security against opening of the lock, since the topmost tumbler will be retained in position while the others are being moved and provides for said others to assume relocking positions before the uppermost one is released. At the moment of release by the proper key however, the several tumblers, moved in succession thereby, are brought into true register to release the shackle and allow it to be expunged or withdrawn.

The advantages of this lock will be appreciated from the foregoing description. Apart from its simplicity of construction, at the same time providing a secure lock which cannot be easily picked or opened by a false key, it provides a very strong lock which cannot be easily broken. The tumblers, moving under individual tensioning and operable in succession by insertion of the key, positively lock the shackle in the closed or locked position both in the fully advanced and retracted positions and will not release the shackle until their openings are brought simultaneously into absolute true register. A feature also resides in the fact that the key is merely inserted and not turned in the lock, although this will not be apparent from the lock exterior. An advantage will also be found to reside in the means of applying yieldable tension to the tumblers as previously stated, the same greatly expediting the assembly of the mechanism without need of fastening any springs in place. The lock may be made of relatively thin material, except in the shackle, so as to make it as light as possible, without destroying or impairing its strength, due to the utilization and manner of securing the partition and reenforcing plates within the casing, adding to which the tumblers and spacers themselves will strengthen and rigidify the lock into a structure having the appearance and feel of great solidity. One of the chief advantages of the lock