Aug. 15, 1933. F. J. SULLIVAN 1,922,062

LOCK

Filed July 27, 1931

Fig. 1.

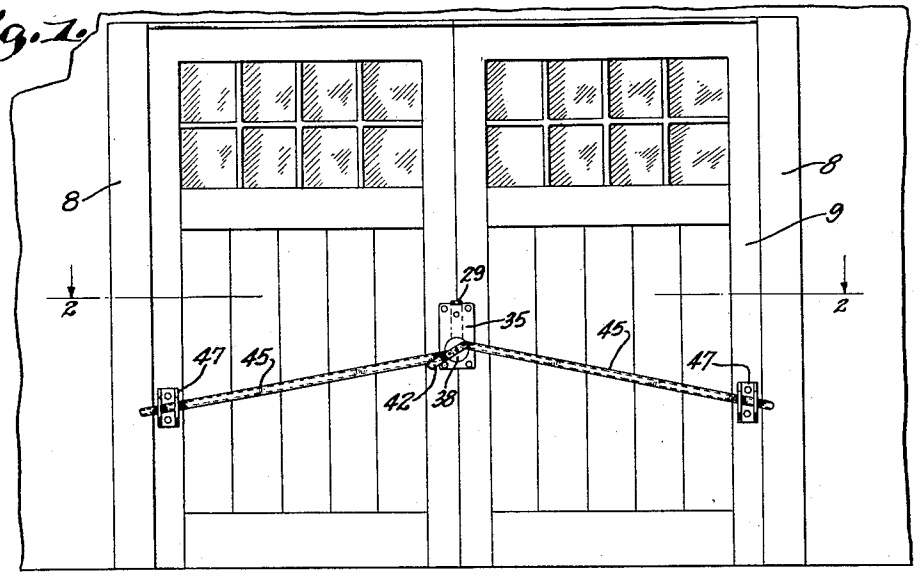


Fig. 2.

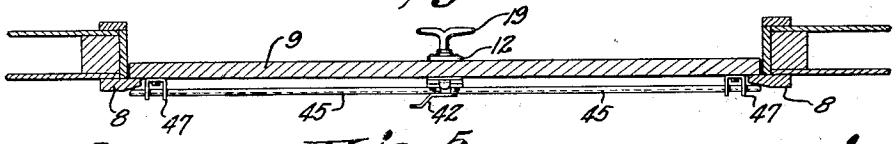


Fig. 3.

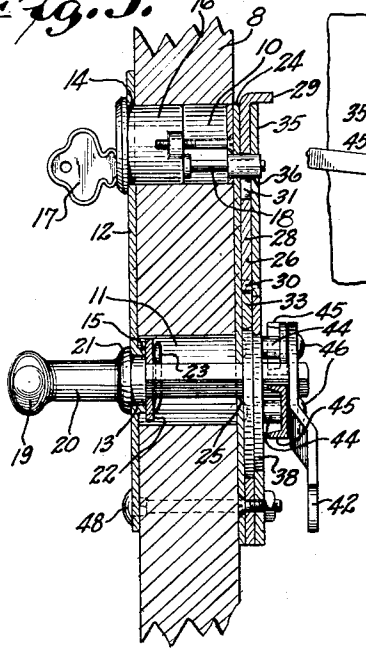


Fig. 5.

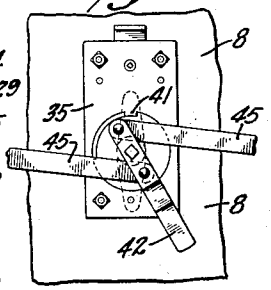
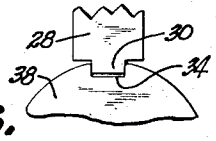


Fig. 4.

Fig. 6.



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Patented Aug. 15, 1933

1,922,062

UNITED STATES PATENT OFFICE

1,922,062

LOCK

Frank J. Sullivan, Oshkosh, Wis.

Application July 27, 1931. Serial No. 553,307

10 Claims. (Cl. 70—74)

This invention relates to improvements in locks.

It is a general object of this invention to provide a simple and improved form of lock which is particularly adapted for use in connection with garage doors, and which is constructed in a compact manner to limit the amount of projection of the lock mechanism from the inside of the door. This feature is particularly important where the lock is to be used on a door of the sliding, overhead type, as frequently the amount of clearance for the sliding movement of the door is very limited, and any substantial projection of the lock mechanism is likely to interfere.

A further object of this invention is to provide an improved lock in which a tumbler plate cooperable with a locking cam is utilized, and in which means is provided for accurately holding the parts in proper position to insure a positive locking engagement at all times and to minimize the possibility of the parts becoming loose and interfering with the proper functioning of the mechanism.

A more specific object of the invention is to provide a construction wherein the tumbler plate and locking cam are mounted and held against outward movement between two flat plates.

A further object of the invention is to provide an improved lock in which a stop disc is employed in connection with the locking cam, the said stop disc being rotatable in an opening of the outer plate, and the locking cam being of larger diameter and rotatable in an opening in an intermediate or spacing plate, the said larger diameter of the locking cam preventing outward movement thereof and insuring the maintenance of said cam in proper position.

A further object of the invention is to provide a lock in which the majority of the parts can be readily stamped out of flat metal to thus render the construction simple and inexpensive to manufacture.

With the above and other objects in view, the invention consists of the improved lock and all its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawing illustrating one complete embodiment of the preferred form of the invention in which the same reference numerals designate the same parts in all of the views:

Fig. 1 is an elevational view showing the inside of a garage door of the sliding, overhead type with the improved lock in connection therewith;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 4;

Fig. 4 is an enlarged view of the rear of the lock mechanism, parts being broken away, the dotted lines indicating different positions of the parts;

Fig. 5 is a similar view on a smaller scale showing the parts in a position when the door is unlocked; and

Fig. 6 is a fragmentary detail view showing the locking engagement between the tumbler plate and locking cam.

Referring more particularly to the drawing, the numeral 8 designates the frame for a garage door, and within said frame is mounted the door 9. The said door, which it is selected to illustrate, is of one-piece construction, but of the type simulating a pair of the usual swinging doors. A door of this type is adapted to be opened by pulling outwardly on the bottom thereof and by then pushing the door upwardly and angularly in the usual manner. In view of the fact that doors of this type are well known and do not form an essential feature of this invention, the specific construction for guiding the door in its movement will not be described.

The door is provided preferably at an intermediate portion thereof with two cylindrical openings 10 and 11 (see Fig. 3). An exterior plate 12, having openings 13 and 14 therein, is utilized on the outside of the door, the opening 14 being adapted to register with the cylindrical opening 10 of the door, and the opening 13 being formed with an inwardly extending circumferential flange 15 and being adapted to register with the cylindrical opening 11. Within the openings 10 and 14 a cylindrical lock 16 of standard construction is positioned, the said lock being operable by a key 17, and having a stem 18 projecting through the opening 10 to the inside of the door. A cam member 18' is rigidly carried on the end of said stem. A handle 19 is provided with a stem 20 having a peripheral flange 21 which engages the plate 12 adjacent the opening 13 thereof, the stem extending through said opening and through the other side of the door and being of squared form. Within the cylindrical opening 11 of the door is a washer 22 surrounding the stem of the handle and held in position by a cotter pin 23.

On the inside of the door is an inner plate 24 which is formed with an opening through which the stem 17 of the cylindrical lock 16 projects, the cam 18' being movable adjacent the outside of said plate. The plate 24 is also formed with another opening 25 through which the stem 20

of the handle 19 rotatably extends. Adjacent the exterior of the plate 24 is an intermediate or spacing plate 26, said plate having a vertical slot 27 extending downwardly from its upper edge for slidably receiving a tumbler plate 28. Said tumbler plate has its upper end formed with a flange 29 and has its lower end formed with a tongue 30. The tumbler plate is also formed with an intermediate opening 31 within which the cam 18' is movable to raise the tumbler. The spacing plate 26 is also formed with a circular opening 32 within which a locking cam 33 is mounted, said locking cam having an edge formed with a recess 34 of a shape to receive the tongue 30 of the tumbler plate. The said locking cam has a central square aperture through which the squared portion of the stem 20 of the handle 19 extends.

Positioned adjacent the exterior of the intermediate plate is an outer plate 35 having an opening 36 for receiving the outer end of the stem 18 of the cylindrical lock, and also having a circular opening 37 which is concentric with the opening 32 of the spacing plate but which is of less diameter. Within the circular opening 37 of the outer plate a stop disc 38 is rotatably mounted, said disc being secured to the locking cam and having a square central opening through which the stem 20 of the handle 19 extends. Said stop disc is provided with a peripheral recess forming stop shoulders 39 and 40 which are engageable with a projection 41 depending into the opening 37 of the outer plate.

An inner handle member 42 has a squared opening 43 through which the inner end of the stem 20 of the handle 19 extends. Pins 44 which have their inner ends in rigid connection with the stop disc have their outer ends extending loosely through apertures in channel shaped arms 45, and are riveted as at 46 to the inner handle member 42. The outer ends of the arms 45 extend slidably through brackets 47 on the sides of the door and are arranged to be moved outwardly through said brackets to the position shown in Fig. 1 so as to prevent outward movement and opening of the door. When the locking mechanism is manipulated to draw the arms inwardly so as to clear the frame 9 of the door, then of course the door can be opened in the usual manner. All of the plates are effectively held together by nuts and bolts 48 which extend through the plates and the door. In use, when the doors are locked, the arms 45 are engaging the frame of the door, and the tumbler plate 28 is in a lowered position with its tongue 30 engaging the recess 34 in the locking cam 33. With the tongue in this position, rotation of the locking cam and attached stop disc 38 is positively prevented and the arms 45 cannot therefore be moved. To unlock the door, the key 17 is turned and the cam 18 on the inner end of the stem 18 is rotated within the recess 31 of the tumbler plate 28 to cause raising of said plate to disengage the tongue 30 from the recess in the locking cam. The handle 19 on the exterior of the door can then be turned to cause rotation of the discs and movement of the arms to the position shown in Fig. 5 so that the outer ends thereof clear the door frame and permit raising of the door.

If it is desired to open the door from the inside when it is locked, this can be done by merely pushing up on the flange 29 on the upper end of the tumbler plate and manipulating the inner handle member 42.

From the above it is apparent that the construction is positive and fool proof. In view of the fact that the locking cam is of greater diameter than the recess in the outer plate 35, outward movement of said locking cam is prevented and it is effectively maintained at all times in proper position between the outer plate 35 and the inner plate 24. Likewise, the tumbler plate is retained in proper position at all times between the two plates, and thus proper engagement of the tongue on the tumbler plate with the recess in the locking cam is insured. Due to the use of the flat plates, a very compact construction has been provided and the amount of projection from the interior of the door is minimized so that proper clearance is insured during sliding and upward movement. It is further apparent that the majority of the parts, particularly the plates and discs, can be quickly stamped from metal, thus rendering the manufacture of the device simple and inexpensive.

Although the invention has been shown as being particularly adapted for use in connection with garage doors, it is apparent that the improved lock may be used in many other connections. It is further to be understood that all changes and modifications are contemplated as may come within the scope of the claims.

What I claim is:

1. In a lock, the combination of a relatively flat plate positionable adjacent a door and having a circular opening and having a second opening communicating with said circular opening, a handle having its inner end extended through said circular opening, a relatively flat locking disk rigidly connected with said handle and rotatable in the circular opening of the plate, a tumbler movable in said second opening of the plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, a second relatively flat plate positioned adjacent the exterior of said first plate for holding the locking disk and tumbler in position, said second plate also having an opening through which the inner end of the handle extends, and means operable upon manipulation of the handle for accomplishing the locking operation.

2. In a lock, the combination of a relatively flat plate positionable adjacent a door and having a circular opening and having a second opening communicating with said circular opening, a handle having its inner end extended through said circular opening, a relatively flat locking disk having a peripheral recess rigidly connected with said handle and rotatable in the circular opening of the plate, a tumbler movable in said second opening of the plate into engagement with the peripheral recess of the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, a second relatively flat plate positioned adjacent the exterior of said first plate for holding the locking disk and tumbler in position, said second plate also having an opening through which the inner end of the handle extends, and means operable upon manipulation of the handle for accomplishing the locking operation.

3. In a lock, the combination of a relatively flat plate positionable adjacent a door and having a circular opening and having a second opening communicating with said circular opening, a handle having its inner end extended through said circular opening, a relatively flat locking disk rigidly connected with said handle and ro-

tatable in the circular opening of the plate, a tumbler movable in said second opening of the plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, a second relatively flat plate positioned adjacent the exterior of said first plate for holding the locking disk and tumbler in position, said second plate also having an opening through which the inner end of the handle extends, a second disk rotatable with the handle in the opening in said second plate, means on said second disk for limiting movement of the disk, and means operable upon manipulation of the handle for accomplishing the locking operation.

4. In a lock, the combination of a relatively flat plate positionable adjacent a surface of a door and having an opening therein, an intermediate spacing plate positioned adjacent said first plate and having a circular opening and also a second opening communicating with said circular opening, a handle having its inner end extending through the opening of the first plate and through the opening of the spacing plate, a relatively flat locking disk rigidly connected with said handle and rotatable in the circular opening of the spacing plate, a tumbler movable in said second opening of the spacing plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, an outer plate positioned adjacent the exterior of said spacing plate for holding the locking disk and tumbler in position, said outer plate also having an opening through which the inner end of the handle extends, and means operable upon manipulation of the handle for accomplishing the locking operation.

5. In a lock, the combination of a relatively flat plate positionable adjacent a surface of a door and having an opening therein, an intermediate spacing plate positioned adjacent said first plate and having a circular opening and also a second opening communicating with said circular opening, a handle having its inner end extending through the opening of the first plate and through the opening of the spacing plate, a relatively flat locking disk having a peripheral recess rigidly connected with said handle and rotatable in the circular opening of the spacing plate, a tumbler movable in said second opening of the spacing plate into engagement with the peripheral recess of the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, an outer plate positioned adjacent the exterior of said spacing plate for holding the locking disk and tumbler in position, said outer plate also having an opening through which the inner end of the handle extends, and means operable upon manipulation of the handle for accomplishing the locking operation.

6. In a lock, the combination of a relatively flat plate positionable adjacent a surface of a door and having an opening therein, an intermediate spacing plate positioned adjacent said first plate and having a circular opening and also a second opening communicating with said circular opening, a handle having its inner end extending through the opening of the first plate and through the opening of the spacing plate, a relatively flat locking disk rigidly connected with said handle and rotatable in the circular opening of the spacing plate, a tumbler movable in said second opening of the spacing plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, an outer plate positioned adjacent the exterior of said spacing plate for holding the locking disk and tumbler in position, said outer plate also having an opening through which the inner end of the handle extends, a second disk rotatable with the handle in the opening of the outer plate, means on said second disk for limiting movement of the disk, and means operable upon manipulation of the handle for accomplishing the locking operation.

7. A lock for use on a door having a pair of openings extending therethrough, comprising a plate positionable adjacent the exterior of the door and having openings registrable with the openings of the door, a relatively flat plate positionable adjacent the interior of the door and having an opening therein, an intermediate spacing plate positionable adjacent said interior plate and having a circular opening and also having a second opening communicating with said circular opening, a handle having its inner end extendible through the opening of the exterior plate and through the openings of the door and interior plates, a relatively flat locking disk rigidly connectible with said handle and rotatable in the circular opening of the spacing plate, a tumbler movable in said second opening of the spacing plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, an outer relatively flat plate positionable adjacent the exterior of said spacing plate for holding the locking disk and tumbler in position, said outer plate also having an opening through which the inner end of the handle is adapted to extend, means extendible through the exterior plate, door and interior plates for holding the parts in position, and means operable upon manipulation of the handle for accomplishing the locking operation.

8. In a lock, the combination of a relatively flat plate positionable adjacent a door and having a circular opening and having a second opening communicating with said circular opening, a handle having its inner end extended through said circular opening, a relatively flat locking disk rigidly connected with said handle and rotatable in the circular opening of the plate, a tumbler movable in said second opening of the plate into engagement with the locking disk to prevent manipulation of the handle, key operated means for moving said tumbler, a second relatively flat plate positioned adjacent the exterior of said first plate for holding the locking disk and tumbler in position, said second plate also having a circular opening of less diameter than the circular opening of the first plate through which the inner end of the handle extends, a second disk rotatable with the handle in the circular opening of the second plate, means on said second disk cooperable with said second plate for limiting movement of the disks, and means operable upon manipulation of the handle for accomplishing the locking operation.

9. In a lock, the combination of a flat plate positionable adjacent a door and having a circular opening and having a second opening communicating with said circular opening, a handle having its inner end extended through said circular opening, a flat locking disc of substantially the same thickness as the plate rigidly connected with said handle and rotatable in the circular opening of the plate, a tumbler of substantially the same thickness as the plate movable in said second opening of the plate into engagement with the

locking disc to prevent manipulation of the handle, key operated means for moving said tumbler, and means operable upon manipulation of the handle for accomplishing the locking operation, the plate locking disc, and tumbler being positioned and movable in the same plane.

10. In a lock, the combination of a handle, a locking disc in connection with said handle and rotatable thereby, a tumbler movable in substantially the same plane as said locking disc and engageable therewith to prevent manipulation of the handle, key-operated means for moving said tumbler, a plate positioned against the exterior of the disc for holding the disc and tumbler in position, said plate having an opening through which the inner end of the handle extends, a second disc rotatable with the handle in the opening of said plate, means on said second disc engageable with the plate for limiting movement of the disc to form a stop for turning of the handle, and means operable upon manipulation of the handle for accomplishing the locking operation.

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