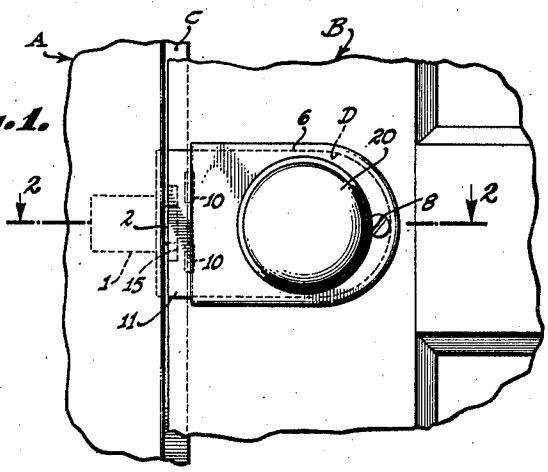
Dec. 15, 1942. A. F. MANTZ 2,304,941

DOOR LOCK

Filed Feb. 15, 1941

Fig. 1.



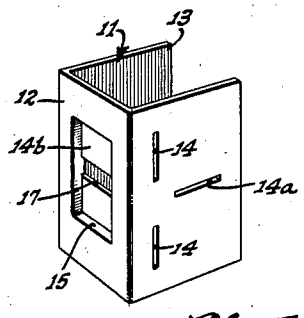


Fig. 7.

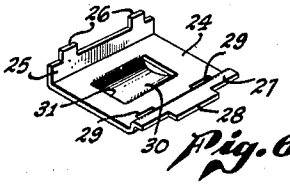


Fig. 6.

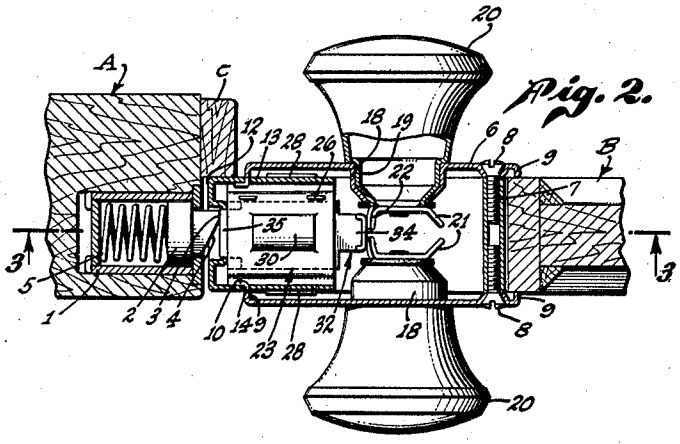


Fig. 2.

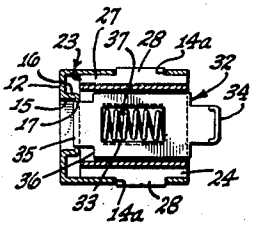


Fig. 5.

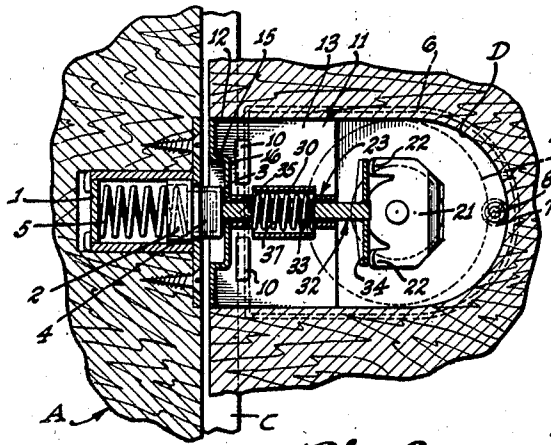


Fig. 3.

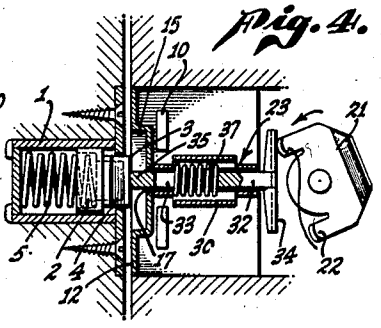


Fig. 4.

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2,304,941

UNITED STATES PATENT OFFICE

2,304,941

DOOR LOCK

Aloysius F. Mantz, deceased, late of Beverly Hills, Calif., by Bertha Mantz, executrix, Beverly Hills, Calif.

Application February 15, 1941, Serial No. 379,059

6 Claims. (Cl. 292—254)

This application is a continuation in part of the copending application for Door lock, Serial No. 232,724, filed October 1, 1938, matured into Patent No. 2,238,066, dated April 15, 1941.

This invention relates to door locks and is particularly directed to a lock of novel character which constitutes a departure from the conventional type inasmuch as the latch bolt is carried by the jamb while the keeper and lock mechanism are carried by the door. By such arrangement the visible cavity in the door jamb is eliminated and the fewest possible projections are exposed to view, or protrude.

An important object of the invention is the provision of a device of the character described which on account of the above mentioned features, may be applied to a door of any size, thickness or the like with ease and simplicity. No particular skill is required for installing, as the preliminary work to be done on the door and its jamb is very simple.

Another important object of the invention is the provision of a device of the character described which possesses the advantage of being very difficult to open or pick from the outside, and the lock consequently operates as a protection against unauthorized entry in addition to its other advantageous features. In such respect, it is practically impossible to insert a thin tool or strip of material against the bevelled face of the latch to retract the same and thereby force the lock. While this invention is not directed to a form of a key or other like mechanism for controlling the lock, it is understood that any suitable design of key mechanism may be used in conjunction with the lock which constitutes the subject matter of this invention. One example of such a key mechanism is shown and described in the said copending application.

A further more specific object of the invention is the provision of a device of the character described which is designed to permit of its adaptation to either a right or left hand door without structural modifications or additional preparations for the door and its jamb.

A still further object of the invention is the provision of a lock of the character described which will be simple to manufacture, inexpensive, easy to install, positive in action, efficient and durable in service and a general improvement in the art.

The lock possesses a minimum number of parts, and several of those parts are duplicates or twins and are therefore interchangeable. That factor makes the lock very inexpensive to manufacture initially and likewise makes the provision of duplicate or spare or replacement parts extremely simple and economical.

The lock is so simple of construction and positive in operation and possesses so few working parts that it may be termed "foolproof."

The two escutcheon plates which hold the knobs or handles on one side and the cam member for depressing the spring-retracted latch engaging plunger as hereinafter described, on the other side, and which are exact duplicates and may be used interchangeably, are very easily secured to or detached from the U shaped central plate which covers the edge of the door and which holds the housing for the spring retracted plunger.

After the door is prepared by making a U shaped opening or notch in the edge thereof to receive the said lock mechanism, the size and shape of said notch being easily predetermined (a pattern of the portion to be cut out of the door can be provided by the factory or retail seller), the application of the entire lock mechanism to the door and over the notch is extremely simple and necessitates the setting of but a single screw. A duplicate screw is provided in the opposite side of the lock housing so that the setting may be performed from either side of the door, as desired.

Devices embodying this invention possess a high factor of safety against pressure operating strains and displacement. It will be found that in use such devices operate in a positive manner and withstand wear exceptionally well. There is no part nor feature of the device which is structurally weak or susceptible of fast wear or which requires frequent replacement. Should it become necessary to replace any parts because of damage thereto from some unexpected and abnormal cause, the replacement of the parts is relatively simple and the operation could be performed by any one without the employment of any especial skill.

Another important object of this invention is the provision of a lock of the character described which will function to release the cooperating latch on the jamb by a very slight rotational movement of either knob in either direction.

Other objects and advantages will become apparent from a further description of this invention and reference to the accompanying drawing.

In the drawing:

Figure 1 is a side elevational view of a device

embodying this invention mounted in a door and the corresponding latch mounted in the jamb.

Figure 2 is a horizontal cross-sectional view of the same device and latch, taken on the line 2—2 of Figure 1.

Figure 3 is a vertical cross-sectional view of the same device and latch, taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary vertical cross-sectional view of parts of the same device in different operative positions.

Figure 5 is a fragmentary horizontal cross-sectional view of parts of the same device.

Figure 6 is a perspective view of one of the parts of the same device.

Figure 7 is a perspective view of a part of the housing of the same device.

Referring more particularly to the drawing, the letter A indicates a door jamb and B a swingable or hinged door cooperating therewith.

The door jamb A is provided with a shoulder C against which the free edge of the door engages when the door is closed. Ordinarily lock keepers are carried by the jamb and the latch or locking bolts by the door, but in carrying out my invention I utilize a reverse order.

A housing 1 is disposed in the jamb A between the shoulder C and the face of the jamb. A latch or locking bolt 2 is arranged within the housing 1 and is formed with a flat end 3 and a bevelled face 4.

To the rear of the latch 2 is an expansion coil spring 5 which will normally function to force the latch to its forward limit of movement within the housing 1 so as to expose the flat end and bevelled surface of the latch beyond the face of the jamb.

The lock keeper and mechanism comprise two escutcheon plates 6 that are duplicates of each other. When the lock device is applied to the door B these escutcheon plates will be disposed over and so as to enclose a horizontally disposed U-shaped opening or notch D that is formed in the edge of the door and which is designed to accommodate the operating parts of the lock device that are positioned between the said plates 6.

The escutcheon plates 6 are secured to the door in position over the opening D by means of the connecting collar 7 which is threaded at each end to receive twin screws 8. The clamping action or tension of the plates against the opposite faces of the door can be adjusted as desired by means of either one or both of the screws in question, the tightening of which will cause a corresponding tightening of the plates against the door.

The said escutcheon plates 6 are formed with their edges turned inwardly so as to form flanges 9. The edges of flanges 9 bear against the opposite faces of the door marginally of the opening or notch D.

A plurality of ears or lips 10 extend from flanges 9 on the front edges of the escutcheon plates.

A detachable U-shaped plate 11 connects the forward ends of the two escutcheon plates together. The said plate consists of the front portion 12, the two sides 13 which are slightly narrower than the escutcheon plates 6 and are disposed between the said plates and are detachably secured thereto by means of slots 14 in the sides 13 which are adapted to receive the ears or lips 10 on the escutcheon plates. The lips are curved so that when they extend through the slots 14 they engage the inner faces of the sides 13.

When the lock device is applied to the door B it will be seen that the U-shaped plate 11 is designed to fit over the outer edge of the door and to cover the mouth of the U-shaped notch D in the door.

The sides 13 of the U-shaped plate 11 are formed with a horizontal slot 14*a* in each thereof positioned midway between the ends.

A rectangular shaped portion of the front 12 of plate 11 is struck inwardly at 14*b* to form a recess or cavity 15 in the outer surface thereof and a corresponding raised portion 16 on the inner surface. A horizontal slot 17 is formed therein midway between the two ends of the said inwardly struck portion 14*b*.

When the lock device is mounted in the door B and the latch bolt is mounted in the jamb A in the position shown, the closing of the door will cause the forward face 12 of the U-shaped plate 11 to strike against the bevelled face 4 of the latch bolt 2 thereby depressing said latch into the housing 1 against the yielding resistance offered by the spring 5 so that when the door is fully closed and recess 15 aligns with the latch 2 the latter will be forced outwardly by the said spring 5 so that the forward end 3 of the latch bolt extends into the recess 15. The straight or flat side of the latch abuts against and engages one of the vertical sides of the recess 15 and thereby securely holds the door in closed position. In order to open the door it is necessary to depress the latch 2 against the yielding resistance offered by the spring 5, sufficiently to allow the face 12 of plate 11 to pass by the forward or flat end 3 of the said latch bolt. Means for performing this function are incorporated in the lock device and will be subsequently described.

Struck inwardly from the intermediate portion of the escutcheon plates 6 are the bell-shaped portions 18 which are designed to provide bearings for the spindle 19. Secured to the outer ends of the said spindles 19 and bearing against the outside faces of the two escutcheon plates 6 are knobs 20. Rotation of the knobs will cause the spindles 19 to rotate correspondingly. Any conventional form of spindle and connecting knobs or other handles may be utilized and would be considered equivalents of the specific structures herein disclosed and described. Secured to the inner end of each spindle 19 is a cam member 21. Any permanent and rigid method of attachment between the cam and the spindle may be employed, such for example as by welding. Two downwardly projecting curved lugs 22 on the cam member 21 provide a smooth cam action as hereinafter described.

Detachably secured to the inner faces of the side 13 of the U-shaped plate 11 and connecting the two together is a plunger housing 23. This housing consists of two interlocking duplicate plates 24. One side edge of each plate 24 is formed with an inwardly projecting flange 25. On the edge of the flange and near each end thereof is a projecting ear 26. The opposite side edge of the plate 24 is bent inwardly and outwardly as shown at 27. Midway between the ends of the bent portions 27 and extending outwardly from the edge thereof is a relatively wide ear 28. Disposed near each end of the plates 24 and adjacent the bent portions 27 thereof, are two rectangular shaped openings or slots 29.

Struck outwardly from the mid portion of each plate 24 is a barrel shaped member 30 with shoulders 31 at each end thereof and against which the ends of a spring abut, as hereinafter more clearly explained.

The two plates 24, being duplicates of each other are designed to lock together when the ears 26 on each plate are inserted through the corresponding slots 29 formed in the other plate. The ears may be slightly bent or twisted so as fixedly to engage in the slots.

The housing 23 consisting of the two plates 24, is held rigidly in position between the two sides 13 of the U-shaped plate 11 by inserting the wide ears 28 through the corresponding slots 14a in the sides 13 of plate 11. These ears 28 may thereafter be bent or turned in order to firmly hold the housing 23 in position between the two sides 13. (To detach the same the ears 28 may be restored to their original shape by means of pincers or pliers and by spreading the sides 13 outwardly the said ears 27 may be detached from their corresponding slots 14a.)

Arranged for horizontal sliding movement within the housing 23 is a T-shaped block or latch engaging plunger 32. The inner walls of the plates 24 which form the housing 23, when interlocked, form bearing surfaces for the said T-shaped plunger 32 and act as a guide for it during its horizontal sliding movements.

The plunger 32 is formed with a rectangular cut-out portion 33, and otherwise comprises the T cross or transverse platform 34 on one end, and the opposite end portion 35 which is of reduced width as shown. The end portion 35 also provides shoulders 36.

A coil spring 37 is pressurally retained between the ends of the rectangular cut-out portion 33 in the plunger 32, and when the plunger is assembled within the housing 23 by interlocking the plates 24, the spring will be accommodated between the two barrel shaped sections or lateral pockets 30 forming a cylindrical spring chamber. The spring 37 will normally maintain the plunger in such a position that the end portion 35 thereof is substantially flush with or slightly forward of the face or surface of the recess 15 formed in the U-shaped plate 11. In such position the T-shaped platform 34 will be raised above the inner edges of the housing 23.

When the plunger 32 is in normal position by reason of the action of the coil spring 37, the T-shaped platform 34 will bear against both the lugs 22 on the cam member 21. When the knob 20 is rotated and rotational movement is thus imparted to the spindle 19 and to the cam member 21, the rotation of the said cam member will cause one of the lugs 22 to pressurally engage the upper surface of the T platform 34 and thereby depress or push forward the entire plunger 32. The extent of movement of the plunger may be limited either by the lower edges of the T platform 34 contacting the inner edges of the housing 23 or by reason of the shoulders 36 on the plunger 32 striking against the raised portion 16 of the U-shaped plate 11, depending on the desired adjustment of the device. In either event a positive stop is provided to limit the forward movement of the plunger. When so extended to the full limit, the end portion 35 of the plunger 32 will extend through the slot 17 in the recess 15 of the U-shaped plate 11, so that the extreme end thereof is substantially flush with the outer face 12 of the said plate 11.

When the lock device is mounted in a door and the latch device in the jamb, the position of the two mechanisms will be such that when the said plunger 32 is forced outwardly or extended by reason of the cam action of the cam member 21, the said end portion 35 will engage and bear against the flat end 3 of the latch bolt 2 and push the said latch bolt into the housing 1 against the yielding resistance offered by the spring 5 and thereby permit the door to be opened. As the end portion 35 extends entirely across the recess 15 the engagement of the plunger and latch bolt provides adequate depression of the latch bolt during the whole operating period of freeing the door for opening. Obviously, when the end portion 35 of the plunger 32 no longer engages the flat end 3 of the latch bolt 2 the said latch bolt by reason of the action of spring 5 will resume its normal forward position so that when the door is closed the bevelled face 4 of the said latch bolt will slide over the outer face 12 of the U shaped plate 11 and fall into the recess 15 and thereby maintain the door in a closed position until one of the knobs is again rotated.

A very slight rotation of either knob 20 in either direction will be sufficient to cause the cam action between the cam member 21 and the top surface of the T platform 34 so as to cause the operation of the device as previously described.

As previously explained, a knob or other handle and spindle of any conventional design, could be used in the place of the one shown and would likewise be considered an equivalent structure.

To assemble the lock device and its component parts the spring 37 is placed within the rectangular cut-out portion 33 in the block 32 and the block 32 is then placed against the inner surface of one of the plates 24 so as to locate the spring 37 within the barrel shaped section 30 of the one plate 24. The other plate 24 can then be interlocked with the first plate by means of the ear and slot arrangement.

The housing 23 holding the block 32 and the spring 37 are then connected by means of the ear and slot arrangement with the U-shaped plate 11, after which the sides 13 of the said plate can be pressed together so as to form a right angle between the sides and the flat forward portion 12 of the said plate 11.

If it is desired to place the lock device on a door which has been previously prepared with the U-shaped notch D, the plate 11 holding the housing 23 and its component parts, should then be placed over the edge of the door so that the operating parts of the lock mechanism extend back into the notch D. Thereafter the escutcheon plates holding the knob, spindles and cam members 21 can be interlocked with the said plate 11 by placing the ears 10 formed on the edges of the escutcheon plates, into the slots 14 formed in the sides 13 of the plate 11. Thereafter the escutcheon plates are secured together by means of the connecting collar 7 and the screws 8. If preferred, the escutcheon plates can be first connected to the U-shaped member and thereafter the entire device applied to the door and connected together as previously described.

The operation of this device although previously described, may be further set forth as follows: Assuming that the device has been installed on a door and the latch bolt on the corresponding jamb, the door may be closed in the following manner: When the door is closed sufficiently to bring it relatively near the shoulder C on the jamb A the outer face of the flat forward portion 12 of the U-shaped plate 11 will strike against the bevelled face 4 of the latch bolt 2 and thereby move the said latch into the housing 1 against the yielding resistance of-

fered by the spring 5 so that when the door is fully closed and the recess 15 in the U-shaped plate 11 aligns with the latch 2, the latter will be forced outwardly by the action of the spring 5 and into the said recess or chamber 15, thus securely holding the door in closed position.

If a person on either side of the door desires to lock it against being opened from the opposite side or from either side, any suitable form of lock, which may be combined with this invention, may be utilized. A form of latch lever preventing rotation of the knob such as described in the copending application for Door lock, Serial No. 232,724, filed October 1, 1939, matured into Patent No. 2,238,066, dated April 15, 1941, may be utilized if desired.

When it is desired to open the door from either side, and assuming that any key lock used in conjunction therewith has been unlocked or released, the knob in question may be partially rotated in either direction. A very slight rotation is all that will be required and in that respect this invention is a decided improvement over the usual form of door lock which requires as a minimum a quarter turn of the knob. As a result of this movement, the action of the cam 21 against the upper surface of the T platform 34 of the plunger 32 will force the plunger 32 outward against the resistance offered by the coil spring 37. Thereby the end portion 35 of the plunger will engage and press against the flat end 3 of the latch bolt 2 and cause the latch bolt to retract within the housing 1 against the yielding resistance of spring 5. The end 3 of the latch bolt 2 is then retracted so that there is sufficient clearance between the end 3 and the outer face 12 of the U-shaped plate 11 to permit the door to be opened. When the engagement between the plunger 32 and the latch bolt 2 is discontinued the latch bolt will be forced forward by the spring 5 into its normal extended position so as to engage and hold the door when it is again closed.

The previous description makes it apparent that a door lock embodying this invention is extremely simple in construction, inexpensive of manufacture, and highly effective in performing the functions for which it is intended.

The lock comprises a minimum of parts which will withstand the usual strain and wear incident to such devices in a highly effective way and the lock may be installed without mortising or disassembling the device and may be reversed by merely turning the lock end for end or upside down. It should be borne in mind that the mounting of the latch in the door jamb instead of in the lock housing and the mounting of the keeper and mechanism in the door, the reverse in both instances of the usual arrangement, makes a very efficient lock, minimizes the possibility of the lock being picked and the possibility of catching and tearing clothing on a moving projecting latch member.

Having disclosed the several parts and features of the invention in certain preferred embodiments, it is to be understood that the improvements are susceptible of variations and changes without departing from the essential ideas and spirit of this invention or the scope of these appended claims.

What is claimed is:

1. A door lock mechanism adapted to be mounted in a door to release a spring advanced latch bolt mounted in a jamb so as to permit opening of the door, said mechanism comprising a housing including a pair of side plates detachably secured to an end plate, the latter having a recess formed in the face thereof and adapted to act as a keeper for the said latch bolt, an inwardly struck bearing flange on each side plate, a rigidly connected knob and cam member supported by each flange, a second housing mounted within the first housing, and a spring-retracted plunger mounted within the second housing and adapted to be actuated by the cam to engage and forcibly depress the said latch bolt against the yielding resistance of the spring cooperating therewith.

2. A door lock mechanism adapted to be mounted in a door to release a spring advanced latch bolt mounted in a jamb so as to permit opening of the door, said mechanism comprising a housing, a rigidly connected knob outside of and cam member inside of and supported by the housing, a second housing mounted within the first housing, including a pair of plates detachably secured together; each of said plates having an outwardly struck boss thereon, the two bosses forming a chamber to accommodate a coil spring, a plunger slidably mounted within the second housing and adapted to be actuated by the cam, and a spiral spring mounted on the plunger within said chamber, the said plunger and spring cooperating to normally restrain the plunger against movement but to yield under action of the cam against the plunger.

3. A door lock mechanism adapted to be mounted in a door to release a spring advanced latch bolt mounted in a jamb so as to permit opening of the door, said mechanism comprising a housing including twin side plates and a detachable center plate having a keeper recess and a slot formed in the recess, an inwardly struck boss on each side plate, a rigidly connected knob and cam member mounted for rotational movement in each boss, a second housing within the first housing, a T-shaped plunger slidably mounted within the second housing and having a cut out central portion with a compression spring mounted therein, said spring acting to normally restrain the said plunger against movement and upon operation of the knob and cooperating cam member to permit forward movement of the plunger so that the outer end thereof will pass through the slot in the center plate and depress the latch bolt to release it from its engagement with the keeper slot in said plate and thereby permit the opening of the door.

4. A door lock mechanism adapted to be mounted in a door to release a spring advanced latch bolt mounted in a jamb so as to permit opening of the door, said mechanism comprising a U-shaped housing formed with a keeper recess and slot in its closed end, a bearing flange formed on each opposite wall of the housing, a separate rotatable spindle extending through and supported by each said flange, a knob or handle rigidly mounted on one end of the spindle and adjacent the outer face of the housing, and a cam member rigidly mounted on the other end of the spindle within the said wall, said cam comprising a pair of downwardly extending lugs, a second housing, a slidable plunger supported within the second housing, a compression spring cooperating with the plunger to normally maintain the latter so that its inner end rests adjacent the pair of cam lugs and its outer end extends through the slot in the housing, said plunger being adapted upon rotation of the knob and cam member and corresponding pressure exerted against the end thereof by one of the lugs on the

cam to move forward and engage and depress the latch bolt to release it from its keeper recess.

5. A lock comprising a housing including a pair of side plates and a detachable connecting U-shaped plate having a slot formed in the end thereof, a rigidly connected rotatable knob and cam member supported by each side plate, a guide mounted within the housing, a slidable plunger supported within the guide, a spring mounted in the plunger and adapted to normally maintain one end thereof abutting the said cam member and the opposite end through the slot in the plate, the said plunger being adapted for limited forward movement upon pressure exerted by the said cam member actuated by rotational movement of the knob, and thereby to advance the opposite end of the plunger further through the slot in the said U-shaped plate.

6. A device of the character described comprising a plunger housing embodying parallel plates having flat portions provided with lateral pockets to form a cylindrical spring chamber, a flat plunger slidably mounted in the housing, the plunger having a spring recess adapted to normally lie within the spring chamber, a spring within the chamber and plunger recess normally centering the plunger within the housing, means to advance the plunger against the action of the spring, the plunger housing being supported within an outer housing, said outer housing embodying a frontal plate formed with a keeper recess and a slot in said recess, the slot being aligned with the plunger for advancement of the plunger through the slot.

BERTHA MANTZ,
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