

(No Model.)

3 Sheets—Sheet 1.

C. E. CANDEE.  
LOCK.

No. 478,784.

Patented July 12, 1892.

Fig. 4.

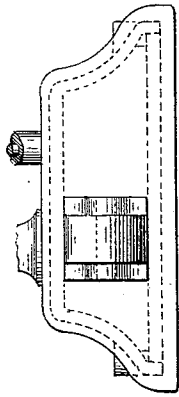


Fig. 1.

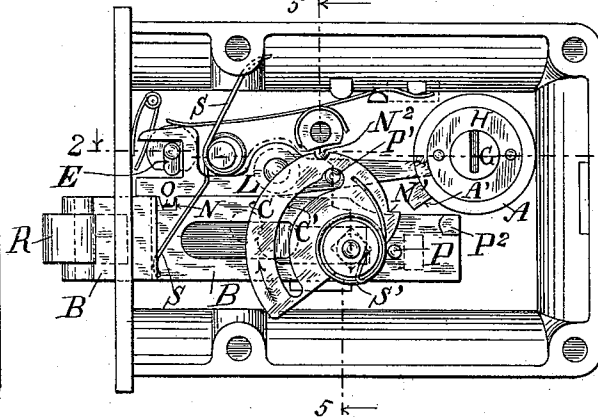


Fig. 5.

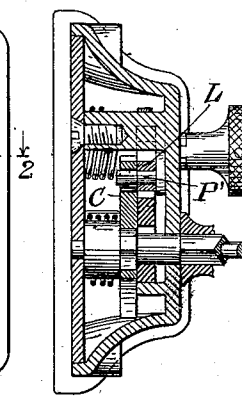


Fig. 2.

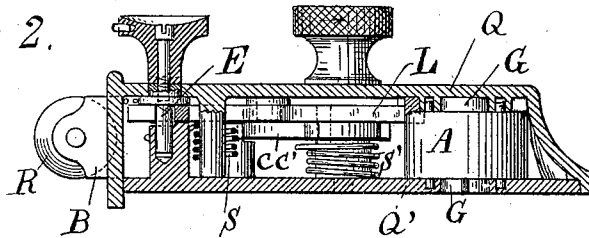
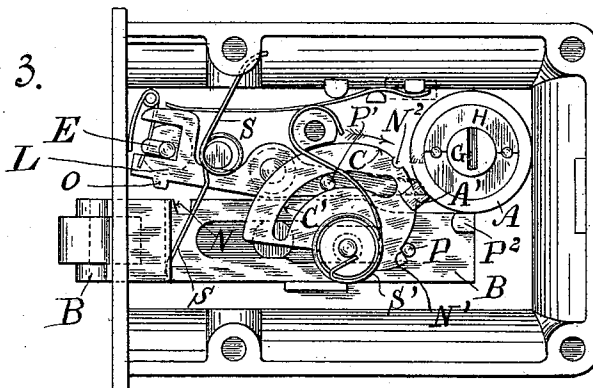


Fig. 3.



Charles Edwin Candee  
Inventor

Witnesses  
Chas Hanemann  
Edward A. Berrall

(No Model.)

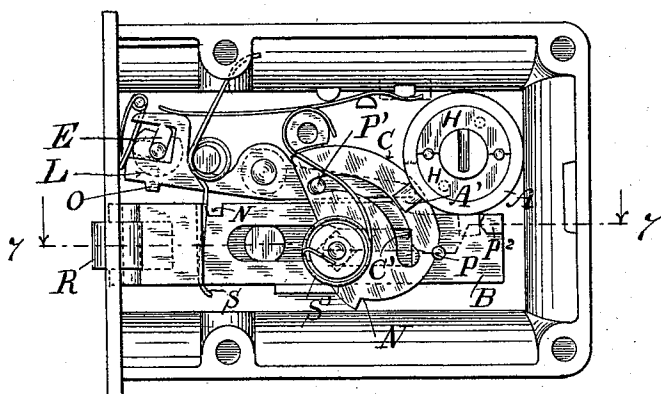
3 Sheets—Sheet 2.

C. E. CANDEE.  
LOCK

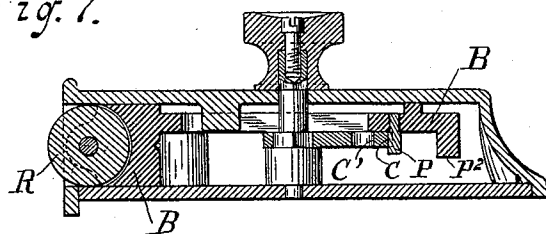
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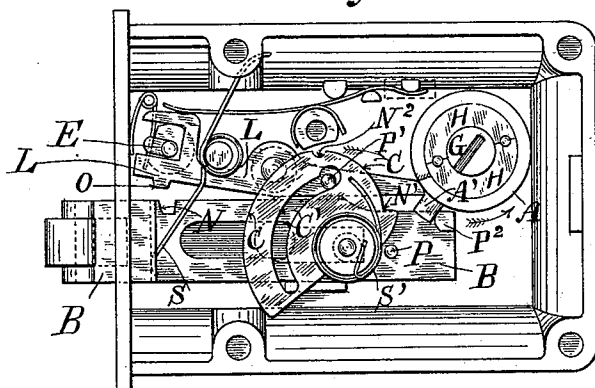
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



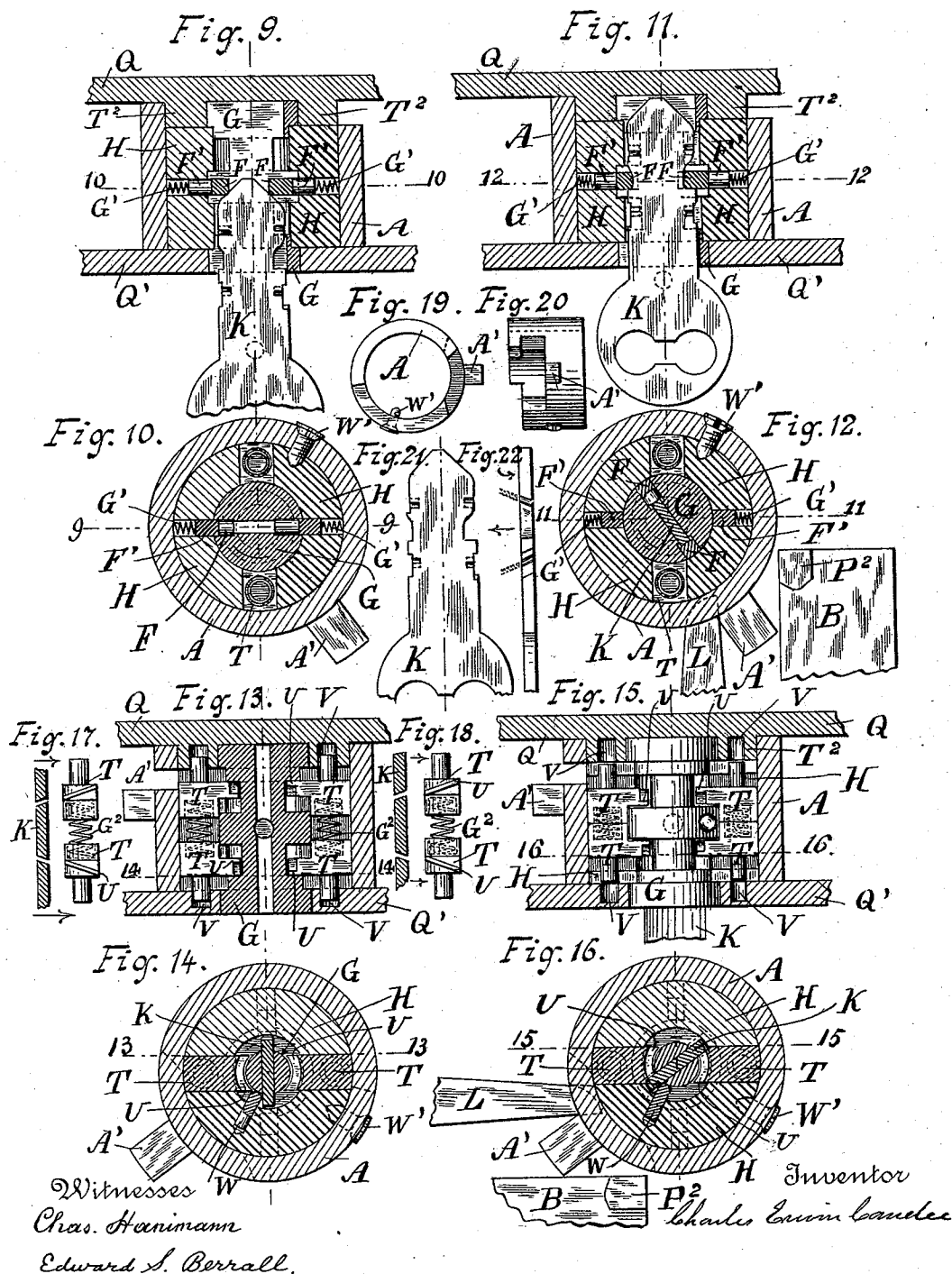
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Inventor

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# UNITED STATES PATENT OFFICE.

CHARLES ERWIN CANDEE, OF NEW YORK, N. Y.

## LOCK.

SPECIFICATION forming part of Letters Patent No. 478,784, dated July 12, 1892.

Application filed July 13, 1891. Serial No. 399,394. (No model.)

### *To all whom it may concern:*

Be it known that I, CHARLES ERWIN CANDEE, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Locks, (for which I have obtained no foreign Letters Patent whatever,) of which the following is a specification.

My invention relates to a lock in which the catch-bolt is also a lock-bolt and in which, preferably, anti-friction devices relieve the bolt in its operative movements in catching and uncatching with the jamb-escutcheon, and also under some conditions in locking, and also in which a pin-tumbler, but of a new form or variety, is used to unlock and retreat the bolt.

The objects of this improvement are, first, to provide means for unlocking and retreating the bolt by turning a knob or thumb-piece on the inside of the door and for holding it in either of two positions from which it may be tripped and relocked, and, second, to provide a pin-tumbler device for unlocking and retreating the bolt from the outside of the door by means of a key operating one or more pin-tumbler bolts. I attain these objects by the mechanism illustrated in the accompanying three sheets of drawings, in which—

Figure 1 represents the lock with the lock-plate removed, the bolt advanced to its most forward position and positively locked. Fig. 2 represents a horizontal section of the same, cut on the line 22, Fig. 1. Fig. 3 represents the lock with the bolt unlocked by means of the thumb-piece on the inside of the lock and retreated to and held in its intermediate position, ready for tripping. Fig. 4 is a front end view of the lock. Fig. 5 is a vertical sectional view cut on line 55, Fig. 1. Fig. 6 is a view of the lock with the bolt unlocked and retreated by means of the thumb-piece on the inside of the lock and detained in its extreme position, ready for tripping by a touch on the front end of the bolt. Fig. 7 is a horizontal sectional view cut on the line 77, Fig. 6. Fig. 8 is a view of the lock with the lock-plate removed, the bolt unlocked by the double-twin pin-tumbler and on the point of being retreated by the continued action thereof. Fig. 9 is a horizontal sectional view cut on

the line 99, Fig. 10, together with a part plan view of the key partially inserted in the pin-tumbler attachment. Fig. 10 is a vertical sectional view cut on the line 1010, Fig. 9. Fig. 11 is a sectional view of the pin-tumbler attachment, similar to Fig. 9, but with the key completely inserted and showing the parts thereby adjusted for turning the revolving key-seat cylinder. Fig. 12 is a vertical section cut on lines 1212, Fig. 11. Fig. 13 is a horizontal section cut on the line 1313, Fig. 14. Fig. 14 is a vertical section cut on the line 1414, Fig. 13. Fig. 15 is a horizontal section cut on the line 1515, Fig. 16. Fig. 16 is a vertical section cut on the line 1616, Fig. 15. Figs. 17 and 18 show the opposite sides of the key with diagonal grooves, and in each figure the corresponding adjacent side of the twin pin-tumbler provided with an inclined tongue corresponding to each inclined groove in the edge of the key. Fig. 19 is a bottom view of the tumbler-cylinder or external case in reduced size. Fig. 20 is a side view of the same. Fig. 21 is a plan view of the key, and Fig. 22 is a side view, both showing the wards of the key, the former on both sides.

Similar letters represent similar parts throughout the device.

B is the bolt.

L is the locking-lever, pivoted between the two end bearings.

E is the positive locking, positive unlocking, and freeing cam for the lever L.

C C' is a double cam with an outer cam-surface C and an inner cam-surface C', the former for action on and with a pin P, located on the bolt B, and the other having the same relation to a pin P', located on the lever L. These pins and cam-surfaces are so related that in starting from the position shown in Fig. 1, when the cam E is turned, as shown in Fig. 3, so as to release the positive lock from the lever L, the first action of the cam C' through the pin P' will be to depress the rear end of the lever L and disengage the shoulder O near its forward end from the notch N in the bolt B, thereby unlocking the bolt B before contact is made between the lower part of the cam C and the pin P. On continuing the motion of the cam backwardly, however, the cam C makes contact with the pin P, and retreating the bolt B sufficiently

far the pin P will drop into the notch N' when the thumb-piece is released, and thereby detain the bolt B in its intermediate position (shown in Fig. 3) for tripping by contact at the forward end of the bolt with the jamb-escutcheon or other sufficient contact to release the cam.

The cam C C' has a spindle-socket, which is provided with a spring S', the bearing of which is such as to throw the cam C C' forward when released and allow the bolt B to come under the control of the spring S, and be thereby advanced to its most forward position. If, instead of being tripped in its intermediate position, the backward movement of the cam C C' be continued sufficiently far, the pin P will drop into the notch N<sup>2</sup> on the release of the thumb-piece and cam at that point, and the bolt will be held in position to be tripped by a slight pressure upon the roller or forward end of the bolt, thereby allowing the bolt to be automatically advanced to its most forward position and to be there locked by the lever L automatically, except when the cam E is turned upward, as shown in Fig. 6, holding the lever L out of action. The cam C', bearing upon the pin P', is shown or corresponds with the outer side of the curved slot formed in the metal that is continuous with the cam C, but within it.

The pin-tumbler attachment has an outside barrel or case A, provided with an arm or extension A' for making contact with the stud P<sup>2</sup> on the bolt B for the purpose of retreating the bolt, and also with a bearing-surface for making contact with the rear end of the locking-lever for the purpose of unlocking the bolt before the same is retreated by the action of the arm A'.

Within the barrel or case A are two hemi-cylindrical pieces H H, which together fill and fit the barrel or case and carry a pair of twin pin-tumblers T T.

Within the hemi-cylindrical pieces H H is located a key-seat cylinder G, which revolves in its corresponding seat in the joined hemi-cylindrical pieces or tumbler-carriers H H, and which also carries short pins F F'. (Shown in section in Figs. 9 and 11.) Other pins F' F' (shown in Figs. 9 and 11 in side view) are located in pin seats or holes in the hemi-cylindrical parts H H and have behind them springs G' G', which, pressing against the inner surface of the outside barrel or case A, tend to force the pins F and F' inward, the former into the key-seat space or channel.

T T are twin pin-tumblers disposed and moving in a plane at right angles with the plane in which the pins F' F' and their seats are located. Between these pin-tumblers on each side are the springs G<sup>2</sup> G<sup>2</sup>, which exert a pressure upon each one of the twin pins automatically, forcing both of them outwardly when permitted to do so by the relations of the parts.

Q and Q' are opposite sides of the lock-frame or plates, which are provided with re-

cesses, holes, or sockets V V, properly located to receive the round part or end of each of the twin tumblers T T, and thereby prevent the turning of the barrel and its arm. The inner side of each one of the pin-tumblers presented toward the key-seat cylinder G is concave in general contour, and this concave surface is provided with an inclined ridge or tongue U U, one or more, which may be varied indefinitely in form and location, and to which one part of one side of the key K is made to conform closely in the form of a correspondingly-inclined groove U', but in such a way as to permit the passage of the key, the grooves in the key and the ridges or tongues in the twin tumbler corresponding accurately for that purpose and being varied on opposite sides, so as to give additional means for protection and so as to limit the possibility of operating the pin-tumblers to the one particular key made to fit the same. The tongues and grooves in the twin pin-tumblers and corresponding parts of the key are reversed in each, so as to enable the key to force the tumblers toward each other as the tongues traverse the grooves, and thereby withdraw the ends of the tumblers from the opposite recesses or sockets V V.

The method of operating the devices is as follows: The key K being inserted in the groove in the key-seat of the cylinder G with its proper corresponding edge upward, as shown in Fig. 9, the beveled point of the key first strikes the pins F on opposite sides and forces them back, one upward and the other downward, each in its seat in the key-seat cylinder G, thereby permitting the key to reach the position shown in Fig. 11. When the key has reached that position, the pins F will have been forced by the springs G' G' into the corresponding scarf or cut on each side of the key, as shown in Fig. 11, and to such an extent as to bring the line of division between the pins F and F' on a line to correspond with the inner edge of the seat of the pins F' F' in the hemi-cylindrical parts H H. When all the parts are in this position, which is shown in Figs. 11 and 12, and only then, will the pins F F' permit the revolving of the key K and with it the key-seat cylinder G within the hemi-cylindrical parts H H. When the proper key thus inserted and moved with its seat and cylinder has reached the position shown in Fig. 12, starting from the vertical position in which it was inserted in the first instance, the corresponding grooves and channels in the key and the pin-tumbler parts will engage, and these grooves and channels being made on a proper and corresponding angle on each side in each pair of the tumblers, the further movement of the key will tend to compress the spring G<sup>2</sup> and force together the two parts of the twin-tumbler T at the opposite sides of the key until they reach the position shown in Fig. 15, thereby withdrawing the pin parts from their seats or recesses V V in the plates Q Q' of the lock-frame. The positions from

which these twin tumblers start in this operation are shown in Fig. 13, and the positions into which they are forced by the key are shown in Fig. 15. Fig. 14 shows the positions of the parts, and particularly of the key, when the key is first inserted, and Fig. 16 shows the positions when the movement of the key is completed, by which the twin pin-tumblers are withdrawn and the tumbler device is unlocked and left free to perform its proper functions in unlocking and withdrawing the bolt B by the action of the tumbler first upon the locking-lever L and subsequently upon the bolt B, the relations of which are shown in Figs. 12 and 16. When the twin pin-tumblers are withdrawn in the manner described, the further movement of the key is stopped by the stud or pin W, with which it makes contact, and the pressure of the key being continued the hemi-cylindrical parts H H, in which the stud W is secured and which themselves are secured to the barrel or case A by the screw W', cause the whole apparatus to revolve until it reaches the limit of its motion and the limit of retreating motion to be given to the bolt B.

The key-seat cylinder G is held in proper relation to the hemi-cylindrical parts H H by heads or collars at each end, which last have their bearings in the lock-plates Q Q' and on which the entire tumbler device turns. The key-seat cylinder also has bearings in relation to the hemi-cylindrical part, located just within the end collars just mentioned, and also a third or center bearing in which are located the pins F F'. Between the center bearing and these two end bearings last mentioned and on each side of the center bearing are located the cylindrical chambers into which the concave sides and grooves of the tumblers project and into which the edges of the key also extend, so as to make engagement with the tumblers and traverse the chamber in turning and in compressing and releasing the opposite-moving tumblers T T. The center cylindrical part also acts as a guide for the four pin-tumblers, which on their adjacent edges, as they are located in pairs, are shouldered or cut away so as to have a bearing on its outer cylindrical surface and be thereby in part guided and held in position. The key-seat cylinder in relation to the two hemi-cylindrical parts is like an axle working in a divisible axle-box in which it is turned by the key, when the pins F and F' are thereby brought into such positions as to permit the turning, or like the bearing of a length of collared shafting. When the locking-lever L is unlocked, as shown in Fig. 3, the bolt B can be operated or retreated like any spring-catch bolt, but with two positions from which it may be automatically tripped, so as to effect engagement with the jamb-escutcheon, or disengagement within certain limits that are evident.

I claim as my invention—

1. In locks and in combination, the bolt B,

provided with the pin P, the lever L, provided with the pin P', and the double cam C C', provided with the notches N' N<sup>2</sup> and spring S', substantially as shown and described.

2. In locks, a pin-tumbler, a revolving tumbler-barrel, and a key for unlocking and revolving the same, in combination, the pin-tumbler projecting beyond the end of the barrel for the purpose of engagement when in its locking position and actuated by the key, in unlocking and revolving the tumbler-barrel, so as to be drawn inwardly for the purpose of unlocking the same, substantially as shown and described.

3. In locks, a compressible and opposite-moving pair of pin-tumblers, in combination with a spring located between them, substantially as shown and described.

4. In locks, a compressible and opposite-moving pair of twin tumblers with a spring located between them, in combination with an opposite like pair of twin tumblers and spring and with a key adapted to operate both pairs of tumblers in unlocking, substantially as shown and described.

5. In locks, the compressible and opposite-moving twin pin-tumblers T T, provided with engaging tongues, in combination with the spring G<sup>2</sup> and with the key K, provided with inclined engaging grooves on its opposite edges, substantially as shown and described.

6. In locks, the compressible and opposite-moving twin pin-tumblers T T, provided with engaging tongues, in combination with the spring G<sup>2</sup>, and also in combination with a like opposite set of compressible and opposite-moving twin pin-tumblers T T, in combination with their spring G<sup>2</sup> and with the key K, provided with opposite inclined engaging grooves on its opposite edges, substantially as shown and described.

7. In locks, the compressible and opposite-moving twin pin-tumblers T T, in combination with the spring G<sup>2</sup> and also with the pins F and F' and the spring G', substantially as shown and described.

8. In a pin-tumbler barrel or case, the pin-tumbler carriers H H, the compressible and opposite-moving twin pin-tumblers T T and spring G<sup>2</sup>, the pin F' and spring G', the key-seat cylinder G, and the pin F, substantially as shown and described.

9. In locks and within the pin-tumbler barrel or case and in pairs, the pin tumbler carriers H H, the pin-tumblers T T, provided with the spring G<sup>2</sup>, and the pins F F', provided with the springs G' and moving to and fro in planes at right angles to the plane of the motion of the pin-tumblers T T, in combination with the key-seat cylinder G and key K, the corresponding surfaces of the key and of the pin-tumblers being tongued and grooved for the purposes of co-operative action, substantially as shown and described.

10. In locks, a pair of pin-tumblers T T, one or more, in combination with the spring G<sup>2</sup> and located between two lock-plates, which are

recessed to receive the ends of the tumblers, and thereby hold the tumbler-carrier mechanism in a fixed position until released by the aid of a key, substantially as shown and described.

11. In combination, the key-seat cylinder G, pins F and F', spring G', pin-tumblers T, provided on their concave surfaces with the tongues U U, and the key provided with reverse grooves U' U' on opposite edges, substantially as shown and described.

12. In locks, a reciprocating bolt, a pin-tumbler, a revolving tumbler-barrel located between the two plates of the lock, and a key for unlocking and revolving the same, in com-

ination with the pin-tumbler, one or more, projecting beyond the end of the barrel for the purpose of engagement with the adjacent lock-plate when in its locking position and actuated by the key, so as to be drawn inwardly for the purpose of permitting the unlocking and revolving of the tumbler-barrel and also for the purpose of permitting the unlocking and retreating of the reciprocating bolt by the tumbler-barrel, substantially as shown and described.

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Witnesses:

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