(No Model.) 2 Sheets—Sheet 1.

J. SCHADE.

LOCKING DEVICE.

No. 537,311. Patented Apr. 9, 1895.

Fig. 1.

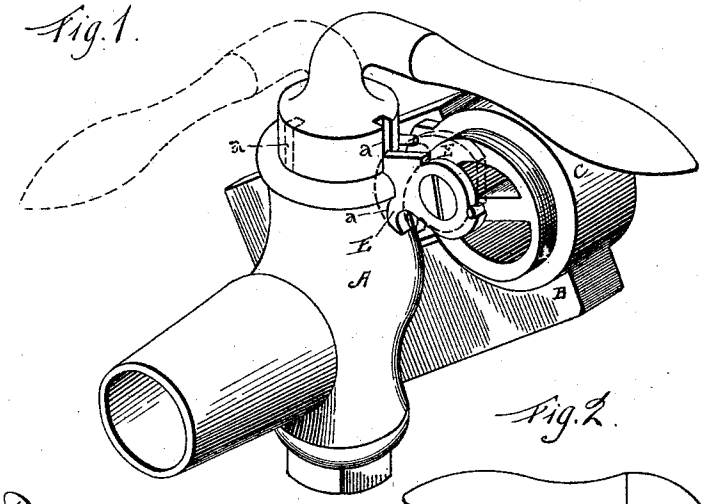


Fig. 2.

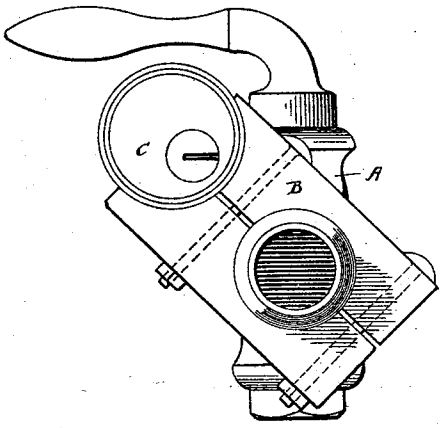
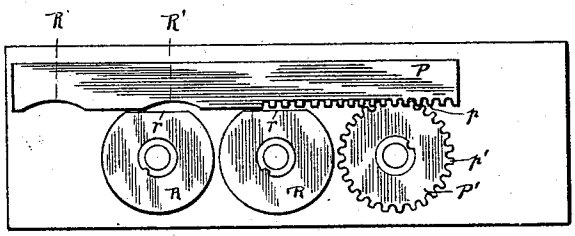


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

J. SCHADE.

LOCKING DEVICE.

No. 537,311. Patented Apr. 9, 1895.

Fig. 3.

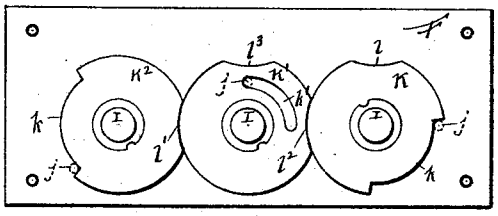


Fig. 4.

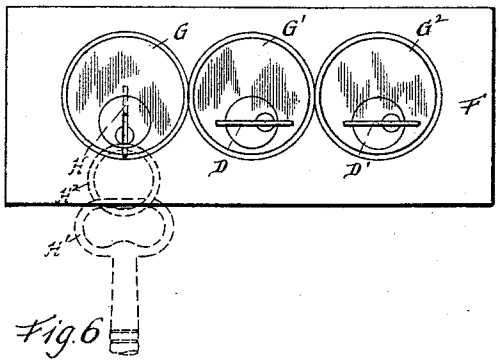


Fig. 5.

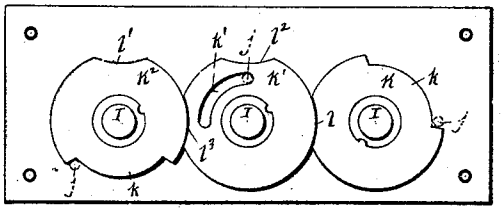


Fig. 6.

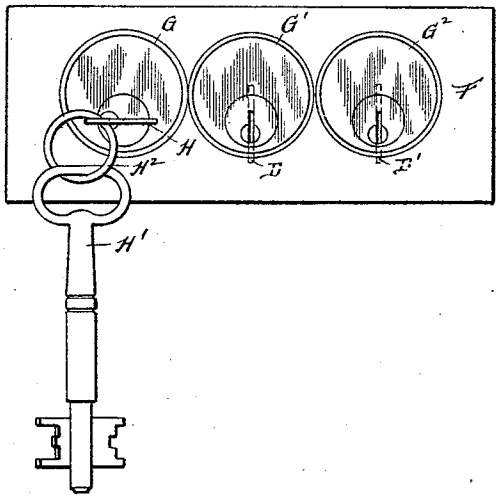
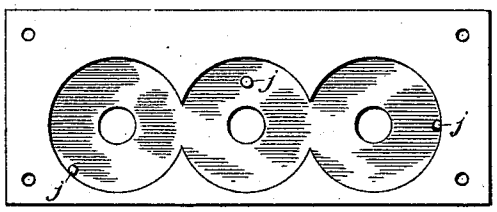


Fig. 7.



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Inventor:
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his Attorney.

UNITED STATES PATENT OFFICE.

JOHN SCHADE, OF BROOKLYN, NEW YORK.

LOCKING DEVICE.

SPECIFICATION forming part of Letters Patent No. 537,311, dated April 9, 1895.

Application filed September 13, 1894. Serial No. 522,922. (No model.)

To all whom it may concern:

Be it known that I, JOHN SCHADE, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Locking Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view of cock with lock therefor applied, the unlocked position of parts being shown in dotted lines. Fig. 2 is an end view showing opposite side of same. Fig. 3 is an elevation showing locking disks in first position. Fig. 4 is a front view of locks in corresponding position. Fig. 5 is an elevation showing locking disks in second position. Fig. 6 is a front view of locks in corresponding position. Fig. 7 is a detail of cap plate. Fig. 8 is an elevation showing a modification of part of invention.

This invention has relation to certain new and useful improvements in locking devices, of that class which are employed for the purpose of insuring or compelling the performance of an act or duty by rendering the performance of a second necessary act absolutely dependent upon the performance of the first.

Mechanism of this character is of great importance for various purposes, and is of especial value for use in buildings as a means of compelling the closing off of the water, gas, electricity, &c., when the building is closed for the night, and thereby avoiding danger of waste, leakage, or overflow, and the loss and damage to property which frequently results from the carelessness of the clerk or porter in charge who neglects to properly perform his duties. Most, if not all of the devices heretofore employed for this purpose have been inefficient for the reason that the mechanisms have been of such character as to afford easy opportunities for the person in charge to "beat" or evade them, this being a matter of less labor than that required for the proper performance of his duties.

The object of the present invention is to provide means of this character of simple nature, but of positive action and of such nature that it is practically impossible to "beat" or evade their proper operation.

With this object in view the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

In the present instance I have devised mechanism of the above character wherein the performance by the clerk, porter, or other person in charge of his duties is made imperative by reason of the fact that until he has done this it is impossible for him to lock up the building, the release of the "locking up" key being absolutely conditioned upon the performance of the preliminary duties; and the invention more particularly consists in providing the locking up key with a secondary key inseparably attached thereto, a series of mutually dependent locks of suitable character, which serve as holders for the secondary key and for a series of non-exchangeable keys which control the opening and closing of the various valves or switches of the water, gas, or other supply pipes or electric wires; said locks being so arranged that the valve or switch keys can be released therefrom only by the use of the secondary key, and that when said valve or switch keys have been released and removed, the secondary key with its attached door key cannot be removed until after the valve or switch keys have been again inserted in their holders.

The invention further consists in the combination with the above of a suitable lock in connection with each of the valves or switches whereby any valve or switch cannot be opened except by its own key, and when so opened, the key cannot be removed from the lock until the valve or switch has been closed, the entire arrangement being such, therefore, that before the locking up key can be made available for use, all the valves or switches in the building must have been closed and the several keys thereof inserted in their respective locks.

Referring to the accompanying drawings, the letter A designates a cock, valve, or switch which controls the supply of water, gas, electricity, or any other material for consumption in a building. Rigidly and permanently secured to the fixture of such cock, valve, or

switch, is a lock case B, having a lock C, which may be of any suitable construction provided it is of such character that the key D cannot be removed from the lock except the parts are in certain relations to each other. A cylinder lock wherein the key, when in unlocked position, is secured against withdrawal by its engagement with the tumbler pins, is preferably employed. Attached to the key plug of such lock is an arm E, which, in locking position, engages a socket or groove *a* in the valve stem, or similar device, and in the case and fixture thereof, and secures said valves in closed position. Upon the operation of the lock by the key D, said arm E, by the rotation of the key plug, moves out of such engagement with the valve, which can then be opened; but the key D cannot then be removed from the lock until the valve has been closed, since the impingement of the arm E against the valve will prevent the key plug from rotating, except the socket or groove *a* be brought into proper relation thereto, which occurs only when the valve is closed.

I do not, however, limit myself to the above devices, since my other devices capable of similar action may be employed, the invention requiring merely a lock having a key which cannot be removed except the valve be closed.

F designates a block or case which is designed to be located in the office of the building, or at any other desired point, and which is fitted with a series of mutually dependent or interlocking locks designated by the letters G, G′, G².

The lock G is designed to be operated by, and form a holder for, a key H, which is inseparably attached to a key H′, which in the present instance is supposed to be the key which operates the lock of the front door of the building. The connection between the two keys may consist of a solid ring H².

Although I have shown but two locks in addition to the lock G, the number actually employed in any case will depend upon the number of duties which it is required the porter shall perform. For instance, in the illustrations, the lock G′ forms the holder for the key D which controls the lock of the water cock or valve, and the lock G² the holder for the key D′ which controls the lock of the gas cock. Where the building is furnished with electricity, a third lock would be provided for the key of the controlling switch. These locks G, G′, G², are preferably of the ordinary cylinder form, and correspond respectively with the several locks attached to the different valves, cocks, or switches, the pins or tumblers of the locks preventing the withdrawal of their keys except in certain positions.

On the inner end portion of the key plug I, of each of these locks and arranged to rotate therewith, is a cam disk, said disks being designated by the letters K, K′, K². The disks K, K² are cut away peripherally at *k* forming stop shoulders, designed to engage pins *j* carried by a cap plate J and thereby limit the rotation of the disks. The disk K′ has an arcuate slot *k′* which engages a similar pin *k* for the same purpose. Said disks K, K′ K², are also each cut away peripherally to form the respective arcuate concavities *l*, *l′*, of a radius corresponding to that of the central disk K′, which has two similar concavities *l²*, *l³*. These concavities form means whereby the disks K, K′, K² may be mutually interlocked in the manner presently described.

The operation is as follows: The porter, clerk, or other person in charge of the building or whose duty it is to open and close the same, upon his arrival in the morning unlocks the front door and removes therefrom the key H′ with its inseparately attached key H, and inserts the latter in the lock G. The disks K, K′, K², are at this time in the position shown in Fig. 3 the disk K being free to rotate, while the disks K′, K², are locked, owing to the engagement of their concavities *l²*, *l′*, one with the periphery of the disk K, and the other with the disk K′. The keys D, D′, of the water and gas cocks are at this time held in the respective locks G′, G², where they were placed and locked the previous night, and are incapable of being withdrawn. The key H, is inserted in the lock G, as above described, and is turned, rotating the disk K, until such disk is stopped by its pin *j*, at which time the concavity *l* is brought opposite the corresponding concavity *l²* of the disk K′. The key D of the corresponding lock G′ can now be turned and withdrawn from the lock, which leaves the disk K′ in such position that its concavity *l³* is brought opposite the concavity *l′* of the disk K², and its periphery into engagement with the concavity *l* of the disk K, thereby locking the latter disk, and the keys H, H′ in the lock G. The key D′ can now be turned and withdrawn, and the various disks will be in the positions shown in Fig. 5. The porter now has his water and gas keys and proceeds to open the respective cocks, which secures the said keys again in the locks C, where they remain. At the time for closing, the porter cannot withdraw the keys H, H′, from the lock G until he has closed these cocks, withdrawn the keys D, D′ from the locks C, and inserted them in the locks G′, G², and turned them to release the locking engagement of the disks, K′, K². By reference to Fig. 5 it will be seen that it is imperative that both the keys D, D′ shall be placed in the holder locks, G′, G², before the lock G can be actuated, so that the porter is compelled to perform all of his duties.

In Fig. 8 I have shown a modified form of mechanism for mutually locking the locks, G, G′, G². This mechanism comprises a bar P arranged to slide endwise upon the lock case or block and having at one end portion a rack *p* arranged to be engaged by teeth *p′*,

on a disk P′ attached to the key plug of the lock G. The plugs of the locks G′, G², are each provided with a disk R one side of which is cut off straight, as indicated at *r*. In the edge of the bar P adjacent to these disks are formed arcuate concavities R′ corresponding to the said disks. When the straight portions *r* of the disks are in contact with the edge of the bar P such disks cannot rotate although the bar can move endwise, but when the concavities R′ are brought opposite the disks, such disks are permitted to partially rotate, but the bar cannot move, being locked. The operation of this arrangement with relation to the keys H and D, D′ is the same as in the form first described, as will readily appear, it being impossible to withdraw all the keys at the same time.

In place of the rack and pinion connection shown, any other suitable connection between the disk P′ and bar B may be employed.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with one or more valve or switch locks having each a key which can be withdrawn only when the valve or switch is closed, of a locking and holding device for each of said keys, a lock for controlling the operation of the holding device or devices, and a key for operating said controlling lock, and having the locking up key inseparably connected thereto, substantially as specified.

2. The combination with a door or locking up key, of a secondary key inseparably attached to said door or locking up key, a holding device for said secondary key, a series of valve or switch locks having non-exchangeable keys which can only be withdrawn when the valve or switches are closed, a series of holding and locking devices for said keys, said holding devices and the holding device for said secondary key being mutually dependent upon each other in their operation, substantially as specified.

3. The combination with a series of cylinder locks, the operations of which are mutually dependent upon one another, and a series of lockable keys for said locks, of the door key inseparably connected to one of said lockable keys and a series of valve locks each one of which is capable of being operated by one of said lockable keys, which key can only be withdrawn therefrom when the respective valve is closed, substantially as specified.

4. The combination with a series of cylinder locks, and a series of non-exchangeable keys therefor, of a cam disk carried by the key plug of each lock, said disks being arranged to interlock, and stops for limiting the rotation of such disks, substantially as specified.

5. The combination with a series of cylinder locks, and a series of non-exchangeable keys therefor, of a disk carried by the key plug of each of said locks, and stops for limiting the rotation of said disks, said disks having peripheral, arcuate concavities whereby they lock one with another.

6. The combination with a valve lock or locks for gas, water, or other household supplies, of an interlocking key holding and securing device, several non-exchangeable lockable keys, and a door key inseparably attached or connected to one of said lockable keys, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN SCHADE.

Witnesses:
PHILIP C. MASI,
GEORGE H. PARMELEE.