No. 705,660. Patented July 29, 1902.

A. R. FERGUSSON.

LOCK.

(Application filed Apr. 24, 1901.)

(No Model.) 3 Sheets—Sheet 1.

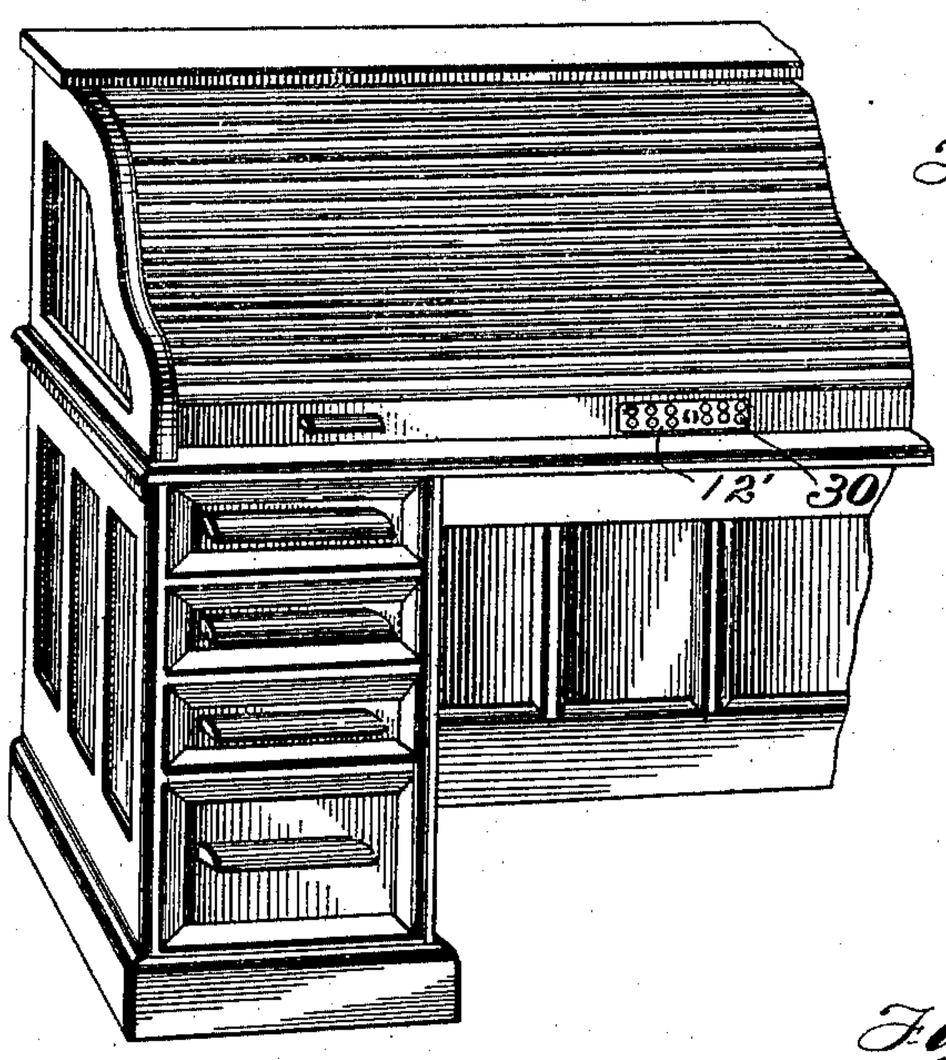

Fig. 1.

Fig. 5.

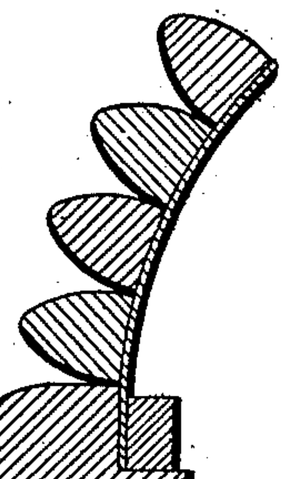

Fig. 3.

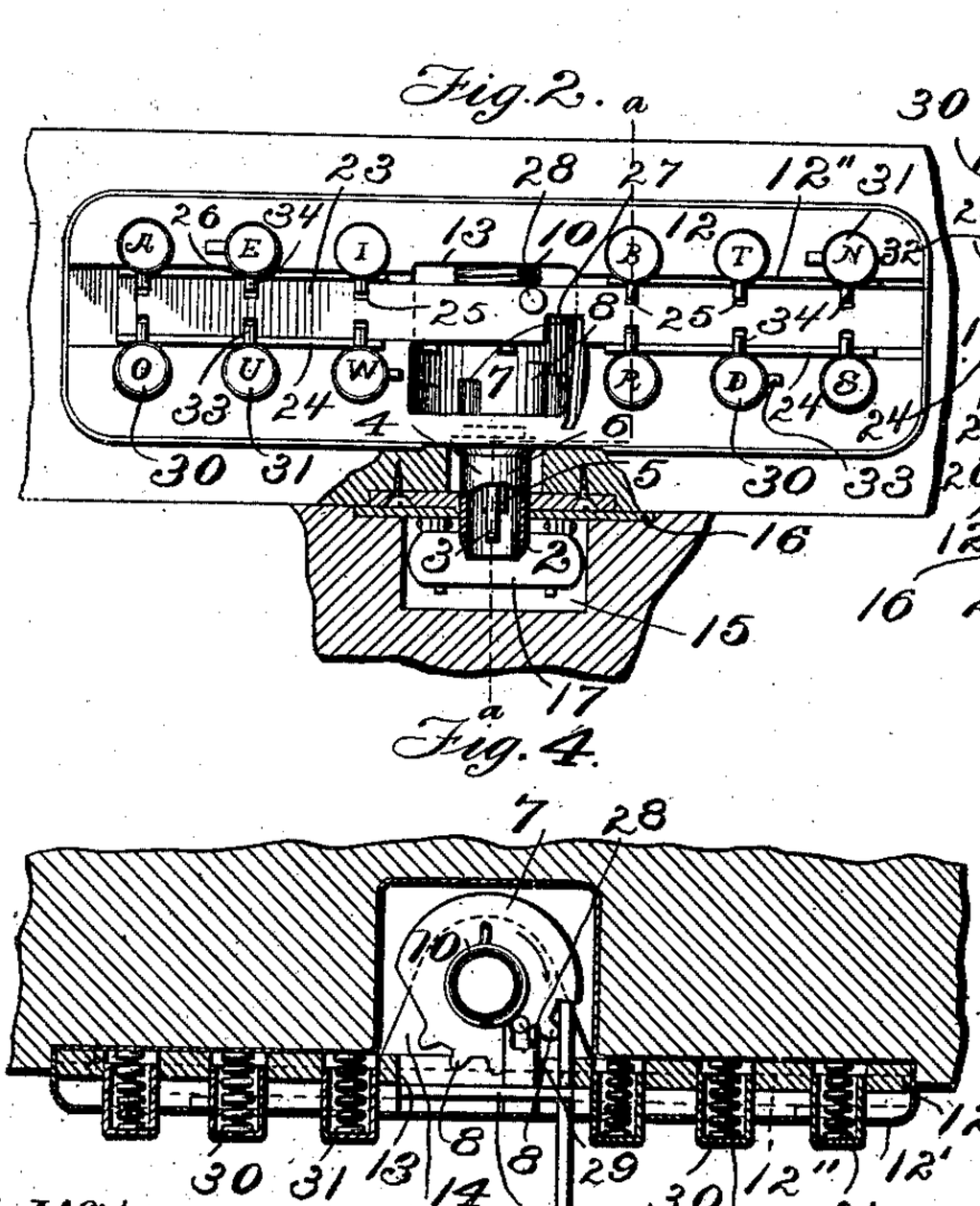

Fig. 4.

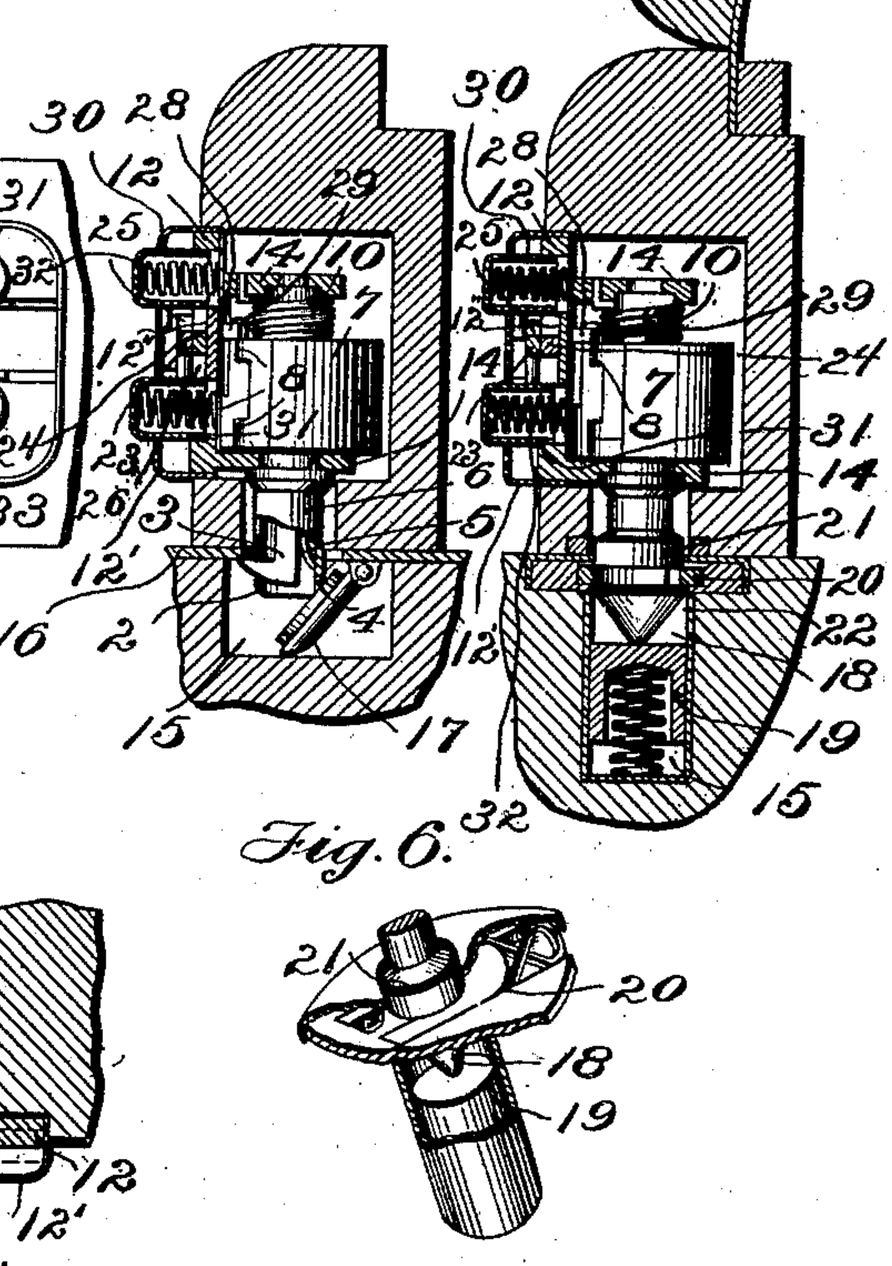

Fig. 6.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 7

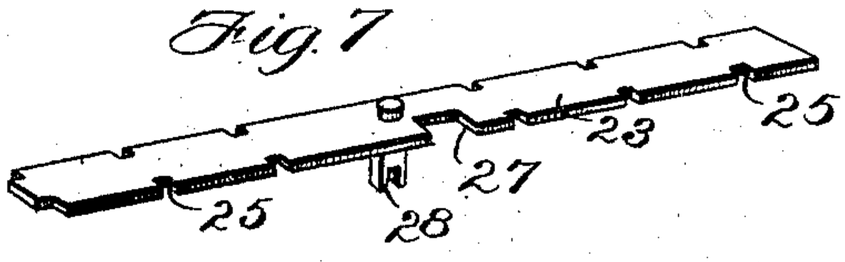

Fig. 8

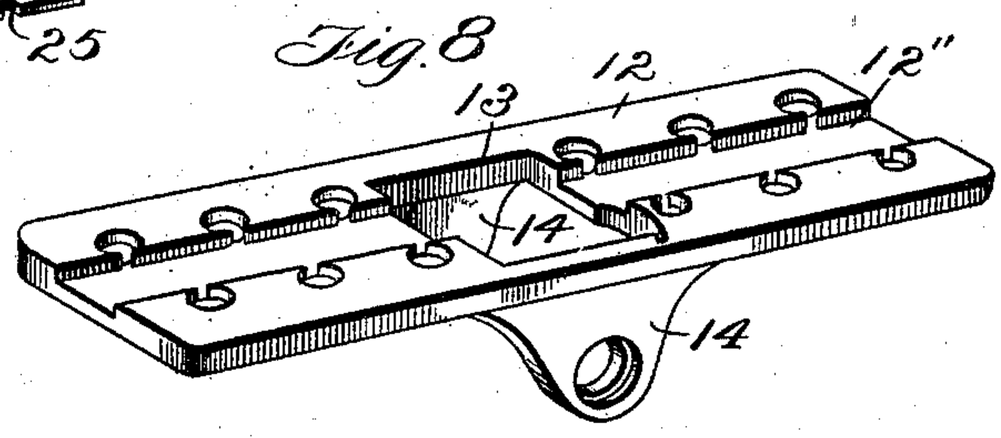

Fig. 9

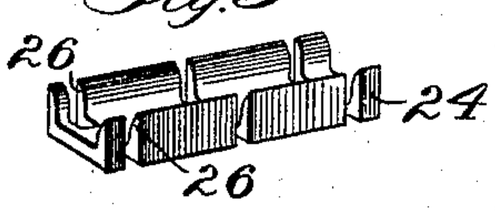

Fig. 10

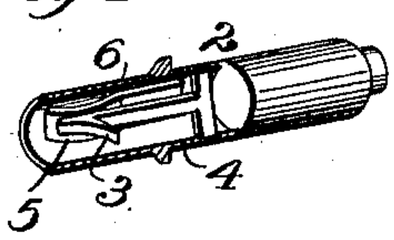

Fig. 11.

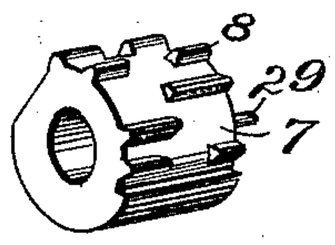

Fig. 12.

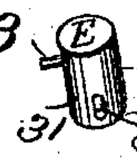

Fig. 13.

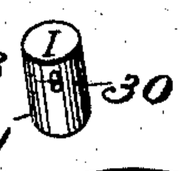

Fig. 14.

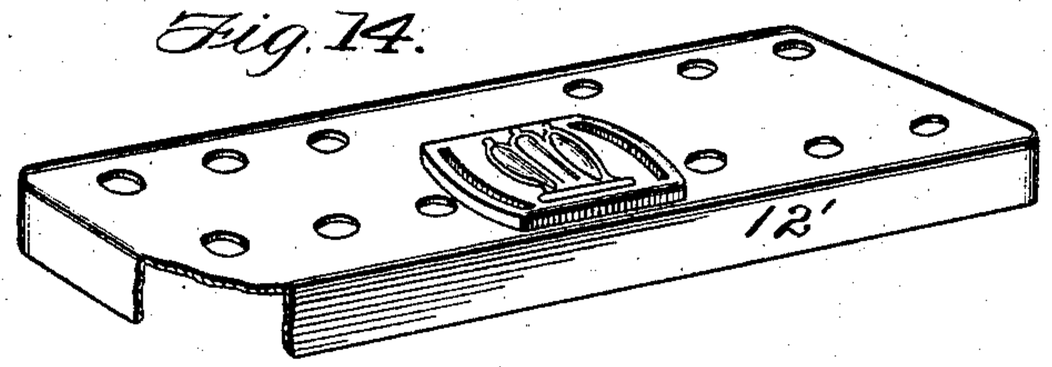

Fig. 15

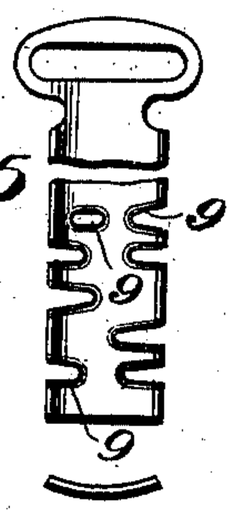

Fig. 16.

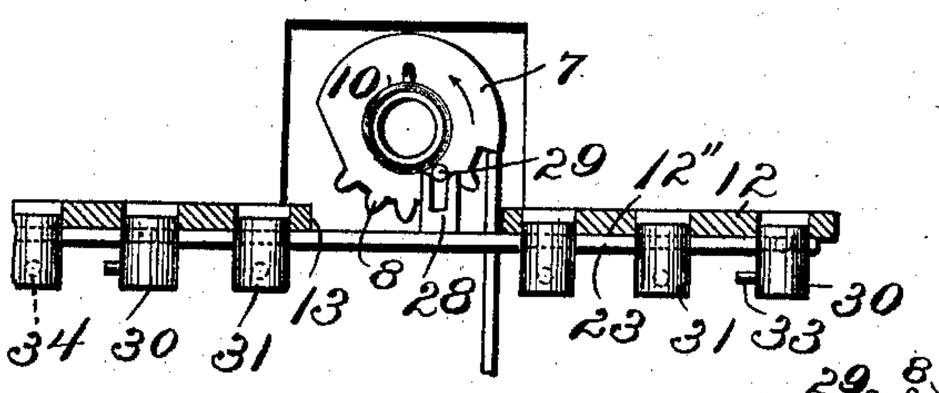

Fig. 17.

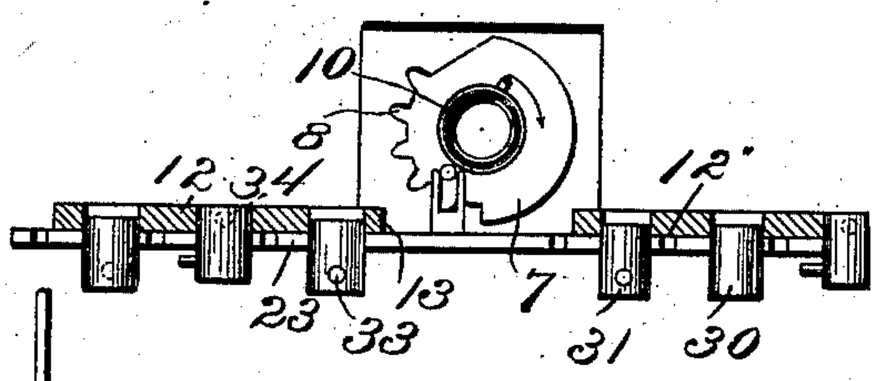

Fig. 18.

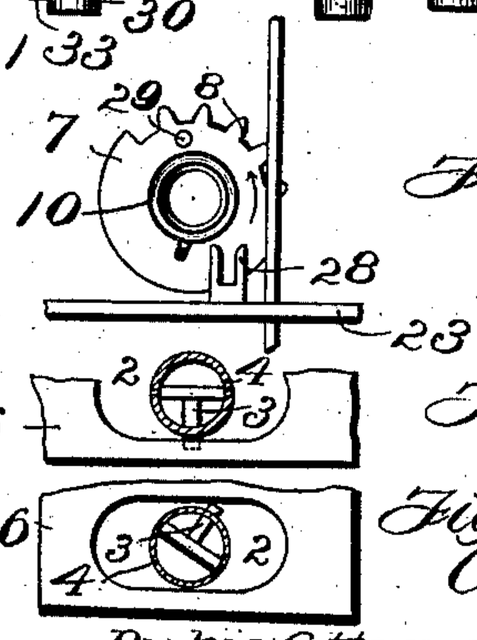

Fig. 19.

Fig. 20.

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No. 705,660. Patented July 29, 1902.

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LOCK.

(Application filed Apr. 24, 1901.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 21.

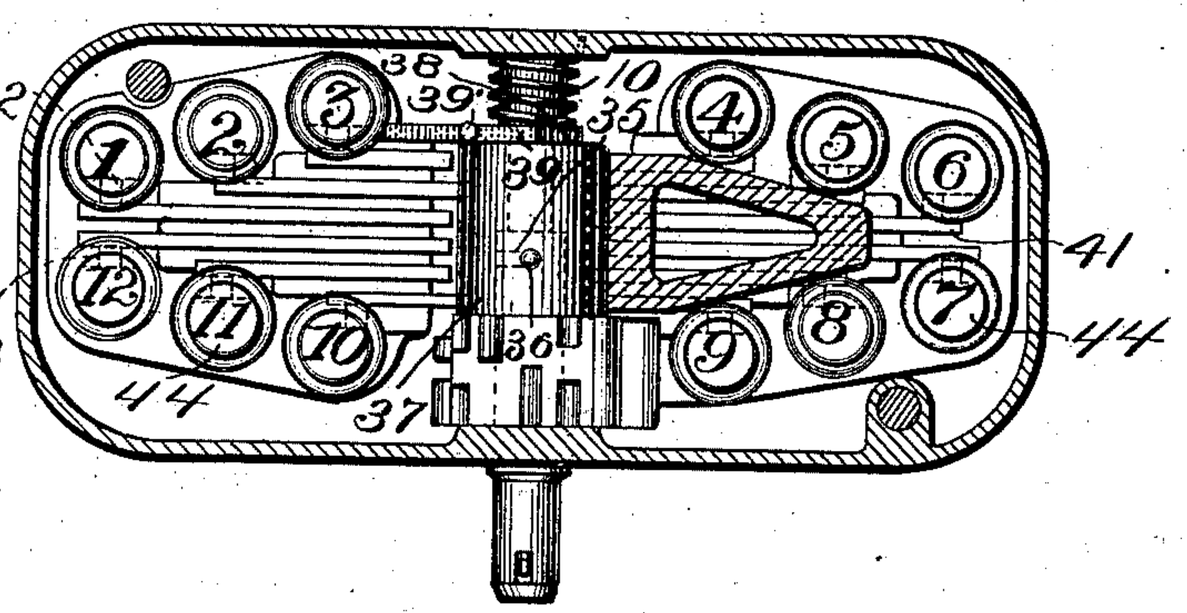


Fig. 22.

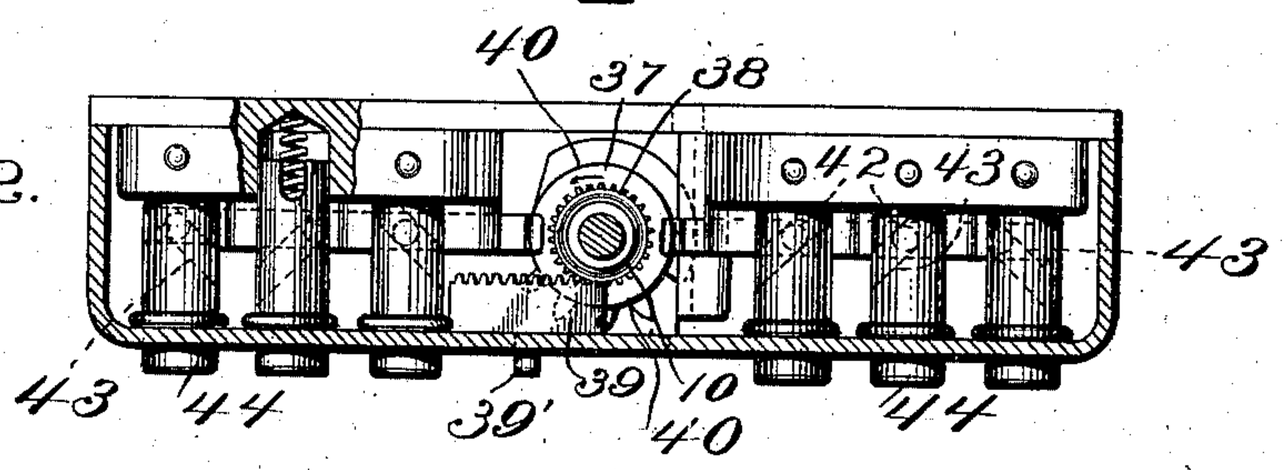


Fig. 23.

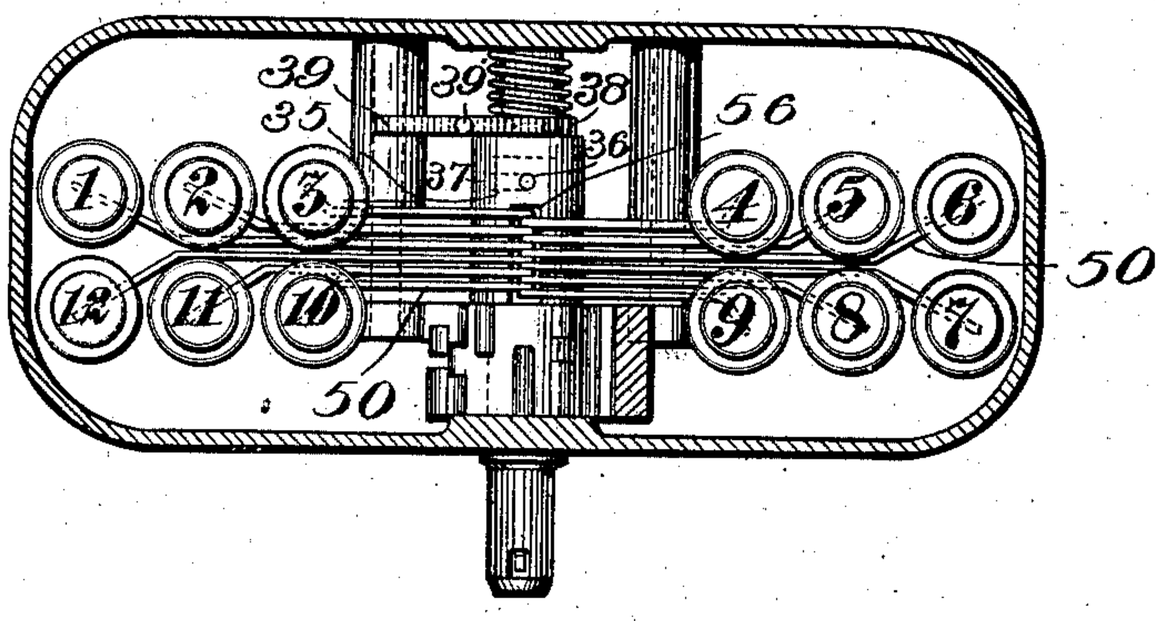
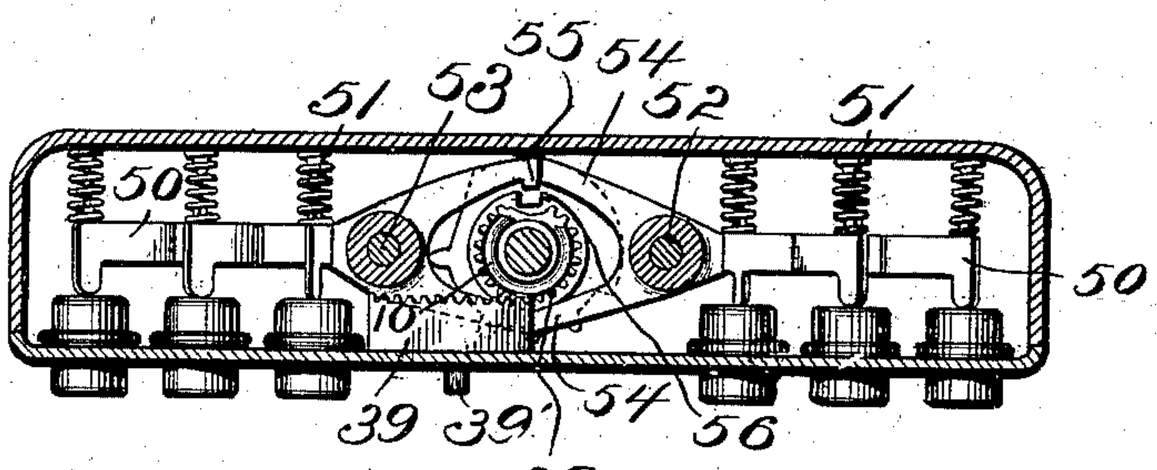


Fig. 24.



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UNITED STATES PATENT OFFICE.

ALAN R. FERGUSSON, OF NEW YORK, N. Y.

LOCK.

SPECIFICATION forming part of Letters Patent No. 705,660, dated July 29, 1902.

Application filed April 24, 1901. Serial No. 57,177. (No model.)

To all whom it may concern:

Be it known that I, ALAN R. FERGUSSON, a citizen of the United States, residing in the borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification.

This invention relates to locks, and it more particularly relates to an improved duplex-operated lock, the object of the invention being to provide an improved duplex-operated lock which while adapted for many purposes is particularly adapted for use in connection with desks.

A further object of the invention is to provide an improved lock which can be manipulated by a plurality of means, one comprising a key and the other a combination means whereby should the key be lost or not at hand the desk or other article can be opened without the necessity of waiting to procure another key or forcing the lock.

A further object of the invention is to provide an improved lock which may be manipulated by two independent means, but which is, however, simple in construction and operation and effective in use.

In the drawings accompanying and forming part of this specification, Figure 1 is a view of a portion of a roll-top desk with this improved lock in position. Fig. 2 illustrates a portion of a desk having this improved lock mechanism applied thereto, the view showing the cover to the lock-casing removed and a part of the lock in section. Fig. 3 is a sectional view taken in line *a a*, Fig. 2. Fig. 4 is a top partially cross-sectional view of this improved lock mechanism applied to a desk, a portion of which is shown in section. Fig. 5 is a substantially similar view to Fig. 3, showing, however, a somewhat different form of locking-bolt. Fig. 6 is a detail view, partly in section, of the form of bolt shown in Fig. 5. Figs. 7 to 14, inclusive, are detail views of the various parts of this improved lock mechanism. Fig. 15 is a view of a key for operating this lock. Figs. 16 and 18 are top views of parts of this lock mechanism, showing the operation of the bolt by the key. Fig. 17 is a similar view showing it operated by the combination means. Figs. 19 and 20 illustrate the bolt in its locking and unlocking position, respectively. Figs. 21 and 22 are front and top views of a somewhat different form of lock mechanism, and Figs. 23 and 24 are front and top views of a still different form of lock mechanism.

Similar characters of reference designate corresponding parts in all the figures of the drawings.

In the use of a desk or other lock operated solely by a key should the key be lost or not at hand—for instance, having been left at home—when the user has reached his office it has been necessary to either force the lock or procure another key, the former of which is detrimental to the lock mechanism and frequently to the desk or other article in connection with which the lock is used, while the latter is often impracticable and sometimes impossible, and to overcome these serious disadvantages is the object of the present invention, this object being obtained by the provision of an improved lock adapted to be operated by two independent means, one of which constitutes a part of the mechanism.

Of course it may be said that if means is provided always at hand for the opening of the desk or other article there is no necessity of providing a lock which may be manipulated by a key; but since this means is preferably worked by a combination system it is a much easier and a much simpler operation to open the desk or other article by means of a key than by the manipulation of such combination, which would require some little thought and time, but inconsiderable as compared with the time which would be necessary to force the lock or procure another key. Therefore it is desirable to provide a plurality of means for unlocking the desk, one of which may be used when it is found impossible to use the key.

This locking means comprises a shiftable locking device, such as a rotary bolt, means, such as rotary means, for controlling such bolt, and locking means for preventing the turning of said rotary means except when operated by the proper key, and a combination system, such as a plurality of push-buttons or devices, for controlling said locking means, the organization being such in the form shown that the locking means is ineffective to pre-

vent the operation of the bolt by the proper key, but is effective to prevent the operation of such bolt in the absence of the proper key until the proper push-buttons are manipulated. This improved lock mechanism may be so organized that on the proper manipulation of the push-buttons the bolt will be automatically released, or this may require the operation of a distinct and separate device even after the combination has been properly worked.

In one form thereof herein shown and described this improved lock mechanism, it being shown herein as applied to a desk, although, as hereinbefore stated, it may be applied to various other articles, comprises a locking device or bolt, shown as a rotary bolt 2, comprising a pivoted hook 3, (shown in Figs. 2, 3, and 10,) located in a cylinder or shell 4 and pressed into its locking position by means of a spring 5, such shell constituting the shank 6 of the bolt and carrying controlling means therefor comprising a shiftable device, such as a rotary tumbler 7, (shown as barrel-shaped,) having a plurality of projections 8 located in position to correspond with corresponding recesses or cut-out portions 9, formed in the key, which is shown concavo-convex in form. For holding the tumbler 7 in its normal position to be operated by the key a suitable device—such, for instance, as a coiled spring 10—is provided, one end of which is secured to the lock-casing and the other end to the tumbler. It will be understood, of course, that any suitable form of lock-casing adapted to the purpose may be used. In the present instance the casing is shown comprising simply a longitudinal base-plate 12, having an opening 13 and provided with a pair of rearward extensions 14, forming journal-bearings for the bolt, and a cover 12′, having a keyhole. This casing is set into the top of the desk, (see Fig. 3,) an opening 15 being formed in the under edge of the desk to permit the passage of the bolt into position to engage the under side of a keeper or striker-plate 16, located in the desk-top and which is shown having an elongated slot, such plate being provided with a suitable closure or flap 17. Instead of forming the bolt in the manner described it may be formed with a conical end 18, Figs. 5 and 6, adapted on the closing of the cover to depress a suitable closure 19 in the recess 15, a spring-pressed locking-plate 20 being adapted to work between a pair of shoulders 21 and 22 on the bolt, the turning of the bolt, owing to its construction, acting to throw the locking-plate out of its locking position and permit the opening of the desk.

The locking means for the controlling means in the form shown is carried in a longitudinal recess or groove 12″, formed in the plate 12, and comprises a sliding member or bar 23, (shown supported by a pair of bifurcated devices or cradles 24, one at each side of the opening 13 in such plate,) such bar having notches 25 in its edges, the cradles likewise having notches 26 to correspond therewith. The bar also has a larger notch or recess 27 to permit the passage of the key. This bar is provided with a projection 28, formed to engage a pin 29, carried by the tumbler.

The combination means for controlling the locking means is carried by the casing and comprises a suitable number of push devices or buttons 30, (shown maintained in their proper normal position by springs.) Each of these buttons comprises in the present instance a suitable tubular cap 31, having a coiled spring 32 on the interior thereof, the inner end of which fits into a recess in the inner wall or plate 12 of the casing. Each of these buttons is provided with a projection 33, effective to engage the casing-cover on its under side, whereby the displacement of the push-pins is prevented. A certain number of the push-pins (in the present instance shown as four) are also provided with additional projections 34, such buttons being designated in the present combination as E, N, W, and D. These projections extend into certain notches of the bar, and so prevent movement of such bar. These pins 34 may be inserted in other push-buttons, so that various combinations may be obtained.

In the organization under consideration the spring 10 is so located on the shank of the bolt that its tendency is to turn such bolt toward the left, such turning being prevented by the locking means or bar just described, from which it will be seen that the bolt is held in its normal locking position by means of the combination mechanism.

In use it will be seen that when the desk-top is closed the beveled under face of the bolt-hook 3 in the form shown in Figs. 2, 3, and 10 will be forced rearward until such hook passes the keeper, when the spring 5 will force it forward. In Figs. 5 and 6 the beveled face of the bolt will force the locking-plate out of the way to permit the passage of such bolt until the recessed portion thereof is in position to be engaged by such plate. In this position of the parts the insertion of the key through the casing in the manner shown in Fig. 4 will rotate the tumbler and the bolt in the manner shown in Figs. 16 and 18, the recessed or cut-out portions in the key conforming to the projections on the tumbler, which projections could, if desired, be letters or figures or other symbols and interchangeable, if preferred. During this movement of the tumbler the pin 29 is carried away from the projection 28 of the locking-bar. When the tumbler and its bolt have been rotated sufficiently, the hook 3 will be rotated out of its locking position, since the slot is an elongated one. Consequently rotary movement of the hook carries it free of the plate 16 and into the end of the slot, so that the cover or lid can be raised. Should, however, the key be lost or not at hand, then on the manipulation of the proper buttons the pins of such but-

tons will be pushed out of engagement with the locking-bar, and consequently permit the spring 10 to rotate the tumbler in the direction of the arrow, Figs. 4 and 17, this action rotating the bolt in a direction opposite to that in which it is rotated by the key and releasing it from the keeper, and so unlocking the lid or cover. The return of the bolt into position to be locked may be accomplished by some suitable means which may be provided for this purpose or by hand manipulation, if preferred, for which purpose an opening may be provided in the bolt, into which a pin may be inserted, so as to return the bolt to its normal position.

In the form shown in Figs. 21 and 22 a separate device is used for operating the tumbler after the push devices have been properly manipulated. In this construction also a somewhat different form of locking mechanism is provided for the bolt. In this organization the bolt is formed as a two-part device, the shank of which carries the tumbler, as hereinbefore described, said bolt having a slot 35 in position to coöperate with a pin 36, carried by a barrel 37, mounted on said bolt-shank, and which barrel in this form constitutes a part of the controlling means for the bolt. The spring 10 acts to maintain the bolt, and therewith the barrel, in its normal or locking position, the bolt being shifted by the key in the direction of the arrow. In this organization the barrel is provided with a gear 38, meshing with a rack 39, which rack is provided with a projection 39′, extending through the front of the casing and movable in a slot therein. The barrel 37 is also provided with a series of radial ribs or projections 40, in engagement with which is shown the locking means, shown in this instance as a plurality of locking members, such as bars 41, carrying pins 42, adapted to work in diagonal slots 43, carried by the push-buttons 44. On the operation of the proper push-buttons in the combination the inward movement thereof will retract the bars in engagement with the barrel, and so permit the bolt to be rotated. In this form when the key is used the tumbler will be rotated in the manner hereinbefore set forth, but independently of the barrel, which is locked at this time against movement by the locking-bars, this independent movement of the bolt and tumbler being permitted by the slot-and-pin connection between such bolt and barrel. When, however, the combination is used, the barrel is first unlocked, after which such barrel may be shifted by means of the gear mechanism through the instrumentality of the sliding pin 39, and so rotate the bolt in the same direction that it is rotated by the key. The diagonal slots in the push-bottons are so organized, however, that when those push-buttons not in the combination are manipulated the bars worked thereby will be shifted into position to lock the barrel against movement.

In the form shown in Figs. 23 and 24 the organization is substantially similar to that just described, except that the push-buttons are in contact at their inner ends with a series of levers 50, held in contact with such push-buttons by springs 51, the levers at one side of the bolt being assembled on one pivot 52, carried by the casing, and those on the other side on another pivot 53, carried by such casing. These levers are shown provided with bifurcated or forked ends 54. Each one of the levers is provided with a projection or inturned portion 55, adapted to enter a recess 56 in the barrel, such barrel having a pair of oppositely-located recesses. Those levers which are connected with the buttons forming the combination have the tongs at one side only of the tumbler provided with objections, which are normally in engagement with one of the recesses in the tumbler, whereupon on the manipulation of the proper buttons these projections will be retracted from the recess, and so permit the barrel to be actuated by the rack in the manner hereinbefore set forth. Those levers which do not form a part of the combination have one set of tongs provided with projections which are normally out of contact with the barrel, so that should any one of the push-buttons not in the combination be manipulated a projection 55′ will be shifted into engagement with the barrel and the same held from rotating. The operation of this form of lock mechanism is substantially the same as that described in connection with Figs. 21 and 22, and therefore a repetition of the same is not necessary.

In the mechanism shown in Figs. 21 to 24 it will be seen that the bolt is turned in the same direction both by the key and the sliding pin; but, if preferred, the bolt on the unlocking of the barrel by the push-buttons can be permitted to turn in the opposite direction, or toward the left, under the action of the spring in a similar manner to the mechanism shown in Figs. 1 to 20, the rack simply being placed at the right-hand side of the gear and being used merely to return the bolt to its normal position.

I claim as my invention—

1. In a lock mechanism, the combination of a bolt, means for controlling said bolt and adapted to be shifted by a key; means adapted to engage and positively prevent movement of said controlling means except when operated by its key; and push devices for controlling said preventing means.

2. In a lock mechanism, organized to be operated by a key or by independent means, the combination of a bolt, means adapted to be engaged and actuated by a key for shifting said bolt; and push devices for controlling the operation of said means independent of said key.

3. In a lock mechanism, the combination of a bolt; rotary means having peripheral key-engaging projections for controlling said bolt and adapted to be shifted by a key; means

for preventing movement of said controlling means; and means for controlling said preventing means; the organization being such that the preventing means is ineffective to prevent the operation of said bolt by the proper key, but is effective to prevent the operation of such bolt in the absence of such key until the proper manipulation of the combination.

4. In a lock mechanism, the combination of a bolt; key-operated means for controlling the bolt; means engaging and locking the controlling means; and one or more push devices operative to release said locking means.

5. In a lock mechanism, the combination of a rotary bolt adapted to be shifted by a key; rotary means having peripheral key-engaging projections for controlling it; locking means for said rotary means; and push-buttons for controlling said locking means.

6. In a lock mechanism, the combination of a rotary bolt adapted to be shifted by a key; rotary means having peripheral key-engaging projections for controlling it; locking means for said rotary means; push-buttons for controlling said locking means; and means for shifting said controlling means after it is unlocked.

7. In a lock mechanism, the combination of a rotary bolt adapted to be shifted by a key; rotary means for controlling it; locking means for said rotary means; push devices for controlling said locking means; and means embodying gearing for shifting said controlling means after it is unlocked.

8. In a lock mechanism, the combination of a bolt; a tumbler adapted to be actuated by a key; means for locking such tumbler against movement; and a plurality of push-buttons for controlling the operation of said locking means.

9. In a lock mechanism, the combination of a bolt maintained in its locking position by a spring and shiftable by a key against the action of such spring, means for controlling the movement of said bolt independently of the key, and comprising a plurality of push devices, a part thereof being assembled in combination, whereby on the operation of the proper devices the bolt may be withdrawn from its locking position and on the operation of any part of such devices not comprised in the combination the bolt is more positively locked in its locking position.

10. In a lock mechanism, the combination of a bolt adapted to be shifted by a key, means for controlling the movement of said bolt independently of the key, and comprising a plurality of push devices, a part thereof being assembled in combination whereby on the operation of the proper devices the bolt may be withdrawn from its locking position and on the operation of any part of such devices not in the combination the bolt is thereby more positively locked in its locking position, the organization being such that the key may operate the bolt independently of any previous manipulation of the push devices.

11. In a lock, the combination of a bolt automatically shiftable under certain conditions into its unlocking position and also shiftable into its unlocking position by a key; and means for preventing the automatic operation of said bolt and controlled by combination means.

12. In a lock mechanism organized to be operated by a key or by independent means, the combination of a rotary bolt; means engaged and actuated by a key for rotating said bolt into its unlocking position on the insertion of such key; and push-buttons for controlling the operation of said bolt independently of said key.

13. In a lock mechanism organized to be operated by a key or by independent means, the combination of a rotary bolt; means having key-engaging projections for rotating said bolt on the insertion of the proper key; and for controlling said bolt independently of said key.

14. In a lock mechanism organized to be operated by a key or by independent means, the combination, with a rotary and oscillatory bolt, of means having key-engaging projections for rotating said bolt on the insertion of the proper key, and means for controlling said bolt independently of said key.

15. In a lock, the combination of a bolt; means for automatically shifting said bolt under certain conditions into its unlocking position, said bolt also shiftable into its unlocking position by a key; and means for preventing the automatic operation of said bolt and controlled by push devices.

16. In a lock mechanism, the combination of a bolt; means for automatically shifting said bolt under certain conditions into its unlocking position, said bolt also shiftable into its unlocking position by a key; means for preventing the automatic operation of said bolt and controlled by push devices, the improper manipulation of which will more positively lock the bolt against automatic movement.

17. In a lock, the combination of a bolt; means for shifting said bolt in one direction into its unlocking position under certain conditions, said bolt also shiftable in another direction into its unlocking position by a key, and combination means for controlling its movement in the first-mentioned direction.

18. In a lock, the combination of a bolt, means for automatically shifting said bolt in one direction into its unlocking position under certain conditions, said bolt also shiftable in another direction into its unlocking position by a key; and one or more push devices for controlling the automatic operation of said bolt.

19. In a lock mechanism, the combination of a bolt adapted to be operated by a key; push-button mechanism for controlling the operation of said bolt independently of said

key and comprising a bar having notches; and means coöperating with the bolt for preventing its movement except when shifted by the key, and push devices having parts projecting into the notches of said bar for preventing the movement of such bar.

20. In a lock mechanism, the combination with a spring-controlled bolt operative by a key under certain conditions, of means for locking said bolt against movement except when operated by the key; and means for controlling said locking means and comprising a plurality of push-buttons, a part thereof being assembled in combination whereby on the operation of the proper buttons the unlocking of the bolt is effected, and on the operation of any part of such buttons not in the combination the bolt is maintained in its locking position.

21. In a lock mechanism, the combination, with a spring-actuated rotary bolt, of rotary means for controlling it; and means in engagement with said rotary means for preventing the rotation thereof and embodying a plurality of push-pins.

22. In a lock mechanism, the combination, with a bolt, of means adapted to be actuated by a key for controlling it; means for locking said means against movement and comprising a device having a part thereof in engagement with said controlling means; and a push-pin for releasing said device.

23. In a lock mechanism, the combination, with a spring-actuated bolt, of a tumbler connected therewith and adapted to be shifted by a key to shift said bolt; means for preventing the movement of said tumbler in the absence of a key and comprising a member in engagement with said tumbler and having a plurality of recesses; and a plurality of push-pins having projections entering said recesses, the organization being such that on the release of said push-pins from said recessed member the bolt will be shifted.

24. In a lock mechanism, the combination, with a spring-actuated rotary bolt, of a tumbler connected therewith and adapted to be shifted by a key to shift said bolt; means for preventing the movement of said tumbler in the absence of the key and comprising a sliding member in engagement with said tumbler and having a plurality of recesses; and a plurality of push-pins having projections entering said recesses, the organization being such that on the release of said push-pins from said recessed member the bolt will be shifted.

25. In a lock mechanism, the combination, with a spring-actuated bolt, of a tumbler connected therewith and adapted to be shifted by a key; means for preventing movement of the bolt in the absence of a key and comprising a shiftable member having a series of recesses; and a plurality of push pins or buttons having projections in engagement with said shiftable member, the organization being such that on the release of certain of the push-buttons from the shiftable member the bolt will be shifted into its unlocking position, and on the manipulation of certain of the push-buttons the bolt will be further locked against movement.

26. In a lock mechanism, the combination, with a spring-actuated rotary bolt, of a tumbler connected therewith and having one or more projections thereon and adapted to be operated in one direction by a key having recesses corresponding with said projections; means for preventing the movement of said bolt in an opposite direction and comprising a sliding bar having a plurality of recesses; and push-pins having projections in engagement with said recesses, the organization being such that on the release of the projections from the bar the bolt is shifted by its spring into an unlocking position.

27. In a lock mechanism, the combination with a bolt, of a spring-actuated tumbler for controlling it; shiftable means in engagement with the tumbler for preventing the movement of said tumbler; and combination-operated means effective to release said shiftable means and thereby permit the operation of the tumbler.

28. In a lock mechanism, the combination, of a bolt adapted to be operated by a key, a tumbler; and means for controlling the movement of said tumbler independently of the key and comprising a plurality of push pins or buttons and means connected therewith and with said tumbler and effective to lock the tumbler against movement until the proper manipulation of the push-buttons.

ALAN R. FERGUSSON.

Witnesses:
C. A. WEED,
GEO. N. SEARS.