

W. S. NASH.
ELECTRIC LOCK.

No. 567,156.

Patented Sept. 8, 1896.

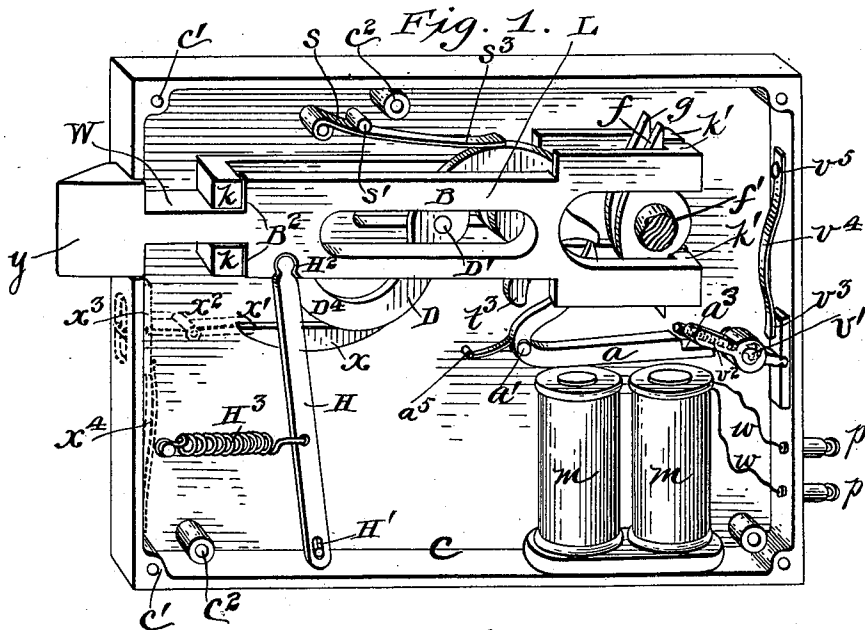
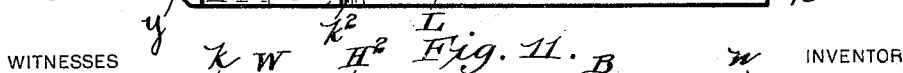
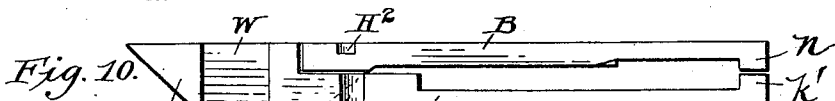
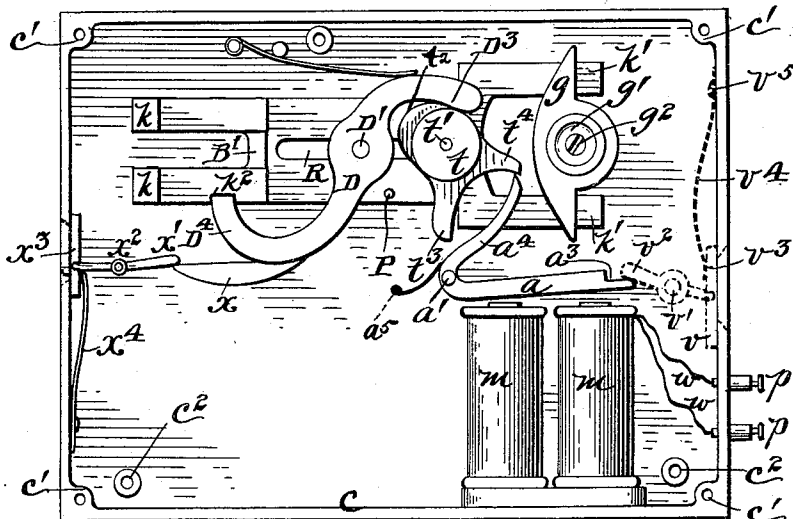


Fig. 2.

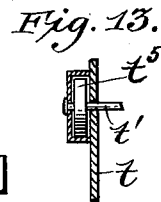
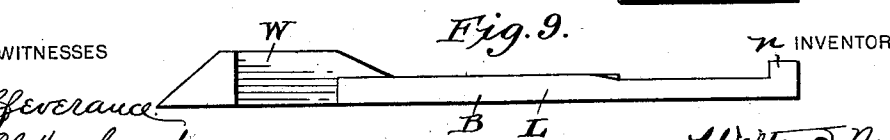
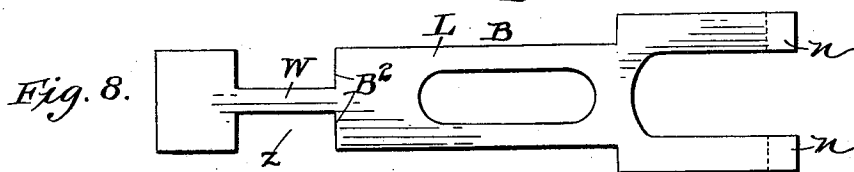
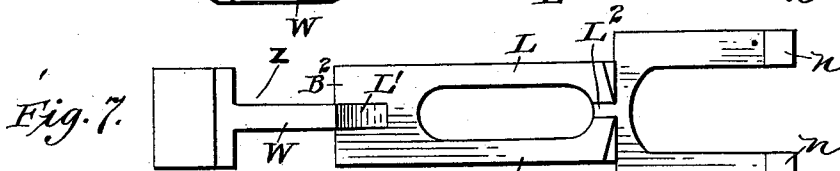
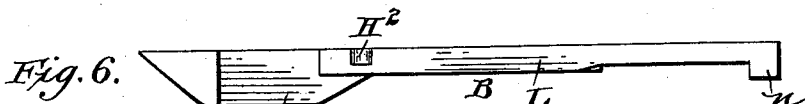
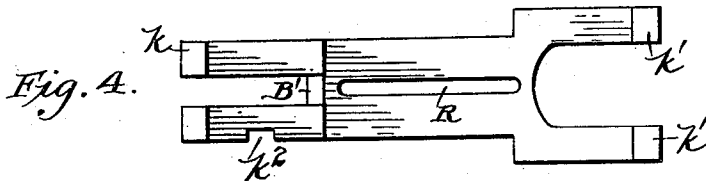
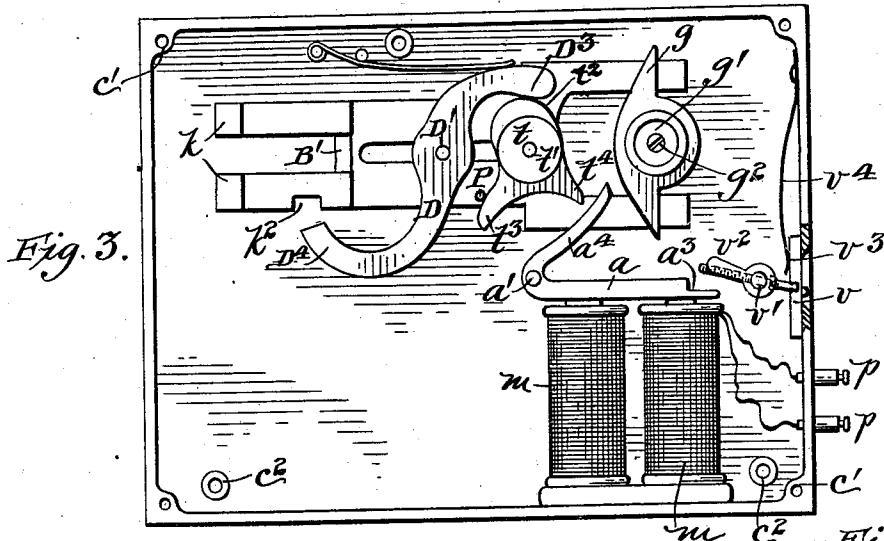


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UNITED STATES PATENT OFFICE.

WALTER S. NASH, OF KNOXVILLE, TENNESSEE.

ELECTRIC LOCK.

SPECIFICATION forming part of Letters Patent No. 567,156, dated September 8, 1896.

Application filed November 21, 1895. Serial No. 569,703. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. NASH, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Door-Locks; 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 the letters of reference marked thereon, which form a part of this specification.

My invention relates to door locks or latches, and more particularly to that class of locks having latch-bars which may be operated from within a house or closure, but can only be made operative from without at the will of a person within the room or building the door of which is so closed, by means of an electric current operated from a distance, as, for instance, by the pressure of a push-button in the office of an apartment-house or hotel, or in the lobby of a theater, and is especially adapted to be applied to the exit-doors of theaters or to the doors of rooms in hotels and apartment-houses and the like, where it is desirable that all doors may be quickly unlocked, especially in an emergency, from some central and accessible station.

In carrying out these objects my invention consists of a latch bar or bolt, a lock-bar or underbolt interlocking therewith, a spring-impelled dog engaging the lock-bar, a device for operating said dog, and an electromagnet for releasing the device, whereby the dog may be disengaged from the lock-bar and the lock be released.

It also consists of a latch bar or bolt with an interlocking lock-bar or underbolt, a spring-impelled dog engaging in a notch in the lock-bar, a spring-actuated trip engaging the dog, an arm upon one side of the trip engaging the upper arm of an elbow-armature, an electromagnet so arranged that when the magnet is energized the trip is released from its engagement with the elbow-armature, thus disengaging the dog from the lock-bar, releasing the lock.

It further consists in certain other novel combinations, constructions, and arrange-

ments of parts, as will be clearly set forth and claimed.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a view of the interior of a latch-lock embodying my invention, showing the normal positions of all parts when the door is locked. Fig. 2 represents the same, save that here the latch-bar and its actuating spring-lever are removed to show more fully the lock-bar and locking mechanism. Fig. 3 represents the same, except that here the locking device is withdrawn from the lock-bar, the latter now being responsive to the outer door-knob. Figs. 4 and 5 illustrate the form and construction of the lock-bar. Figs. 6, 7, 8, and 9 are illustrative of the form and construction of the latch-bar. Fig. 10 shows the latch and lock bars combined and interlocked in their normal positions. Fig. 11 represents the same, save that here the latch-bar is retracted independently, as when it has responded to the rotation of the inner door-knob. Figs. 12 and 13 illustrate the construction and mode of operation of the spring-trip with reference to its actuating-spring and the lock-casing, respectively.

In the drawings, *c* represents the lock-casing, *c'* and *c''* representing screw-sleeves for attaching cover to lock and lock to door, respectively.

L is the latch-bar, provided with the inwardly-projecting shoulders *n*, which furnish a fulcrum for the inner knob-tumbler *f*, and with the notch *H*², into which engages the head of the spring-lever *H*, which is of the ordinary form and construction. The latch-bar *L* is provided also with the head *y* and neck *W*. The dog *D* is pivoted to the lock-case at *D'* and is provided with the arms *D*³ and *D*⁴ and with the spring *S*, which being sprung by the post *S'* exerts a downward impulse to the dog-arm *D*³, thereby elevating dog-arm *D*⁴, as is apparent. The trip *t* is provided with the eccentric or cam *t*² and with the arms *t*³ and *t*⁴. Trip *T* is pivoted to the lock-case at *t'* and contains a coil-spring, attached to the inner wall of the trip and to the pivot at *t*⁵ and *t*⁶, respectively, Fig. 12, by which the trip is actuated to the front.

g, *g'*, and *g*² are the outer knob-tumbler, tumbler-shaft, and set-screw, respectively,

being so adapted that the inner knob-tumbler f is loosely socketed into said tumbler g , so that both tumblers are independent in their action.

5 A is an elbow-armature pivoted to the lock-case at a' and provided with the spring a^5 , of ordinary form, actuating said elbow-armature upward and to the front, and with the notch a^3 . a^4 is the upright arm of said elbow-armature A and is preferably curved, as shown, in
10 order to economize space, to render the armature more sensitive, and to give full play to trip-arm t^3 . The electromagnets m are of the usual form and are provided with the wires
15 w and poles p . The lock-bar B is provided with the slot R, within which are the pivots D' and t' of the dog and trip, respectively, with the projections k' , which afford a fulcrum for the knob-tumbler g , and with the
20 notch k^2 , into which engages dog-arm d^4 , thus locking the door from the outside. Into the groove B' of the lock-bar slides the miter-shaped portion L' of the latch-bar when the latch-bar is retracted, and by the interlocking
25 of the knobs or projections k of the lock-bar with the shoulders b^3 of the latch-bar the latch-bar is retracted with the lock-bar, as is apparent. When the door is latched, it will be observed that the shoulders n rest upon
30 the projections k' . The miter-back L' is enveloped by the sleeve b^3 , and the knobs k project through the wells z and interlock with the shoulders b^3 . The latch-bar L is also provided with a groove L^2 , in order that when it
35 is being retracted it may clear the head of the trip-pivot t' .

V is a spring-actuated slide-catch pivoted at v' , which when pushed up depresses the armature A by means of the lever-arm v^2 , operating at a^3 , whereby the trip T is released
40 and dog-arm d^3 disengages from notch k^2 , thus unlocking the door permanently, or until the slide-catch is depressed to its normal position. The slide-catch v and accessories are of course
45 only adaptable to a rim-lock.

In mortise-locks the spur or shank x , forming a part of the dog-arm d^4 , and the slide-catch x^3 and accessories (pivoted lever x^2 , lever-arm x' , and actuating-spring x^4) are
50 designed to afford a means for disconnecting the locking mechanism by disengaging dog-arm d^4 from the lock-bar B at will. It will be apparent that but one form of such disconnecting mechanism will be required in
55 either a rim or a mortise lock.

The operation of the device is as follows: The mechanism being in the position shown in Figs. 1 and 2, the pressure of a push-button in the central station, as, for instance, in
60 the office of a hotel or apartment-house, closes a circuit through the poles p and the electromagnet m , causing the latter to attract the elbow-armature a , thus releasing the trip t . The trip t , pivoted to the lock-case at t' , contains a coil-spring t^5 , attached to the pivot t' and to the inner wall of the trip t , which actuates trip t to the position in Fig. 3 where it

is stopped by the pin or lug P engaging with the trip-arm t^3 . The revolution of the trip causes the periphery of the eccentric t^2 to lift
70 the upper arm d^3 of the dog D, which being pivoted at d' to the lock-case withdraws the end of the dog-arm d^4 from the notch k^2 in the lock-bar B, freeing the same and rendering it movable in connection with the rota-
75 tion of the outer knob-tumbler g , which engages with the projections k' , so that when the lock-bar B is retracted by the rotation of the knob-tumbler g the knobs k engage the shoulders b^3 of the latch-bar L. The latch-
80 bar L is also retracted and the door swings free. The locking mechanism is automatic in this: The turning of the outer knob rotates the outer knob-tumbler g , retracting the lock and latch bars, as shown. The lock-
85 bar B is provided with the pin or lug P, against which bears trip-arm t^3 when the locking mechanism is disconnected from lock-bar B, as shown in Fig. 3. Hence when the lock-bar is retracted, pin or lug P, bearing on
90 trip-arm t^3 , as described, reverses the trip t , whereby trip-arm t^4 is forced along the arm a^4 of the armature a , which, having been demagnetized by the breaking of the circuit
95 when the pressure is removed from the push-button, has been impelled to its normal position, Figs. 1 and 2, by the spring a^5 , so that when the lock and latch bars have been fully retracted trip-arm t^4 has passed the upper
100 extremity of the armature-arm a^4 , slightly depressing same in transit. When the outer knob is released, the latch-bar L and the lock-bar B, which is interlocked with the latch-bar by the engagement of the knobs k
105 and the shoulders b^3 , are pulled forward to their normal positions, Fig. 1, by the spring-impelled latch-lever h , which is socketed into the latch-bar L at h^2 . Trip t , however, has
110 passed above and beyond armature-arm a^4 , and on its return-armature a having returned to its normal position, Figs. 1 and 2, trip-arm t^4 reengages with armature, arm a^4 , thus automatically resetting the trip, while the reversing of the trip t has at the same time released
115 the dog D, the dog-arm d^4 being forced into the notch k^2 of the lock-bar B by the action of the spring s on dog-arm d^3 at s^3 when the lock and latch bars have regained their normal positions, as in Figs. 1 and 2. Latch-bar L and lock-bar B form when united a com-
120 pound latch or bolt, so constructed, as shown by the details, Figs. 4 to 11, inclusive, that the latch-bar L moves freely within and upon the lock-bar B, and can be at all times retracted by the rotation of the inner knob-
125 tumbler f , which is loosely socketed into but works wholly independently of the outer knob-tumbler g , the door being thus always unlocked from within, a turn of the inner door-knob rotating the tumbler f and retracting
130 the latch-bar. The locking mechanism can at all times be controlled from within at will, because in a rim-lock, if the slide-catch v , which is attached to and projects through the

rear end of the lock, be pushed up the arm v^2 of the spring-lever v' engages notch a^3 in the elbow-armature A, depressing the elbow-armature, thus releasing the trip t and disengaging the arm d^4 of the dog D from the notch k^2 in the lock-bar B, which renders the lock-bar B responsive to the outer knob-tumbler g , as is apparent, while for mortise-locks the same purpose is effected by the slide-catch x^3 , attached to and projecting from or rather through the face of the lock, which, when pushed up, depresses the arm x' of the spring-lever x^2 , which engages with the spur or shank x , attached to or forming a part in mortise-locks of the arm d^4 of the dog D, and withdraws dog-arm d^4 from its engagement with the lock-bar B in the notch k^2 , rendering the lock-bar operative, as before indicated. It will be observed that when arm d^4 of the dog D is disengaged from the notch k^2 of lock-bar B the lock-bar is at all times responsive to the outer knob-tumbler. Hence, as it follows that when the lock-bar B is retracted it withdraws with it the latch-bar L, when the locking mechanism is disconnected from the lock-bar B the rotation of the outer door-knob retracts the lock and latch bars and permits the door to swing freely.

Having described my invention and its operation, I claim—

1. In a door-lock, the combination of a latch bar or bolt, a head portion and a neck portion of the said latch bar or bolt and laterally-projecting shoulders at one end of said latch-bar, and lateral projections at the other end of the same, a lock-bar provided with a recess adapted to receive the neck portion of the latch-bar so that it may slide therein, and lateral projections at one end of said lock-bar adapted to engage and interlock with the laterally-projecting shoulders of the latch-bar and lateral projections at the other end of the said lock-bar, an outer knob-tumbler engaging with the said lateral projections of the lock-bar, an inner knob-tumbler acting independently of said outer knob-tumbler and engaging the lateral projections on the latch-bar, and means for locking and unlocking the lock-bar, substantially as described.

2. In a door-lock, the combination of a latch-bar, or bolt, and a lock-bar, or underbolt, interlocking therewith, a spring-impelled dog engaging the lock-bar, a device for operating said dog and an electromagnet for releasing the device, whereby the dog may be disengaged from the lock-bar and the lock be released, substantially as described.

3. In a door-lock, the combination of a latch-bar, or bolt, with an interlocking lock-bar, or underbolt, a spring-impelled dog engaging in a notch in the lock-bar, a spring-actuated trip engaging the dog, an arm upon one side of the trip engaging the upper arm of an elbow-armature, and an electromagnet so arranged that when the magnet is energized the trip is released from its engagement with the elbow-armature, disengages the dog

from the lock-bar, thus releasing the lock, substantially as described.

4. In a door-lock, the combination of a latch-bar, or bolt, with an interlocking lock-bar, or underbolt, a spring-impelled dog engaging in a notch in the lock-bar, a spring-actuated trip which automatically operates the dog when released, and is adapted to be moved to its normal position by the operation of the lock, an elbow-armature engaging the trip and an electromagnet controlling said armature, substantially as described.

5. In a door-lock, the combination of a sliding latch-bar, or bolt, an interlocking lock-bar, or underbolt, a notch in the side of the lock-bar, one arm of a spring-actuated trip engaging the notch and the other arm engaging the periphery of an eccentric on, or a cam projecting from, a spring-impelled trip, an arm on said trip engaging the upper arm of an elbow-armature controlled by an electromagnet, and another arm on said trip adapted, when the trip is released and the locking mechanism is disconnected, to engage with a stud or lug provided on the lock-bar, so that when the lock-bar is retracted the backward pressure of the stud or lug reverses the trip, so that, when the lock-bar is fully retracted, the trip-arm, which normally engages the elbow-armature, has passed beyond the upper end of said elbow-armature, slightly depressing it in transit, consequently, when the lock-bar is released and is carried forward by the action of the latch-bar, the upper trip-arm springs forward to its normal engagement with the upper arm of said elbow-armature, setting the lock, substantially as set forth.

6. In a door-lock, the combination of a latch-bar, or bolt, with an interlocking lock-bar, or underbolt, a notch in the side of the lock-bar, a pivoted spring-impelled dog, one arm of which normally engages the notch in the lock-bar and the other engaging the periphery of the eccentric of a pivoted spring-actuated trip, an arm attached to the side of the trip engaging with the upper arm of a pivoted spring-actuated elbow-armature controlled by an electromagnet, another arm attached to the lower side of the trip a stud or lug projecting from the top of the lock-bar, and conducting-wires extending to a distant point, the whole apparatus being so arranged that the closing of an electric circuit through the electromagnet disconnects the locking mechanism from the lock-bar rendering it operative, while the retraction of the lock-bar and the latch-bar, interlocked as set forth, automatically resets the lock, substantially as set forth.

7. The combination of a spring-actuated slide-catch, a pivoted lever controlled thereby and engaging with the lower arm of the elbow-armature, the whole arranged so as to depress the elbow-armature and disconnect the locking mechanism, as set forth.

8. The combination of the spring-actuated

slide-catch, a pivoted lever controlled thereby and engaging a spur or shank attached to, or forming a part of the pivoted dog, the whole arranged so as to disconnect the locking mechanism from the lock-bolt, as set forth.

9. In a door-lock; the combination of an outer knob-tumbler, an inner knob-tumbler loosely socketed therein, a movable latch bar or bolt provided with projections on the under side thereof, forming a fulcrum for said inner knob-tumbler, and with a spring-impelled lever actuating said latch-bar to the front, a lock-bar or underbolt, interlocking with said latch-bar, provided with knobs or projections on the top thereof, which engage projecting shoulders of the latch-bar, a neck to said latch-bar and a sleeve or recess in said lock-bar, whereby said latch bar or bolt moves freely and independently within and upon said lock-bar or underbolt, projections on the rear end of the lock-bar forming a fulcrum for the outer knob-tumbler, a notch in the side of the lock-bar or underbolt, a pivoted spring-impelled dog, one arm of which normally engages the notch in the lock-bar or underbolt the other arm engaging the periphery of the eccentric, or a cam, of a pivoted spring-impelled trip, an arm attached to the rear of the trip engaging the upper arm of a pivoted spring-actuated elbow-armature regulated by a set-screw and controlled by an electromagnet, another arm attached to the lower side of the trip, a stud or lug projecting from the face or upper side of the lock-bar or underbolt, conducting-wires extending to some central station, the spring-actuated slide-catch, a pivoted lever controlled thereby engaging with a notch in the lower arm of the elbow-armature, as and for the purposes set forth.

10. In a door-lock, the combination of an

outer knob-tumbler, an inner knob-tumbler loosely socketed therein, a movable latch-bar, or bolt, provided with projections on the under side thereof, forming a fulcrum for said inner knob-tumbler, and with a spring-impelled lever actuating said latch-bar to the front, a lock-bar, or underbolt, interlocking with said latch-bar, provided with knobs or projections on the top thereof, which engage projecting shoulders of the latch-bar, a neck to said latch-bar and a sleeve or recess in said lock-bar whereby said latch bar or bolt moves freely and independently within and upon said lock-bar or underbolt, projections on the rear end of the lock-bar forming a fulcrum for the outer knob-tumbler, a notch in the side of the lock-bar or underbolt, a pivoted spring-impelled dog, one arm of which normally engages in the notch in the lock-bar or underbolt, the other arm engaging the periphery of the eccentric, or a cam, of a pivoted spring-impelled trip, an arm attached to the rear of the trip engaging the upper arm of a pivoted spring-actuated elbow-armature regulated by a set-screw and controlled by an electromagnet, another arm attached to the lower side of the trip, a stud or lug projecting from the face or upper side of the lock-bar, or underbolt, conducting-wires extending to some central station, and the spring-actuated slide-catch, a pivoted lever controlled thereby and engaging with a spur or shank attached to, or forming a part of, the pivoted dog, as and for the purposes set forth.

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

WALTER S. NASH.

Witnesses:

R. H. SIMMONDS,
ROBT. L. LOFTIS.