

April 4, 1939.

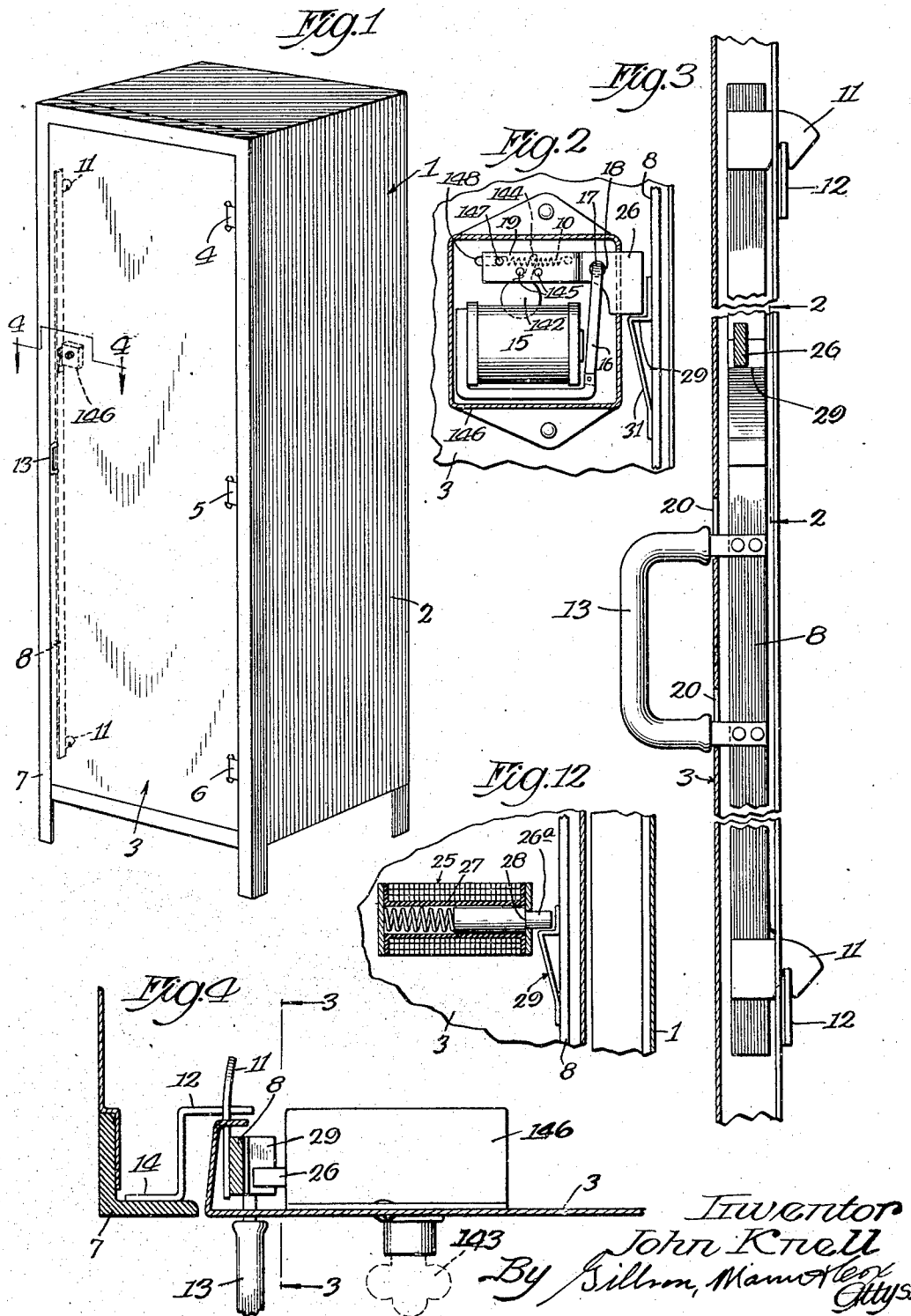
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2,153,088

ELECTRIC LOCKER CONTROL

Filed March 24, 1936

4 Sheets-Sheet 1



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ELECTRIC LOCKER CONTROL

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4 Sheets-Sheet 2

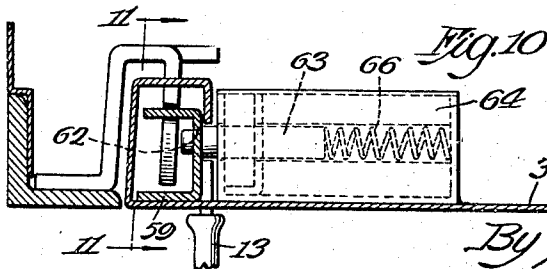
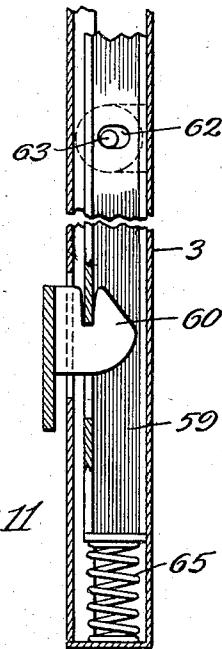
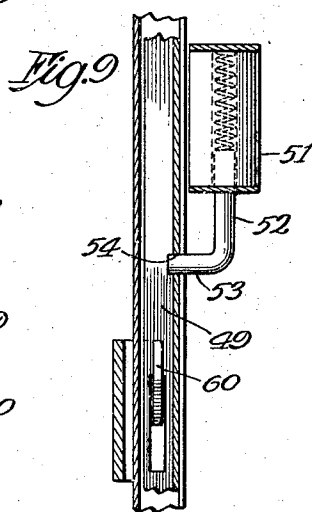
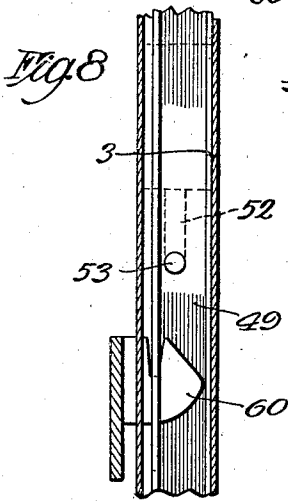
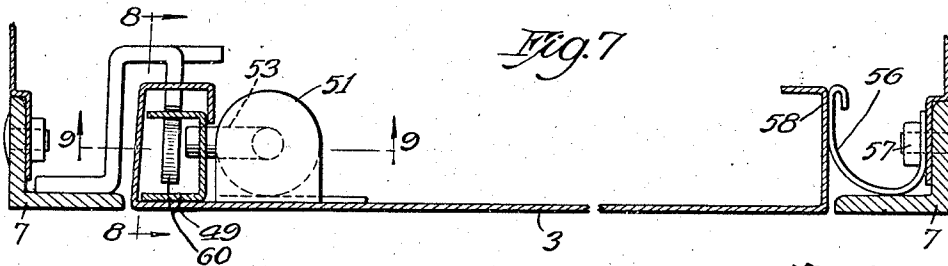
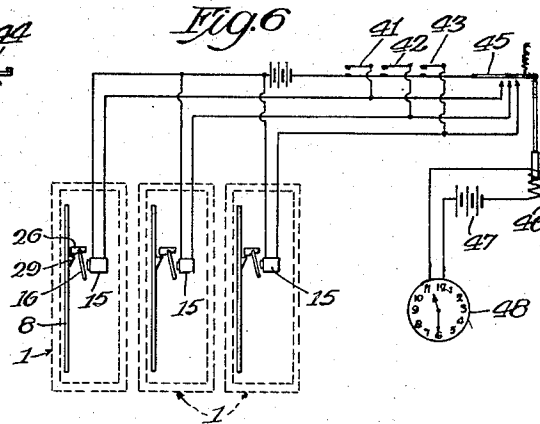
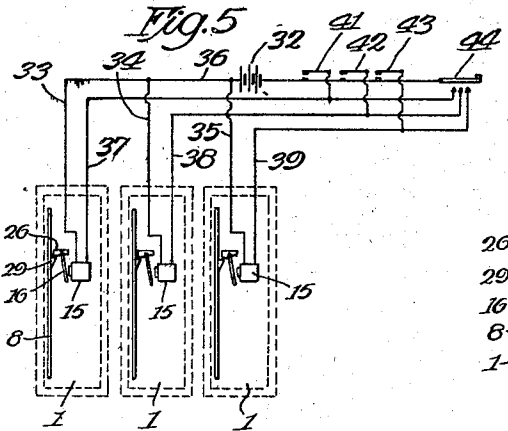


Fig. 11

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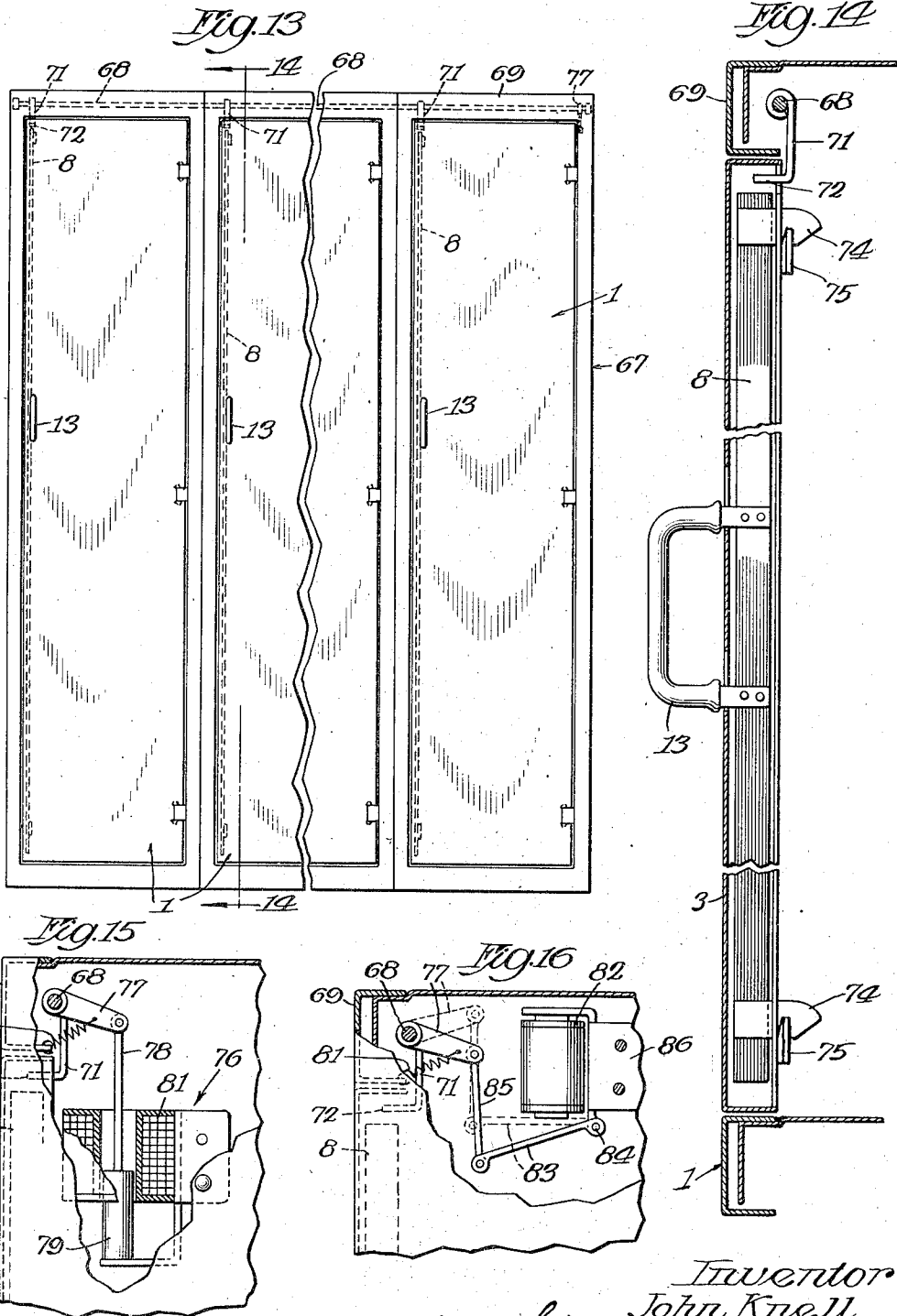
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ELECTRIC LOCKER CONTROL

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4 Sheets-Sheet 3



Inventor  
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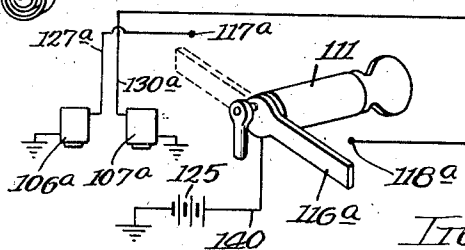
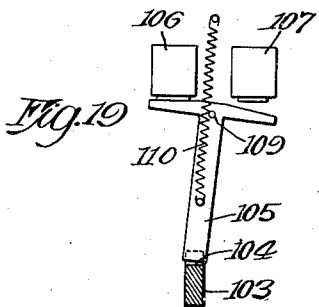
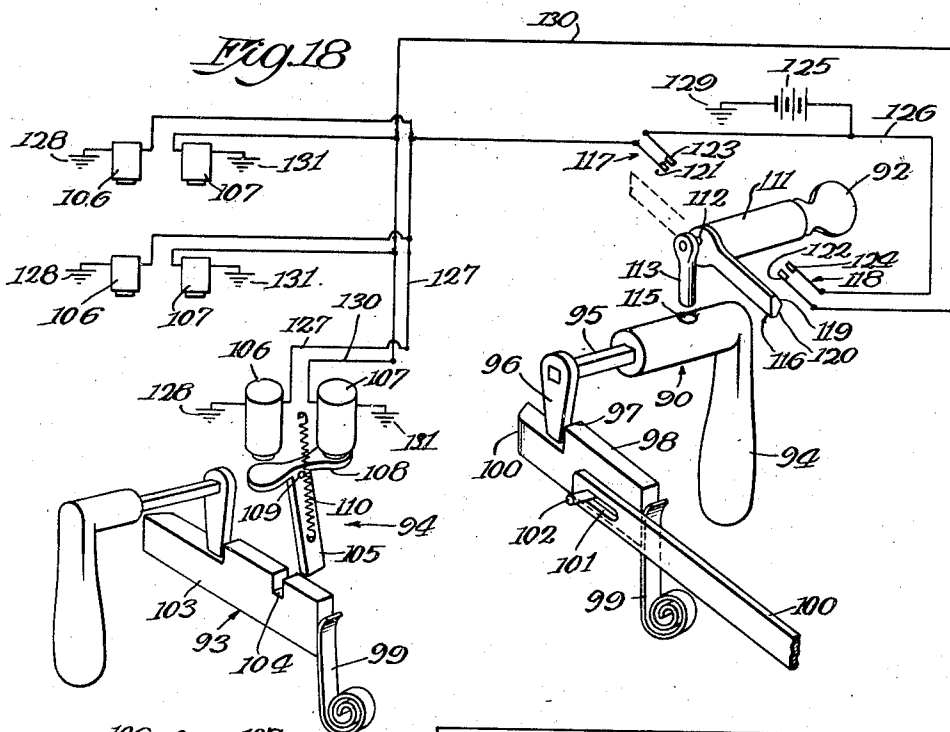
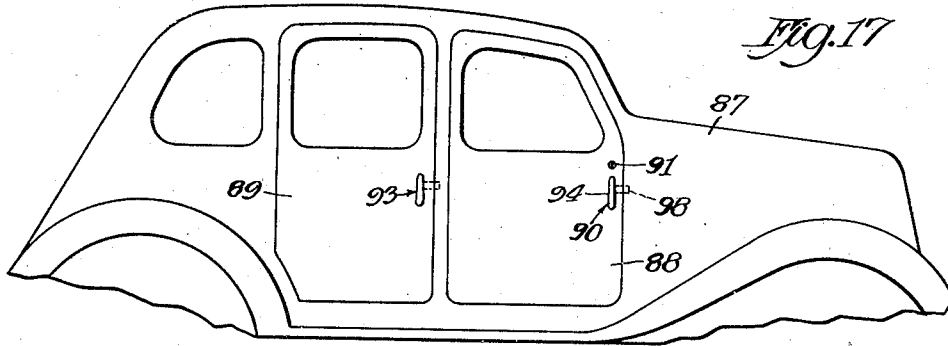
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ELECTRIC LOCKER CONTROL

Filed March 24, 1936

4 Sheets-Sheet 4



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# UNITED STATES PATENT OFFICE

2,153,088

## ELECTRIC LOCKER CONTROL

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Application March 24, 1936, Serial No. 70,621

2 Claims. (Cl. 292—150)

This invention relates to lockers and more particularly to means for fastening and unfastening the latch bars associated with the doors of the lockers.

5 One of the objects of the invention is the provision of new and improved means electrically operated for controlling the locking of latch bars used for securing the doors of lockers in closed position.

10 Another object of the invention is the provision of a new and improved system for controlling the locking and unlocking of the doors to a plurality of lockers, especially adapted for use in public schools and the like.

15 A further object of the invention is the provision of new and improved mechanism for securing doors of lockers and the like in closed position adapted to be associated with novel remote control means for automatically locking and releasing the doors of a bank of lockers at predetermined intervals of time.

20 A still further object of the invention is the provision of new and improved control means for locking and releasing doors of lockers for use in schools that is so constructed and arranged that it will encourage promptness in attendance on the part of the pupils.

25 Another object of the invention is the provision of a new and improved means for controlling the releasing or unlocking of latch bars for lockers that is simple in construction, reliable in operation, easily installed and is composed of a minimum number of parts.

30 Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a perspective view of one of the lockers;

40 Fig. 2 is a diagrammatic view of the lock operating mechanism;

Fig. 3 is a section on the line 3—3 of Fig. 4;

Fig. 4 is a section on the line 4—4 of Fig. 1;

45 Fig. 5 is a diagrammatic view of the locker system showing a plurality of lockers with the invention in position thereon together with the wiring for the control mechanism;

Fig. 6 is a view similar to that shown in Fig. 5 but showing a modified form of control;

Fig. 7 is a horizontal section through one of the lockers showing a modified form of the invention;

Fig. 8 is a section on the line 8—8 of Fig. 6;

55 Fig. 9 is a section on the line 9—9 of Fig. 7;

Fig. 10 is a view similar to Fig. 7 but showing a modified form of locking mechanism;

Fig. 11 is a section on the line 11—11 of Fig. 10;

Fig. 12 is a vertical section of a door showing a modified form of lock;

Fig. 13 is a front elevation of a bank of lockers showing the invention in position therein in dotted lines;

Fig. 14 is a section on the line 14—14 of Fig. 13;

Fig. 15 is a side view of the lower portion of one of the lockers showing the operating mechanism on an enlarged scale with parts broken away;

Fig. 16 is a similar view showing a modified form of operating mechanism;

Fig. 17 is a side elevation of a vehicle showing a modified form of the invention in position therein;

Fig. 18 is a diagrammatic view of the locking system;

Fig. 19 is a diagrammatic view of the locking bolt; and

Fig. 20 is a diagrammatic view of the locking mechanism with a modified wiring diagram.

It is a common practice in schools and the like in which individual lockers are provided, for each of the pupils to have a key for securing the latch bar in its lowered position for locking the door of his individual locker. Considerable difficulty has been experienced with this arrangement due to the fact that the pupils not infrequently misplace or lose the keys. The present invention seeks to remedy this difficulty by the provision of means whereby the use of a key is dispensed with.

In the form of the construction shown, which is by way of example only, the locking and unlocking of the doors are under the control of the teacher or an attendant and the parts are so constructed that the locking mechanism is under remote control. A plurality or bank of lockers is included in the system and the fastening mechanism is arranged so that the doors may be unlocked simultaneously or may be locked or unlocked separately or independently as occasion may require.

Since the lockers are all of substantially the same construction, only one need be described in detail.

Referring now to the drawings, the reference character 1 designates one of the lockers, each of which is of the usual or conventional type comprising the top, bottom and vertical walls 2 and corner posts or uprights 7. The door 3 is hinged as at 4, 5 and 6 to one of the corner posts or uprights 7. The locker may be and prefer-

ably is of sheet metal, the side or panels being secured together by the corner posts or uprights 7. The door is adapted to be secured in closed position by an elongated latch bar 8, which is slidably mounted in a channel formed on the free edge of the door as clearly shown in Figs. 2 and 3 of the drawings. The latch bar 8 is provided with a plurality of catches 11 which are adapted to engage keepers 12 rigidly mounted on the upright or corner post 7 of the locker as shown at 14 (see Figs. 3 and 4). The latch bar 8 is adapted to be elevated for disconnecting the catches 11 from the keepers 12 by a handle member 13 which extends through slots 20 in the door 3 and is rigidly connected to the bar as shown in Fig. 3. The bar is held in lowered position by gravity as is usual in such constructions. Since the details of the construction of the locker and the latch bar constitute no part of the present invention, it is not thought necessary to further illustrate or describe the same.

In the form of the construction selected to illustrate one embodiment of the invention, a plurality of the lockers 1 (see Fig. 5) is suitably arranged, either together as one bank or assembly, or otherwise arranged as may be desired. The latch bar for each of the doors is locked in lowered position by electrically operated mechanism that will now be described.

Since the device for locking each latch is identical, only one need be described. Any suitable mechanism may be employed. Referring to the drawings, and more particularly to Fig. 2, an electromagnet, shown diagrammatically in said figure, is employed. In this figure, the reference character 15 designates an electromagnet of the club-foot type having a pivoted armature 16 provided with a reduced end 17 extending through an enlarged opening 18 in the inner end of the locking bolt 26 for releasing said bolt when the electromagnet is energized. A spring 10 normally holds the armature 16 in inoperative position shown in Fig. 2, whereby the bolt 26 is normally projected forwardly for engaging a shoulder on the lock bar for holding the same in latched position.

If desired, a solenoid may be employed instead of an electromagnet for operating the locking bolt. As shown in Fig. 12, a suitable solenoid 25 is secured to the inner side of the door 3 adjacent to the free edge thereof. The solenoid is provided with a movable core or armature in the form of a plunger 26a, which is slidably mounted in the tubular stationary core 27 of the solenoid. The plunger 26a is provided with a reduced outer end forming a shoulder 28 which limits its outward movement.

The bolt or plunger 26 is adapted to engage a ledge or shoulder member in the form of a bracket 29 (see Fig. 4) rigidly secured to the latch bar 8 for holding the same in lowered position. The ledge or shoulder member 29 is provided with an inclined surface 31 which is adapted to engage the plunger 26 for automatically retracting the same when the latch bar moves from inoperative to operative position. When it is desired to operate the door, the electromagnet 15 is energized, which retracts the plunger 26, thereby permitting the latch bar 8 to be elevated by the handle 13 for releasing the catches 11 from the keepers 12.

In order that the locking and unlocking of the doors may be controlled from a distance, the wiring for the electromagnets is arranged in any approved manner with switches for the individ-

ual electromagnets and a master switch, for all of the lockers, all located at a point convenient for the teacher or attendant.

In the diagrammatic form shown, which is for illustrative purposes only, a battery 32 (see Fig. 5) is provided for furnishing the electrical energy for energizing the electromagnets 15 of the lockers. It is understood that any suitable source of electrical energy may be employed instead of the batteries. Conductors 33, 34 and 35 are arranged in parallel with the battery lead 36 and the return conductors 37, 38 and 39 are connected respectively to one pole of the switches 41, 42 and 43, the other poles of which are connected with the battery lead 36. The switches are also arranged in parallel so that the circuit may be closed through either of the electromagnets as may be desired by operating the corresponding switch. The master switch 44 is also connected with the battery 36 and is adapted to be depressed for closing the circuit simultaneously through each of the return conductors 37, 38 and 39.

In the practical application of the system, the teacher or attendant will operate the master switch 44 when it is desired to open all of the lockers simultaneously, as when the bell rings for the beginning of school work in the morning or at noon. The switch may be left closed for a predetermined length of time, say ten minutes during which time the pupils are supposed to place their coats, hats, etc., in their individual lockers and close the door. After the prescribed interval of time has elapsed, the switch 44 is opened and the closed doors thereby locked. Any door that is open when the circuit is opened, may, of course, be locked by closing the same and lowering the latch bar, which will cause the retraction of the plunger 26 and its snapping back to locked position when the shoulder 29 passes beneath the plunger. In case the pupil is tardy, it will be necessary for him to report to the teacher or the attendant, whereupon the individual switch 41, 42 or 43, as the case may be, will be operated for releasing the door of the pupil's locker. By means of this arrangement, the pupil is relieved of the necessity of carrying the key and furthermore, promptness in attendance of the pupil will be encouraged as otherwise he is under the necessity of reporting to the teacher or attendant before he may have access to his locker. This is considered an important feature of the invention.

The construction shown in Fig. 6 differs from that in Fig. 5 in that the master switch is closed automatically by a time control or chronometer mechanism at predetermined times, as for instance, at five minutes before nine o'clock in the morning and five minutes to one o'clock in the afternoon and again in the afternoon when the school day is over. The time mechanism is so constructed that after a predetermined number of minutes the circuit will be opened thereby locking all the lockers automatically. In this form of construction the master switch 45 is operated by a relay 46 having a separate battery 47 for furnishing the electrical energy. The time control mechanism 48 may be of the usual or any well-known construction and since the details of this mechanism constitutes no part of the present invention, it is not thought necessary to further illustrate or describe the same. This mechanism is shown diagrammatically at 48 in Fig. 6.

The system shown in Fig. 6 is also provided with the individual switches 41, 42 and 43 for the lockers 1, there being one individual switch for

each locker, as in the construction previously described.

A modified form of the locking mechanism is shown in Fig. 7. In this form of the construction, the latch bar 49, carried by the door 3, is operated by a solenoid 51. In this form of the construction, the solenoid 51 is provided with an armature in the form of a plunger 52 having its lower end bent laterally as at 53 (see Fig. 9) for engaging in the opening 54 in latch bar 49. In this form of construction, when the solenoid 51 is energized, the armature 52 is elevated and with it the latch bar 49. The parts are so constructed that the armature 52 moves a sufficient distance for releasing the latch bar 49 from the keepers 60 for unlocking the door.

Suitable means may, if desired, be provided for automatically opening the door when the latch bar is elevated.

In the form of construction shown, one or more curved springs 56 are employed for that purpose. The spring 56 is attached to the upright or corner post 17 of the locker by means of a bolt or rivet 57 and the free end of the spring engages the hinged edge of the door as at the inner edge of the angle portion 58 (see Fig. 7) for opening the door when the latch is released. In order to counter-balance the weight of the latch bar 49, a spring may, if desired, be provided for assisting in supporting the bar.

In the form of construction shown in Figs. 10 and 11, the latch bar 59 is normally held in released position by suitable means. In this form of the device, the latch bar is held in elevated position by a spring 65 (see Fig. 11) engaging beneath the bar. The latch bar 59 is provided with an opening 62 which is adapted to receive the reduced end of the plunger 63, which constitutes the armature for the solenoid 64.

In this form of construction, when the plunger 63 is withdrawn, the spring 61 will elevate the lock bar, thereby releasing the door so that the same may be opened. In order to lock the door, it is only necessary to close the same and by means of the handle 13 move the latch bar 59 to its lowered position whereby the plunger 63 will be projected forwardly by the spring 66, Fig. 10, and will engage the opening 62 for holding the bar 59 in lowered position for locking the door.

In Figs. 13 to 16 is shown a bank of lockers having a modified form of operating mechanism.

In this form of the construction, a plurality of lockers 1 is arranged in a bank 67 of any suitable length and this bank is provided with a common shaft 68 extending the full length of the bank and rotatably mounted in a suitable position therein.

In the form of construction selected to illustrate one embodiment of the invention, this shaft 68 extends along the upper portion of the lockers adjacent to the upper channel frame members 69 of the lockers 1. Rigidly mounted on this shaft are a plurality of locking members 71, one for each locker. The ends of the locking members 71 are bent forwardly as at 72 whereby they may be turned above the latch bar 8 of each of the doors for preventing the upward movement of the latch bar.

In the form of construction shown, the latch bars 8 are normally held in this lower position by gravity and the latch elements 74 are adapted to engage the upper edges of the keepers 75 for locking the door in closed position. When it is desired to open the door, the latch bar 8 is moved upwardly with the handle 13 for re-

leasing the latch elements 74 from the keepers 75. When the laterally extending portion 72 of the locking member 71 is in the position shown in Fig. 14, the latch bar 8 is held from upward movement and the door is thereby held in locked position. When it is desired to release the latch bar 8, the shaft 68 is rotated counterclockwise, Fig. 14, which will withdraw the laterally extending portions 72 of the locking member from above the latch bar whereby the same may be raised to unlocked position.

Suitable means are provided for locking the bar in its lowered position. In the form of the device selected to illustrate one embodiment of the invention, a solenoid mechanism 76 is employed for rotating the shaft 68. This mechanism comprises a crank or arm 77 which is rigidly attached to the shaft 68 at one end and is pivotally connected to an extension 78 on the movable core 79 of the solenoid 76. The core 79 of the solenoid is normally held in its lower position by a suitable spring 80 operating between the channel bar 69 and the crank or arm 77.

It will be seen that the locking member 71 is normally held in position for locking the latch bar 8 against upward movement and that upon energizing the winding 81 of the solenoid, the latching member 71 will be rotated to the right, Figs. 14 and 15, after which the latch bar may be moved downwardly for releasing the door.

In Fig. 16 is shown a modified construction for releasing the locking member 71. In this form of the construction, an electromagnet 82 is employed for this purpose. The armature 83 is pivoted as at 84 at one end and has its other end connected to a link 85, which in turn is pivoted to the crank or arm 77 of the latch bar 68. When the electromagnet 82 is energized, the parts are moved to the dotted line position shown in Fig. 16 so that the latch bar 8 may be lowered for opening the door. The solenoid and electromagnet may be energized by operating a switch, either manually or by time mechanism, as in the previously described construction.

The electromagnet or solenoid may be located in any convenient position, either on the outer side or on the inner side of the lockers. In the construction shown, these electrical devices are mounted within the lockers as indicated at 86.

While the shaft 68 is shown as being located at the upper portion of the locker above the doors, it is understood that it may be located in the lower portion of the lockers below the doors if it is considered to be advantageous or desirable. Where the gravity type of latch bar is employed, the locking member 71 will, of course, engage above some portion or projection of the latch bar for preventing its elevation while the door is closed.

In Figs. 17 to 20 inclusive, is shown a modified form of the invention as applied to the doors of an automobile.

In this form of construction, the lock for one of the doors is manually operated while those of the remaining doors are electrically operated by electromagnets or solenoids. The switch for controlling the electrically operated lock mechanism is controlled by the manually operated lock mechanism.

In Fig. 17 is shown a motor vehicle 87 having 70 the front and rear doors 88 and 89 respectively, on each side. The front door 88 on the right side of the vehicle is provided with a latch 90 of the conventional type having the keyhole 91 for receiving a key 92, see Fig. 17, for controlling 75

the locking mechanism. Each of the remaining doors is provided with a latch mechanism 93 similar to the latch 90, but the locking mechanism 94 is different in that it is electrically operated.

The construction is shown diagrammatically in Fig. 18. The right front door is provided with a conventional latch 90 having the spindle 95 provided with a handle 94 on one end and an operating arm 96 which engages a shoulder 97 on the latch bolt 98, in the other end. The bolt 98 is normally pressed outwardly by a spring 99, and its outward end is beveled as at 100a as is usual in such constructions.

In opening the door, the handle 94 is turned for causing the arm 96 to engage the shoulder 97 for retracting the latch bolt 98. The bolt may also be opened by a lever, not shown, which is connected to the link 100. The link 100 has a slotted end 101 engaging a pin 102 rigidly mounted on the latch bolt. The slot in the link permits the latch bolt to be operated by the handle 94. Likewise, the latch bolt may be withdrawn by the link 100 without affecting the handle 94.

Since the details of the lock constitute no part of the present construction, it is not thought necessary to further illustrate or describe the same, and since the latching mechanism 93 for each of the remaining doors is substantially the same as the latch 90, it is not thought necessary to describe or illustrate the same.

The locking mechanism for the latch 90 is such that when the key is turned to lock the door, a circuit is momentarily closed through electrically operated mechanism, which operates a lock on each of the other doors.

As shown, the spring-pressed latch bolt 103 is provided with a recess 104 that is adapted to be engaged by a locking bolt 105 operated by the electromagnets 106 and 107. As shown, diagrammatically in Fig. 1, this locking bolt constitutes a projection on the rocking armature 108 of the magnets 106 and 107. This armature is pivoted as at 109 and a spring 110 connected to the projection or locking bolt 105 is adapted to pass dead center when the armature is rocked for holding the locking bolt in locked or unlocked position.

When the magnet 106 is energized, the bolt 105 will rock from the position shown in Fig. 18 into the recess 104 for preventing the retraction of the latch bolt 103 and when the magnet 107 is energized, the lock bolt will be rocked out of engagement of the recess 104.

The switch mechanism for opening and closing the electric circuit will now be described. For convenience of illustration, the cylinder 111 of the lock for the front door, Fig. 18, is shown as being provided with a pin 112 eccentrically arranged and on this pin is pivoted a locking bolt 113, which is adapted to be raised and lowered by the rotation of the cylinder 111, which is accomplished in the usual manner by a key 92. When the key 92 is turned so that the locking bolt 113 is in its lowermost position, the bolt will engage in an opening 115 in the rotating spindle 95 for preventing its rotation, whereby the handle 94 is locked from rotation, thereby locking the door in its closed position.

The cylinder 111 is provided with a wiper arm 116, which is adapted to be rotated through an angle of 180 degrees.

When the lock is operated, a pair of switches 117 and 118 are provided which are adapted to be

operated by the wiper arm 116 during the rotation for closing the circuit through the electromagnets 116 and 117. The arm 116 is provided with a pair of inclined faces 119 and 120 which are adapted to engage spring fingers 121 and 122 for moving them into engagement with contact members 123 and 124 for closing said circuits.

The operation of the device will now be described. When the parts are in the position shown in Fig. 18, the doors may be unlatched by rotating the handles in the usual manner. When it is desired to lock the doors, the key 92 is inserted in the cylinder 111 in the usual manner and upon rotating the same, to cause the bolt 113 to engage in the opening 115, the wiper arm 116 will engage first the switch 118, thereby closing the circuit through the electromagnet 108, and then the switch 117 for closing the circuit through the electromagnet 106. When the switch 117 is closed, the electromagnet 106 is energized, which will rock the armature 108 for causing the projection 105 to engage the recess 104 in each of the remaining door latches for locking the doors.

The circuit may be traced from the battery 125, which is grounded as at 129, through the conductor 126, switch 117, conductor 127, electromagnet 106, to ground at 128. When the cylinder 111 is rotated to unlock the door, the wiper arm 116 will momentarily close the circuit 117, but since the armature is already in contact with the electromagnet 106, this will not affect said armature since it is held in locked position by the spring 110 which has passed dead center, but when the arm, in its rotation, passes the switch 118, it will close that switch, thereby energizing the electromagnet 107, which will rock the armature, thereby releasing the projection 105 from the notch or recess 104 and releasing the locks. The spring 110 will pass dead center in the opposite direction and will hold the locking bar 105 in unlocked position.

The circuit may be traced from the battery 125, which is grounded on the vehicle as at 129, through the conductor 126, switch 118, conductor 130, electromagnets 107 of each of the doors, and to the ground as at 131. The energizing of the electromagnets 107 will rock the locking bolts out of engagement with the recesses 104 in the latches 113.

In Fig. 20 is shown a slightly different wiring diagram from that shown in Fig. 18. This arrangement differs from that disclosed in Fig. 20, in that the cylinder 111 and wiper arm 116a constitute one element of a switch. The battery 125 is connected to the wiper arm 116a by the conductor 140. The circuit is closed through the electromagnet 106 by rotating the arm 116a into engagement with the contact 117a of the conductor 127a for locking the doors and is turned into engagement with the switch contact 118a of the conductor 130a for closing the circuit through the electromagnet 107a for releasing the latches of the doors the same as in the previous construction.

If desired, means may be provided for withdrawing the locking bolt 26, Fig. 2, and also the locking bolt 98, Fig. 18, without operating the electrical mechanism. This means is shown in Fig. 2 and for the sake of clearness is not repeated in the construction shown in Fig. 18. The device or lock is provided with a conventional key cylinder 142 which is adapted to be partially rotated by a removable key 143, Fig. 4, as is usual



in such constructions. The cylinder 142 has a finger 144 which operates between two pins 145 rigidly connected to the latch bolt 26. When the key is turned, the latch bolt 26 is moved counter-clockwise, as viewed in Fig. 2, the bolt being retracted against the tension of the spring 10 which has one end connected to the casing 146 and its other end connected to a pin 147 rigidly mounted on the latch bolt 26 and slidably mounted in a slot 148 in said casing.

It is thought from the foregoing taken in connection with the accompanying drawings, that the construction and operation of my device will be apparent to those skilled in the art and that changes in size, shape, proportion and details of construction may be made without departing from the spirit and scope of the appended claims.

I claim as my invention:

1. In a locker having cooperating door and jamb members, a latch bar slidably mounted on one of said members and adapted to cooperate with a keeper mounted on the other member, a bolt automatically movable into position for locking the latch bar in latched position and re-

tractible to clear said bar for movement to unlatched position, a link pivotally mounted at one end on the member carrying the latch bar and having its opposite end pivoted to the bolt for positively retracting the bolt, and electromagnetic means for moving said link to retract said bolt.

2. In a locker having cooperating door and jamb members, a latch bar slidably mounted on one of said members and having a projecting shoulder element provided with a cam surface inclined from the outer end of said shoulder toward a point on the latch bar below said outer end, a bolt movable into position above said shoulder element for locking the latch bar in latched position and retractible to clear said bar for movement to unlatched position, spring means biasing the bolt to locking position and yieldable to permit the bolt to move toward retracted position when the cam surface moves downwardly in contact with the bolt, and electromagnetic means adapted when energized to positively retract the bolt.

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