Jan. 31, 1956 M. J. NOREGAARD 2,732,703

DOOR LOCK

Filed Sept. 9, 1952 2 Sheets-Sheet 1

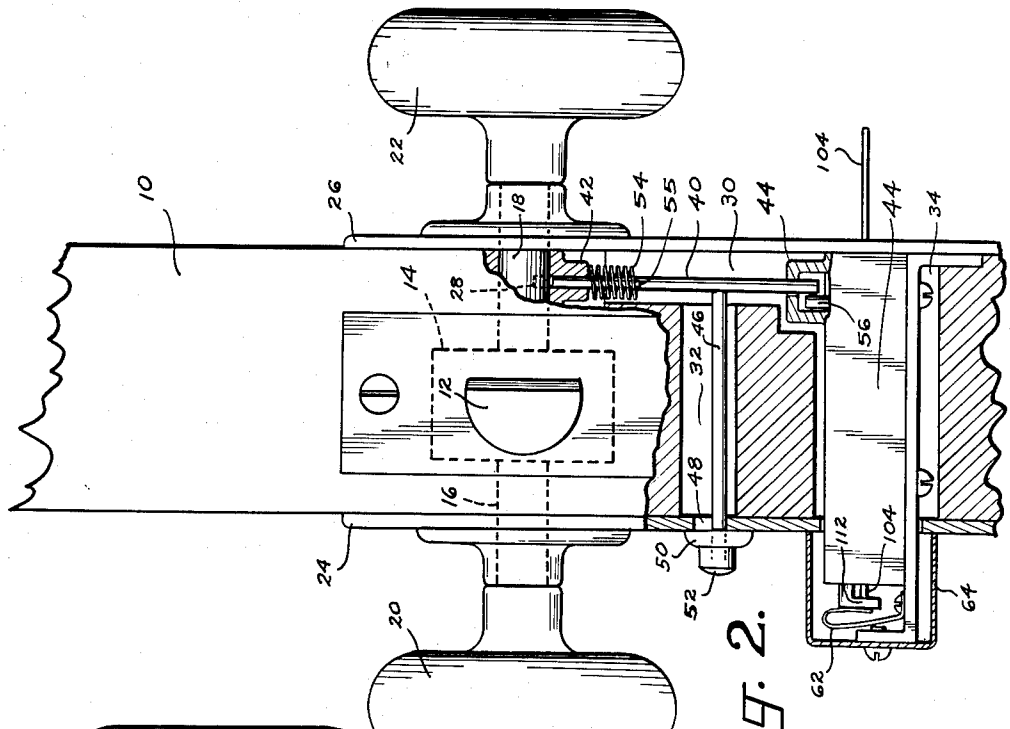


Fig. 2.

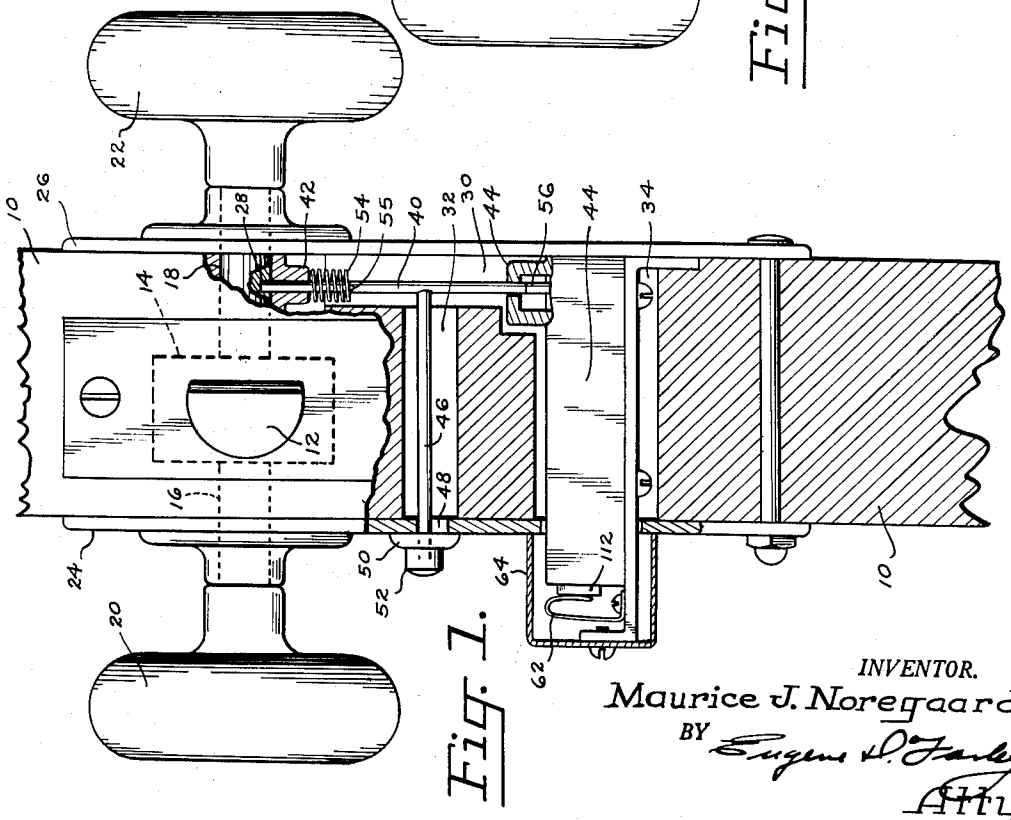


Fig. 1.

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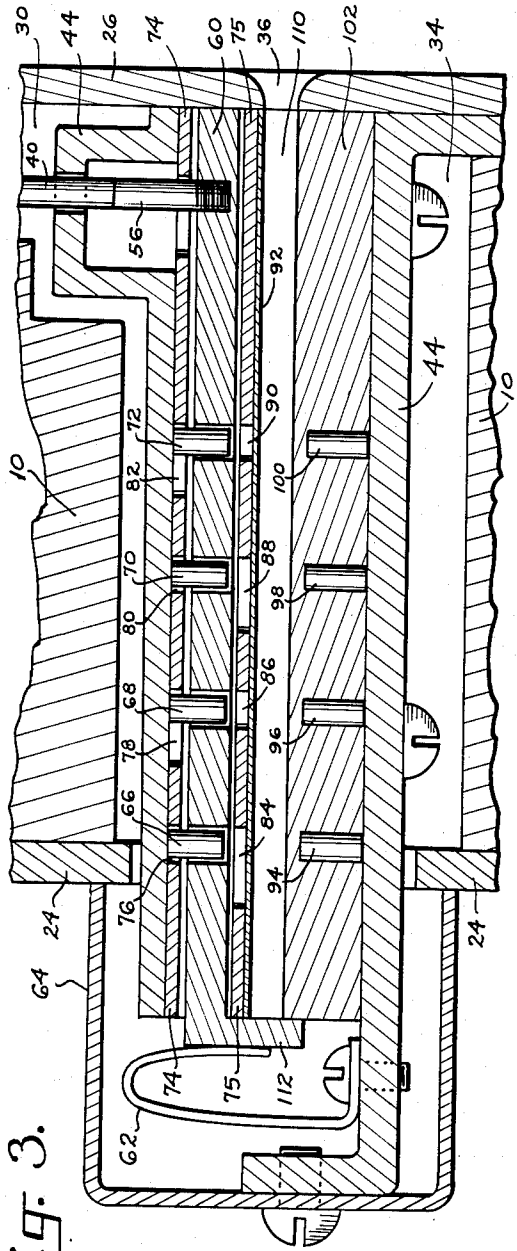


Fig. 3.

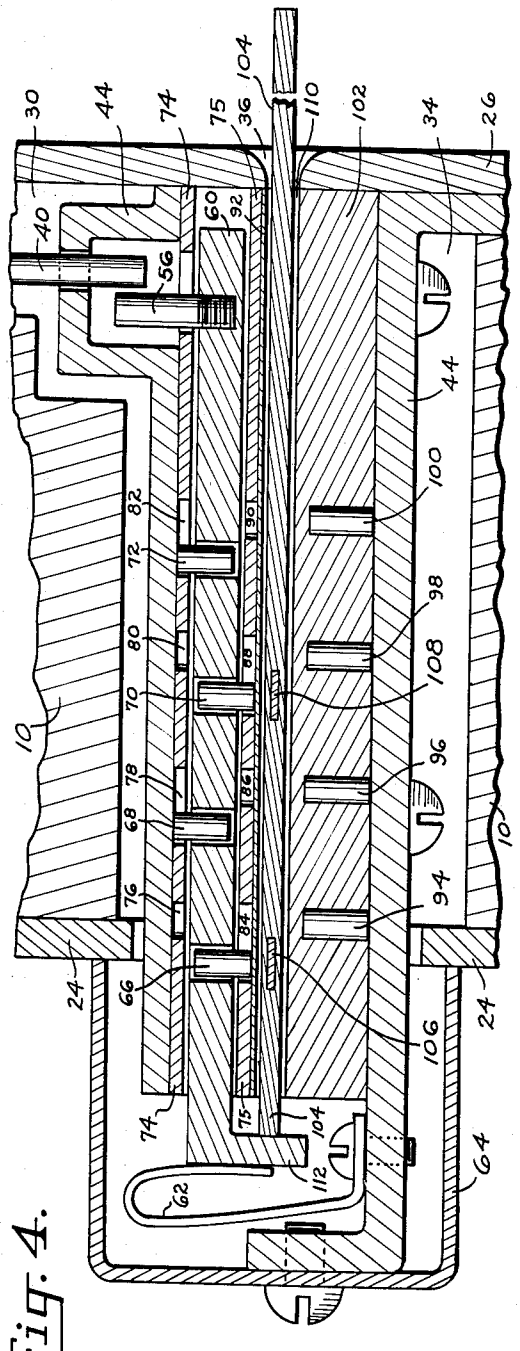


Fig. 4.

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DOOR LOCK

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10 Claims. (Cl. 70—211)

This invention relates to mechanical door locks and more particularly pertains to door locks of the class having a spindle engageable by a locking pin for preventing the rotation of the spindle.

It is a primary object of this invention to provide a mechanical door lock operable by a key in the form of a flat fibrous card.

Another object of this invention is the provision of a mechanical door lock applicable particularly to the doors of apartment houses, hotels and homes as well as to those of club rooms and club buildings. In the latter case, the lock may be operated by means of the membership cards of the club.

It is another object of this invention to provide a door lock wherein the spindle of the door latch may be locked, thereby eliminating the necessity of providing a separate locking member.

Still another object of this invention is the provision of a mechanical door lock which is simple in construction and attachable to a variety of door latch assemblies.

The manner in which the foregoing and other objects of this invention are accomplished will be apparent from the following specification and claims considered together with the accompanying drawing wherein like numerals of reference indicate like parts, and wherein:

Fig. 1 is a sectional view in side elevation, illustrating the presently described door lock in its locked position;

Fig. 2 is a view similar to Fig. 1, illustrating the lock in its unlocked position;

Fig. 3 is an enlarged view of the presently described lock mechanism in the position of Fig. 1; and

Fig. 4 is an enlarged view of the presently described lock mechanism in the position of Fig. 2.

As is illustrated in the drawings, the door lock of this invention is applicable to a door 10 which may afford access to an apartment, hotel room, or dwelling, or to quarters occupied by a club, the members of which are provided with membership cards. The door is operated by means of a latch bolt 12 connected through latch bolt retracting means 14 to an interior spindle 16 and an exterior spindle 18. The latter are attached in turn to door knobs 20 and 22 respectively. A pair of escutcheon plates 24, 26 may also be included. This assembly may be of substantially conventional construction, the latch bolt retracting means being of the class permitting the bolt to be operated independently by the interior and exterior spindles. Any one of a member of such retracting means currently on the market thus is adaptable to the purposes of the present invention.

To adapt a conventional door and latch bolt assembly for use in this invention, one of the spindle members, usually the exterior spindle 18, is provided with a transverse recess 28 on its under side. Also, the door is provided with a longitudinal recess 30, a transverse boring 32 communicating with recess 30, and a transverse opening 34, also communicating with recess 30. Opposite opening 34 is a horizontal slot 36 through escutcheon plate 26.

Stationed within recess 30 is the locking pin 40 extending substantially perpendicular to spindle 18 and positioned for retractable penetration of recess 28 therein. The upper end of the locking pin is guided by means of sleeve 42. Its lower end penetrates and is guided by an opening in a non-magnetic housing 44 contained in the transverse opening 34.

Manual reciprocation of locking pin 40 may be achieved by means of a locking pin extension 46 attached to the locking pin at about its mid-point and lying in transverse boring 32. The outer end of this extension penetrates an opening 48 in escutcheon plate 24 and is fitted with a guide plate 50 in sliding contact with the escutcheon plate. A head 52 is provided on the outer end of the extension so that by suitable maniuplation of the same the locking pin may be re-inserted in recess 28 in spindle 18 after each unlocking operation.

Means are provided, however, for normally urging the locking pin in the direction of withdrawal from the recess. In the illustrated embodiment such means comprise the spring 54 compressed between sleeve 42 and a projection 55 extending outwardly from locking pin 40.

Means also are provided for opposing the withdrawing action of spring 54 and for maintaining the locking pin within recess 28 when it is desired to lock the spindle against rotation. Such means comprise the abutting pin or post 56. The latter pin is threaded into or otherwise affixed to slidable locking means comprising a locking plate 60 slidably mounted for longitudinal reciprocation within housing 44. Thus plate 60 may be stationed in the retracted position of Fig. 1 wherein supporting pin 56 underlies and supports locking pin 40 within recess 28. Alternatively, it may be moved to the advanced position of Fig. 2 wherein pin 56 no longer underlies and supports locking pin 40. The latter, urged both by gravity and by spring 54, thereupon is withdrawn from recess 28.

To urge locking plate 60 normally in the direction of its retracted station, resilient means are provided in the form of a spring 62 mounted on the lower member of housing 44 and contained within the housing extension 64. Spring 62 is stationed in the path of movement of plate 60 and normally bears against the same. Hence it resiliently opposes the advancing movement of the locking plate and will return it to its retracted position when the moving force is withdrawn.

Lock means are provided for locking the locking plate in its retracted position underlying locking pin 40 and hence locking spindle 18. In the illustrated form, the lock means comprises a plurality of cylindrical magnets 66, 68, 70 and 72 stationed within transverse openings in locking plate 60 and arranged in a predetermined pattern. The locking plate and the magnets which it carries are sandwiched between a pair of non-magnetic perforated plates 74, 75. These serve as guides for the reciprocative movement of locking plate 60 and also as stops for opposing the motion of the same, depending upon the position of the magnets.

Thus upper plate 74 has therethrough a plurality of perforations 76, 78, 80 and 82 opposite the openings in plate 60 which house magnets 66, 68, 70 and 72 respectively. Selected ones of the openings, for example, openings 76 and 80 have a diameter just sufficiently large to accommodate the ends of the corresponding magnets. However, others of the openings, for example, openings 78 and 82 are sufficiently large to permit a restricted lateral movement of the magnet when inserted therein.

Similarly, the lower plate 75 carries a corresponding pattern of perforations 84, 86, 88 and 90. However, in this case perforations 84 and 88 opposite magnets 66 and 70 respectively are enlarged, whereas openings 86 and 90 opposite magnets 68 and 72 respectively are restricted in diameter to slightly more than the diameter of the mag-

nets. A shield plate **92** underlies plate **75** and the magnets for protecting the latter and assisting in retaining them in place.

The magnets are further located within the locking plate by means of a plurality of opposing magnets **94**, **96**, **98** and **100** respectively. These are housed in transverse recesses in a lower non-magnetic housing plate **102** which is adjacent the lower housing member **44**. Magnets **94**, **96**, **98** and **100** are so arranged as to repel the corresponding magnets **66**, **68**, **70** and **72** in the upper section of the lock means and tend to urge them normally upwardly in the direction of the upper housing member **44**.

Thus it will be apparent that magnets **66**, **68**, **70** and **72** serve as locking pins when in the position of Figs. 1 and 3, since they are forced upwardly until they extend through the perforations in plate **74** by the force of the magnets opposite them in the lower section of the assembly. In this position they oppose advancement of locking plate **60** toward the rear of the housing, for when such movement is attempted magnets **66** and **70** will engage plate **74**.

Retraction of magnets **66** and **70** may be effectuated, however, by use of a properly constructed key **104**, thereby permitting advancement of locking plate **60** and unlocking of the spindle. A suitable key is illustrated in Figs. 2 and 4. It comprises an elongated member fabricated principally of non-magnetic materials. It preferably is in the form of a card, for example, a club membership card, made of a plurality of plies of paper and having therein a pattern of magnetic elements **106**, **108**. Elements **106**, **108** may be fabricated, for example, from pliable shim steel and hence are undetectable by ordinary inspection methods. Cord **104** and the magnetic elements sealed therein are dimensioned and arranged so that the latter will lie adjacent the magnets which are actively locking the locking plate (i. e. magnets **66** and **70**) when the key is fully inserted through slot **36** into a keyway **110** separating the lower magnet housing plate **102** and the upper shield plate **92**. Thereupon the magnets are withdrawn from perforations **76**, **80** in perforated plate **74** and locking plate **60** is released for movement to the position of Fig. 2.

The motive power for shifting the position of the locking plate may be supplied by the key itself. To this end the locking plate is provided with an extension or abutment **112** which extends across the keyway. Hence, inward pressure exerted upon the key will be transmitted to the locking plate which is moved inwardly, but against the tension of spring **62**.

Operation

As has been noted above, the presently described lock apparatus is particularly designed for use in locking and unlocking the doors of hotel rooms, apartments, homes, and club rooms. In these applications, the door is fitted in the manner indicated in the drawings with locking pin **40** operating in a recess in the exterior spindle **18** and locking pin extension **46** extending through the inside face of the door. Latch bolt **12** is operated through the retracting means indicated generally at **14**, independently by spindle **16** or by spindle **18** connected respectively to the inner and outer door knobs **20** and **22**.

The lock normally is maintained in the position of Fig. 1 with locking pin **40** supported by pin **56** and extending into recess **28** in the exterior spindle. When it is in this position, persons on the inside may open the door at will by turning knob **20**.

However, when a person wishes to enter from the outside, he must first withdraw locking pin **40** from the exterior spindle. He accomplishes this by inserting card **104** into keyway **110** until its inner end contacts abutment **112** on locking plate **60**.

When the card is in this position, the magnetic shims **106**, **108** concealed therein are stationed in registry with locking magnets **66** and **70**. The latter are attracted by

the shims and withdrawn from perforations **76**, **80** in plate **74**. Hence pressure of the card against the abutment will force the locking plate to the advanced position of Figs. 2 and 4 against the resilient force of spring **62**.

In this position supporting pin **56** carried by the locking plate is withdrawn from beneath the lower end of locking pin **40** which therefore gravitates downwardly, assisted by the tension of spring **54**. In this manner it is withdrawn from recess **28** in the spindle and the door may be opened from the outside.

After the door has closed, it may again be locked from the inside by moving the locking pin extension **46** upwardly by means of knob **52** until it again is inserted in recess **28**. When this has been done spring **62** pushes locking plate **60** to its retracted position with supporting pin **56** again underlying and supporting locking pin **40**. The door then remains locked until again opened by means of the proper key.

If an improper key is used, for example, a card containing no magnetic elements, it will be obvious that the magnets in the lock will remain ineffective and the door will remain locked. Moreover if a knife blade or other instrument made of magnetic material is inserted in the keyway, all of the magnetic pins will be attracted. In this case, however, magnets **68** and **72** will be drawn into openings **86** and **90** in plate **75**. Because of the small dimensions of these openings, the magnets will be held securely against lateral movement and the door will remain locked.

It is to be understood that the form of my invention herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A lock for doors and the like comprising a latch bolt adapted to be extended from an edge surface of the door, latch bolt retracting means connected to the latch bolt, exterior and interior door knob spindles connected to the latch bolt retracting means for separate operation of the latch bolt, the exterior spindle having a transverse recess therein, a locking pin positioned substantially perpendicular to the exterior spindle and mounted for retractable penetration the recess therein, a sleeve stationed adjacent the exterior spindle and slidably receiving one end of the locking pin for guiding the same, a locking pin extension extending laterally of the locking pin through the inner side face of the door for manual insertion of the locking pin into the spindle recess, a guide plate on the other end of the locking pin extension and in sliding contact with the inner side face of the door, first resilient means connected to the locking pin for urging the same in the direction of withdrawal from the spindle recess, a lock housing adapted to be stationed within the door adjacent the door knob spindle and having a transverse opening and a longitudinal keyway extending therein, the other end of said locking pin being slidably received in and guided by the transverse opening, a locking plate mounted substantially parallel to the keyway in the housing for longitudinal reciprocation therein between advanced and retracted positions, said locking plate having thereon an abutment extending across the keyway for contact by a key inserted therein, a supporting pin extending outwardly from the locking plate in the direction of the locking pin, second resilient means within the housing and bearing against the locking plate for maintaining it normally in its retracted position wherein the supporting pin supports the locking pin and maintains it in the spindle recess, and lock means engaging the locking plate for releasably locking it in its retracted position pending unlocking by said key, the pressure of the key on the locking plate abutment moving the locking plate to its advanced position wherein the supporting pin no longer

supports the locking pin which accordingly is withdrawn by the first resilient means from the spindle recess, releasing the latch bolt.

2. A lock for doors fitted with a latch-bolt-operating spindle having therein a transverse recess, said lock comprising: a locking pin positioned adjacent the spindle for retractable penetration of the recess therein, a locking pin extension extending laterally from the locking pin and operable manually to insert the locking pin into the recess, first resilient means connected to the locking pin for urging the same in the direction of withdrawal from the recess, a lock housing adapted to be stationed adjacent the spindle and having a transverse opening and a keyway extending thereinto, one end of said locking pin being slidably received in the transverse opening, a locking plate mounted substantially parallel to the keyway in the housing for longitudinal reciprocation between advanced and retracted positions, the locking plate having thereon an abutment extending across the keyway for contact by a key inserted therein, a supporting pin extending outwardly from the locking plate in the direction of the locking pin, second resilient means within the housing and bearing against the locking plate for maintaining it normally in its retracted position wherein the supporting pin supports the locking pin, and lock means engaging the locking plate for releasably locking the same in its retracted position pending unlocking by the key, thereby permitting movement of the locking plate by the key against the force of the second resilient means to its advanced position wherein the supporting pin does not support the locking pin which accordingly is withdrawn by the first resilient means from the recess in the spindle, releasing the latch bolt.

3. A lock for doors and the like fitted with a latch bolt spindle having a transverse recess therein, said lock comprising: a locking pin positioned below the spindle for retractable penetration of the recess therein, a locking pin extension extending laterally from the locking pin for manual adjustment thereof with respect to said recess, a lock housing stationed below the locking pin and having a transverse opening and a keyway extending thereinto, the adjacent end of the locking pin being slidably received in the transverse opening, a locking plate mounted substantially parallel to the keyway for longitudinal reciprocation between advanced and retracted positions, said locking plate having thereon an abutment extending within the keyway for pressure contact with a key inserted therein, a supporting pin extending upwardly from the locking plate and normally supporting the locking pin, resilient means within the housing bearing against the locking plate for maintaining the same normally in its retracted position with the supporting pin underlying the locking pin for maintaining the same inserted in the spindle recess, and lock means engaging the locking plate for releasably locking the same in its retracted position pending its unlocking by insertion of the key in the longitudinal opening.

4. A lock for doors fitted with a latch bolt and a spindle having therein a transverse recess, said lock comprising: a locking pin positioned adjacent the spindle and mounted for retractable penetration of the recess therein, guide means for guiding the movement of the locking pin, a locking pin extension extending laterally of the locking pin for manual insertion of the same into the recess, means associated with the locking pin for urging the same in the direction of withdrawal from the recess, a locking member mounted adjacent the locking pin for reciprocation between advanced and retracted positions, the locking member having thereon an abutment, a supporting pin extending outwardly from the locking member in the direction of the locking pin, resilient means bearing against the locking member for maintaining the same normally in its retracted position wherein the supporting pin supports the locking pin within the recess, and lock means engaging the locking member for releasably locking the same in its retracted position, the locking member being

shiftable by pressure of a key on the abutment thereon into its advanced position wherein the supporting pin is withdrawn from contact with the locking pin, withdrawing the latter from the recess and releasing the latch bolt.

5. A lock for doors provided with a latch-bolt-operating spindle having a transverse recess therein, said lock comprising: a locking pin positioned adjacent the spindle and mounted for retractable penetration of the recess therein, means connected with the locking pin for manual insertion of the same into the recess, means connected to the locking pin for normally urging the same in the direction of withdrawal from said recess, a locking member mounted for reciprocation between advanced and retracted positions and having thereon contact means positioned for contact by a key, a support member extending outwardly from the locking member in the direction on the locking pin, resilient means bearing against the locking member for maintaining the same normally in its retracted position wherein the support member supports the locking pin inserted in the spindle, and lock means engaging the lock member for releasably locking the same in its retracted position pending its unlocking by means of the key, the key being thereupon further operable to move the lock member to its advanced position by pressure contact with the contact means thereon against the resilient force of the resilient means, thereby removing the support member from beneath the locking pin and permitting withdrawal of the locking pin from the recess in the spindle.

6. A lock for doors provided with a latch-bolt-operating spindle having a transverse recess therein, said lock comprising: a locking pin positioned adjacent the spindle and mounted for retractable penetration of the recess therein, means connected to the locking pin for manual insertion of the same into the recess, a locking member mounted for movement between advanced and retracted positions and having thereon contact means positioned for contact by a key, a support member extending outwardly from the locking member in the direction of the locking pin, resilient means bearing against the locking member for maintaining the same normally in its retracted position wherein the support member supports the locking pin inserted in the spindle, and lock means engaging the locking member for releasably locking the same in its retracted position pending its unlocking by means of the key, the key being thereupon further operable to move the lock member to its advanced position by pressure contact with the contact means thereon against the force of the resilient means, thereby removing the support member from beneath the locking pin and permitting withdrawal of the locking pin from the recess in the spindle.

7. A lock for doors provided with a latch-bolt-operating spindle having a transverse recess therein, said lock comprising: a pin positioned adjacent the spindle and mounted for retractable penetration of the recess therein, means connected to the pin for manual insertion of the same into the recess, a locking member mounted for movement between advanced and retracted positions and having thereon contact means positioned for contact by a key, a support member extending outwardly from the locking member in the direction of the pin and normally supporting the pin inserted in the spindle, and lock means engaging the locking member for releasably locking the same in its retracted position pending its unlocking by means of the key, the key being thereupon further operable to move the lock member to its advanced position by pressure contact with the contact means thereon, thereby removing the support member from the pin and permitting withdrawal of the same from the recess in the spindle.

8. A lock for doors fitted with a door latch and comprising latch engaging means positioned adjacent the latch and mounted for releasable locking engagement therewith, a locking member mounted adjacent the latch

engaging means for movement between advanced and retracted positions and having thereon contact means positioned for contact by a key, the locking member serving as an abutment for the latch engaging means, and locking means engaging the locking member for releasably locking the same in its retracted position pending its unlocking by means of the key, the key being thereupon further operable to move the locking member to its advanced position by pressure contact with the contact means thereon, thereby removing the locking member from the latch engaging means and permitting the disengagement of the latter from the latch.

9. A lock for doors fitted with a door latch and comprising latch engaging means positioned adjacent the latch and mounted for releasable locking engagement therewith, locking means mounted adjacent the latch engaging means and comprising a pair of transversely perforated plates, one of which is movable relative to the other, the movable plate serving as an abutment for the latch engaging means and having thereon contact means positioned for contact by a key incorporating a magnetic element, the perforations in the plates being arranged in opposed pairs, and movably mounted in at least one of said pairs of perforations a magnet which normally interlocks the plates but which is adapted upon being approached by the magnetic element in the key to be withdrawn from the perforations in one of the plates, thereby permitting the relative movement of the plates and disengagement of the latch engaging means from the latch upon pressure contact of the key with the contact means on the said first plate.

10. A lock for doors fitted with a door latch and comprising latch-engaging means positioned adjacent the latch and mounted for releasable locking engagement therewith, a pair of relatively movable plates having therein at least one pair of opposed recesses, one of the plates serving as an abutment for the latch-engaging means, and, movably mounted in said pair of recesses, a magnetic element normally positioned for interlocking the plates but adapted, upon the approach of a second magnetic element, to be withdrawn from the recess in one of the plates, thereby permitting the relative movement of the plates and the disengagement of the latch-engaging means from the latch.

References Cited in the file of this patent

UNITED STATES PATENTS

553,444	Wilson	Jan. 21, 1896
1,965,789	Anglyn	July 10, 1934
2,121,301	Ractliffe	June 21, 1938