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Ebersman et al.

[11] **3,875,772**

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[54] **DOOR LATCH AND ANTI PANIC DEAD BOLT LOCK**

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[52] **U.S. Cl.** **70/107**; 292/38

[51] **Int. Cl.** **E05b 59/00**

[58] **Field of Search** 70/107; 292/38, 50, 171, 292/225

[56] **References Cited**

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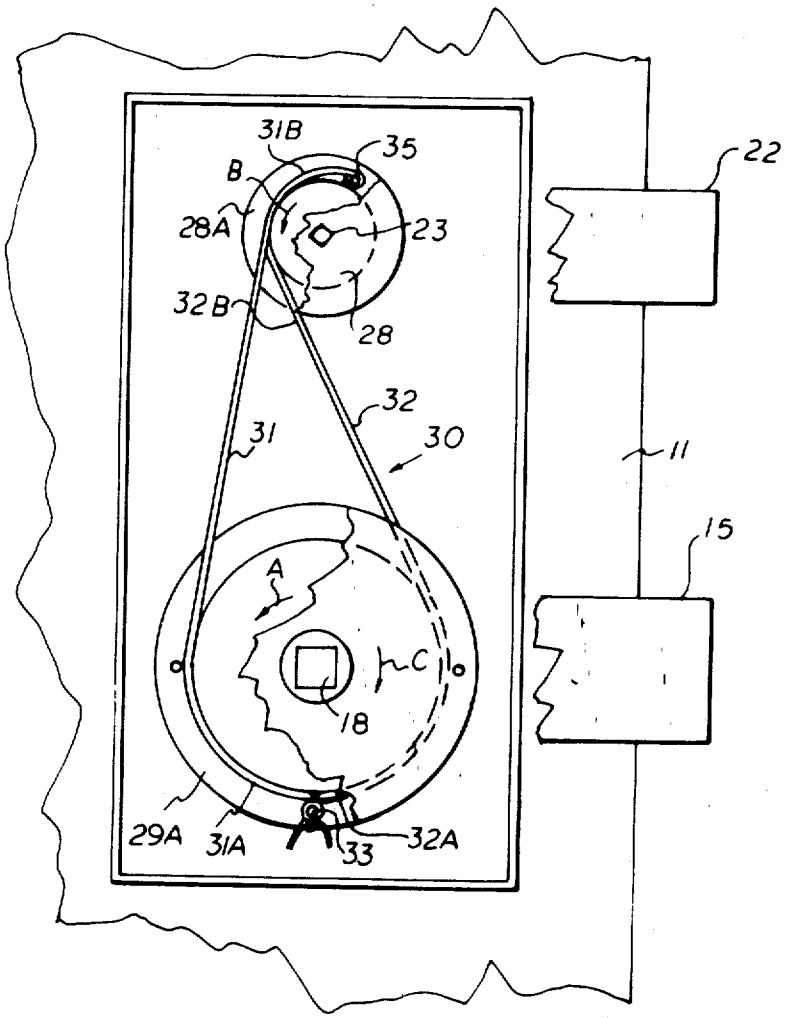
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Primary Examiner—Albert G. Craig, Jr.

[57] **ABSTRACT**

This disclosure is directed to a door latch and dead bolt assembly which includes a door latch assembly with associated door knob and/or key lock and a dead bolt assembly. The respective door latch assembly and dead bolt assembly are interconnected by a pulley and cable arrangement which enables the dead bolt to be retracted from a locked position to an unlocked position by rotation of a door knob spindle in either direction and whereby the dead bolt can be operated between a locked and unlocked position independently of the door latch.

12 Claims, 6 Drawing Figures



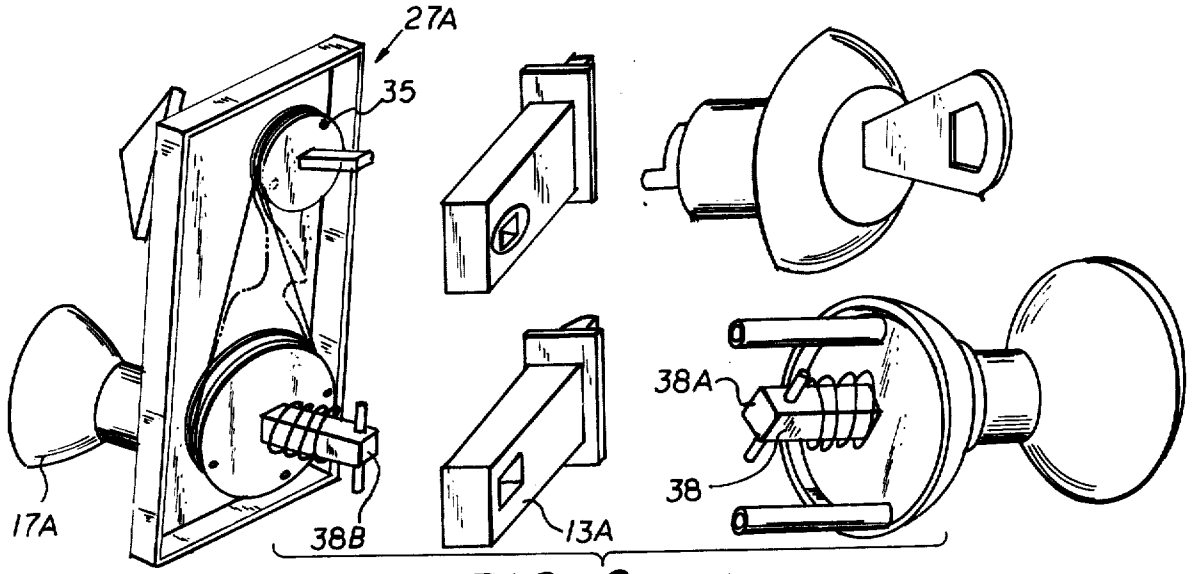

27A
35
38A
38
17A
38B
13A

FIG. 2

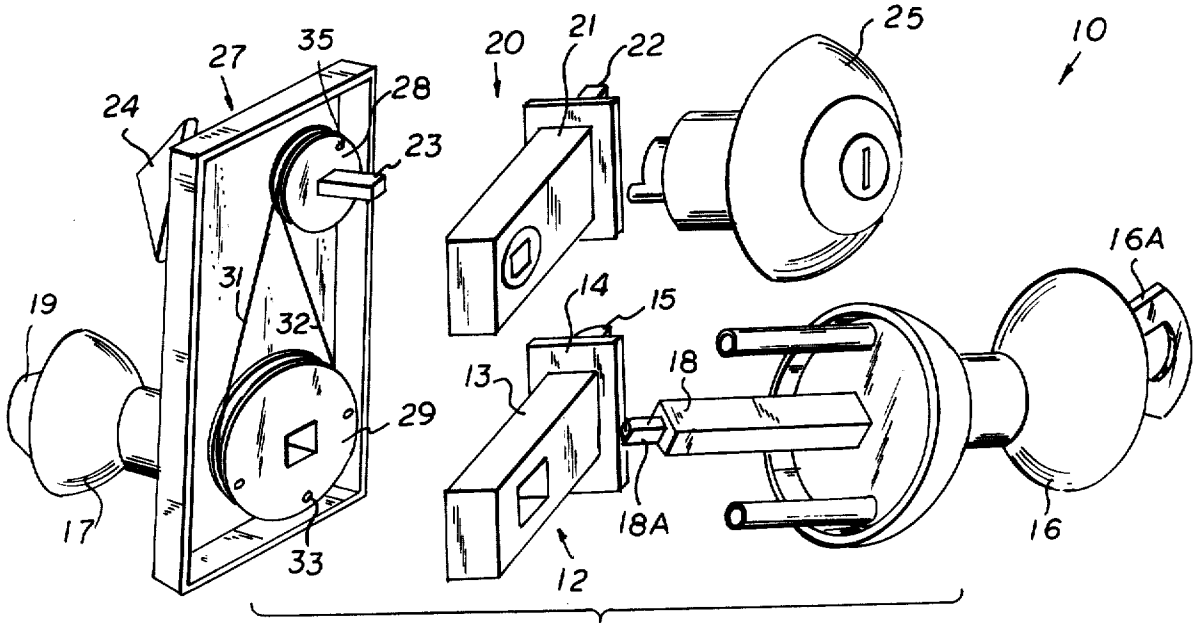
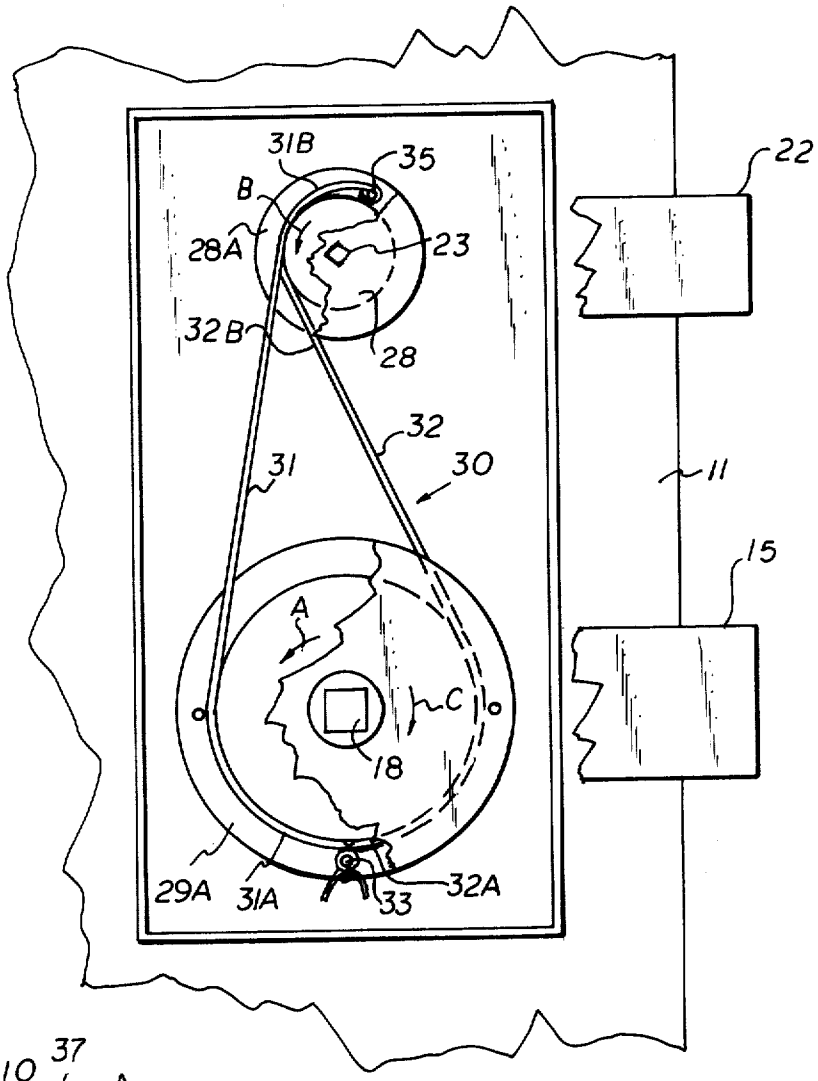

27
35
28
24
23
20
21
22
25
10
16A
19
31
32
14
15
13
18
29
17
33
18A
16
12

FIG. 1

FIG. 3



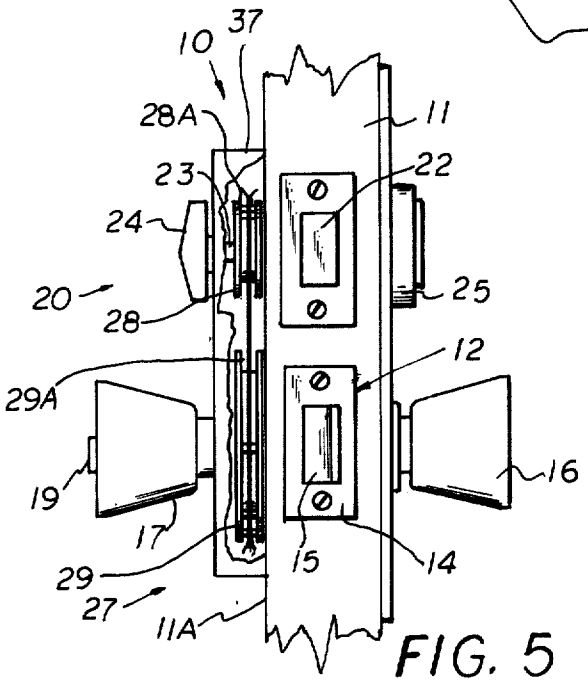


FIG. 5

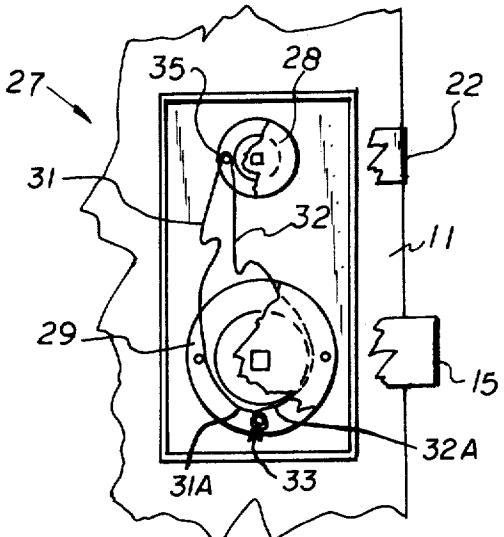


FIG. 4

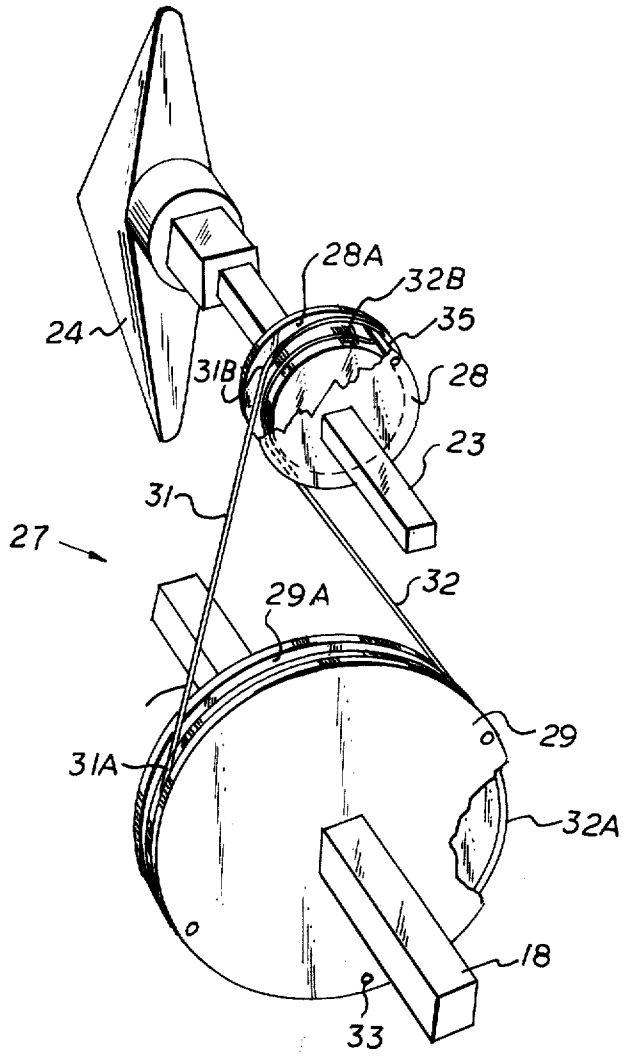


FIG. 6

DOOR LATCH AND ANTI PANIC DEAD BOLT LOCK

PROBLEM AND PRIOR ART

To enhance security against unauthorized entry a conventional type door latch or lock can be supplemented by a dead bolt locking device. A dead bolt lock heretofore used generally consisted of an independent lock which was actuated independently of the door lock or latch. The known or commonly used dead bolt locks were generally provided with a turn knob actuated from the inside for additional security; and the operation of such dead bolt locks was independent of the door lock or latch. Often such dead bolts were provided with key locks whereby they could be locked and unlocked externally by a key much in the manner of a general door lock.

However, experience has shown that while the dead bolt type lock provided the required added security, it also presented a hazard in the event of fire which sometimes prohibited escape. Panic resulting from fire has frequently been attributed to serious injury and even loss of life in instances when a home has been secured by a dead bolt security lock. This was principally attributed to the fact that due to such panic, an occupant could not in time effect the unlocking of both the door lock and the supplemental security dead bolt lock; as each was required to be independently actuated. Also due to darkness or unfamiliarity with the security arrangement, e.g. an occupant or guest, may become easily trapped within a burning building simply because he was unaware or unable to release the dead bolt lock. For this reason there has existed an inherent conflict between the need for providing additional security to discourage theft and unauthorized entry and the need to provide for quick and easy escape in the event of fire, and particularly when one is panic stricken and is motivated purely by instinct rather than by reason.

In an effort to balance the need for security and the need for rapid and easy escape in case of fire, efforts have been made to compromise these needs. However, the known locks which are available to satisfy these needs were relatively complex, costly to manufacture and difficult to install. Generally a door had to be especially prepared to receive such locks and for this reason could not be readily adapted to existing locks or existing doors. Also some of the known prior construction could only be applied to given doors, i.e. a right or left hand door had to be specified for a particular lock construction. Also some of the prior lock constructions capable of compromising the foregoing needs required properly aligned doors to prohibit binding of the dead bolt portion thereof.

OBJECTS

An object of this invention is to provide a door lock and dead bolt assembly which can be readily applied to existing installations or new installations.

Another object is to provide a door lock and dead bolt assembly in which the dead bolt can be retracted from locked to unlocked position when the door knob controlling the conventional door latch is actuated.

Another object is to provide a door lock and dead bolt assembly in which both the door latch and/or dead bolt can be key locked with the same key or different keys for added security.

Another object is to provide a door latch and dead bolt assembly in which the dead bolt can be retracted to unlocked position by rotation of the door knob spindle in either direction of rotation.

Another object is to provide a door latch and dead bolt assembly wherein the dead bolt can be retracted to unlocked position by turning either the internal or external door knob, when the door latch is not in a locked position.

Another object is to provide a door latch and dead bolt assembly in which the dead bolt is retracted to the unlocked position only when the inside door knob is rotated in either direction.

Another object is to provide a door latch and dead bolt assembly in which the dead bolt can be actuated between a locked and unlocked position independently of the door latch; and whereby the dead bolt can be retracted to unlocked position by rotation of a door know spindle in either direction.

BRIEF SUMMARY OF THE INVENTION

The foregoing objects and other features and advantages are attained by a door latch and a dead bolt assembly comprising a door latch having an actuating spindle and associated door knobs of general construction which are operatively connected to a dead bolt assembly, which includes a dead bolt, an operating spindle and a turnknob, by an interconnecting means which includes a pulley connected to the respective spindles of the dead bolt assembly and door latch, and which pulleys are interconnected by a flexible cable which is threaded about the pulleys so that rotation of the door knob spindle in either direction will effect retraction of the dead bolt, when the latter is in the protracted locked position. The door latch and dead bolt assembly are of general well known construction which can be readily mortised in the usual manner within the thickness of the door. The pulley arrangements connected to the respective spindles are disposed externally of the door and enclosed within a cover plate. The flexible cable includes a pair of lengths which are fixedly secured at their respective ends to the respective pulleys at a fixed attachment point. The respective cable lengths are threaded about the respective pulleys so that the dead bolt can be operated between a locked and unlocked position independently of the door latch. In the locked position of the dead bolt, the latter can be retracted to unlocked position by rotation of the door spindle in either direction. Key lock means may be provided for the door latch and the dead bolt assemblies which will effect the respective locking and unlocking of the door latch with the same key or different keys.

FEATURES

A feature of this invention resides in the provision wherein the spindle of the dead bolt and the spindle of the door latch are interconnected by a means which enables the dead bolt, when locked, to be retracted to unlocked position upon turning of the door handle.

Another feature of this invention resides in the provision whereby the means for unlatching the dead bolt includes a pulley and cable arrangement activated by the door knob.

Another feature resides in the provision in which the pulley and cable assembly can be mounted externally of the door.

Another feature of this invention resides in the pulley and cable assembly for effecting the release of the dead bolt which can be readily applied to an existing installation.

Another feature resides in the provision of a dead bolt release which is panic proof.

Other features and advantages will become more readily apparent when considered in view of the drawings and specification in which:

FIG. 1 is a perspective exploded view of a door latch and dead bolt assembly embodying the present invention in which the perspective of the component parts has been turned at different angles to illustrate the invention.

FIG. 2 is a view similar to that of FIG. 1, but illustrating a modified embodiment.

FIG. 3 is a side view of the pulley and cable arrangement utilized in the latch and bolt assemblies of FIGS. 1 and 2, showing the relative position of the parts when the dead bolt is in the locked or protracted position.

FIG. 4 is a view similar to that of FIG. 3 illustrating the relative position of the parts when the dead bolt is in the unlocked position.

FIG. 5 is a front end view of the latch and bolt assembly of this invention.

FIG. 6 is a fragmentary perspective detailed view of the pulley and cable arrangement of FIGS. 1 and 2.

Referring to the drawings, e.g. FIG. 1, there is shown a door latch and dead bolt assembly 10 embodying the present invention. The assembly 10 is readily applied to a door 11 and comprises a door latch assembly or means 12 of generally well known construction. It includes a housing 13 having a front flange 14 which is readily mortised within the door 11 in a well known manner. It will be understood that the door bolt latch 15 is mounted within the latch housing 13 in a conventional manner. A door knob 16 connects to the end of an associated spindle 18 arranged to extend transversely of the latch housing 13. As shown in FIG. 1 the door knob spindle 18 is arranged to be operatively associated with the latching mechanism within the latch housing 13 for effecting the retraction and protraction of the door latch 15 in a well known manner. The other door knob 17 is detachably connected to the spindle 18. It will be understood that the exterior door knob 16 may be provided with a key lock whereby the door may be locked by a key 16A in the well known manner. A lock release button 19 may be provided to the internal door handle or knob 17 to release the lock latch 15 from the inside.

Cooperatively associated with and to supplement the security of the door latch 12, described, is a dead bolt assembly. In the illustrated embodiment the dead bolt assembly 20 may be of well known construction which comprises a housing 21 in which a dead bolt 22 is slideably mounted for movement between protracted locked and retracted, unlocked position. Operatively connected to the dead bolt 22 is a spindle 23 having a turn knob 24 connected to one end and a tumbler key lock mechanism 25 connected to the other end of the bolt spindle 23. The dead bolt housing 21 with sliding bolt 22 is mortised in a door in a well known manner. As illustrated the dead bolt assembly 20 is recessed in the edge of the door above the latch assembly 12. It will be understood that the key lock 25 for the dead bolt assembly 20 and for the key lock 16A for door latch 12 may be actuated by the same key, or the respective tumblers of locks 25 and 16A set to render the respective key locks operative with different keys. The dead bolt assembly 20 and door latch assembly 12 thus far described may comprise of generally well known constructions and operate in the conventional manner.

The improvement to such door latch 12 and dead bolt assembly 20 resides in a means 27 for operatively connecting the spindle 23 of the dead bolt assembly 20 to the spindle 18 of the door latch assembly 12 whereby the dead bolt 22, when in the locked position, can be readily retracted to unlocked position simply by effecting the rotation of the door latch spindle 18, and whereby the dead bolt 22 can be operated between locked and unlocked position independently of the door latch 15.

In the illustrated embodiment the means 27 comprises a member which may comprise an arcuate segment or pulley 28 which is fixed to the dead bolt spindle 23 to rotate the spindle 23 when the spindle 23 is rotated. As best seen in FIG. 5 the pulley 28 is connected to the portion of the dead bolt spindle 23 which extends beyond the side surface 11A of the door, i.e. to the inside of the door.

A complementing sector or pulley 29 is fixed to the door knob spindle 18 so that pulley 29 will rotate when the door knob spindle 18 is rotated.

Interconnecting the respective pulleys 28, 29 is a flexible cable means in the form of two cable lengths 31 and 32. If desired the periphery of the respective pulleys 28, 29 may be provided with a groove 28A and 29A for accommodating the respective cable lengths 31 and 32. As shown in FIGS. 3 and 4 the corresponding ends 31A and 32A of cable lengths 31, 32 are threaded to opposite sides of pulley 29 and are secured thereto at a fixed point of attachment 33. In the embodiment of FIGS. 3 and 4 the fixed point of attachment 33 on pulley 29 comprises a pin extending transversely of the groove 29A to which the respective ends 31A and 32A of cable 31 and 32 are threaded or otherwise secured. While the ends 31A, 32A of the cable 31, 32 may be secured about a common point of attachment 33, as seen in FIG. 3; it will be understood that the cable ends 31A, 32A may be secured to separate, oppositely disposed, points of attachment on pulley 29 so long as the respective cables 31, 32 are threaded to opposite sides of pulley 29 as shown in FIGS. 3, 4 or 6.

The other corresponding ends 31b, 32B of cable lengths 31 and 32 are threaded to the same side of the dead bolt pulley 29 as seen in FIGS. 3 and 6, and they are secured to a fixed point of attachment 35. As seen the ends 31B and 32B of cable lengths 31 and 32 are fixed or tied to a pin 35 extending transversely of groove 28A.

With the cable and pulley arrangement 27 described, and referring to FIG. 4, it will be noted that when the dead bolt 22 is in the retracted unlocked position the cable lengths 31, 32 are hanging loosely or are slackened between pulleys 28 and 29, since the point of attachment 35 on pulley 28 is located at a point to impart some slack to the respective cable length 31, 32. When it is desired to provide for the security of the dead bolt 22, the turn knob 24 is rotated to extend the dead bolt 22 to protracted locked position. As viewed in FIGS. 3, 4 and 6, the extension of the dead bolt 22 to lock position causes the dead bolt pulley 28 to rotate in a clockwise direction as viewed in FIG. 3 resulting in the cable lengths 31, 32 being pulled taut as the fixed end 31B,

32B cause the cable lengths **31, 32** to be wound about pulley **28.** Rotation of the dead bolt turn knob **24** in the opposite direction will cause the dead bolt **22** to retract to an unlocked position whereby the cable lengths **31, 32** resume the slackened position as seen in FIG. **4.** Thus it will be noted that by rotating the turn knob **24** in one direction or the other, the dead bolt **22** is caused to be extended and retracted between locked and unlocked positions independently of the door latch **15** or rotation of the door knobs **16, 17.**

With the dead bolt **22** disposed in the retracted or unlocked position as seen in FIG. **4**; it will be noted that the door knob spindle **18** can be rotated in either direction to effect retraction of the door latch **15** without influencing the operation of the dead bolt **22.** Actuating the door latch **15** independently of the dead bolt **22** is rendered possible by the slack in the cable lengths **31, 32** in the unlocked position of the dead bolt **22.** Thus with the dead bolt **22** in the unlocked or retracted position, the door latch **15** can be readily actuated to open or close the door **11** by operating the door knobs or handles **16, 17.**

However when the dead bolt **22** has been extended and locked, as indicated in FIG. **3,** the dead bolt **22** can be readily retracted to unlocked position, for quick exit, as in case of fire or other emergency, simply by turning the door knob **17.** As viewed in FIG. **3,** rotation of the door spindle **18** by rotation of the door knob in a counterclockwise direction A will cause cable length **31** to wind pulley **29** causing pulley **28** to rotate in a counterclockwise direction B; which will effect a retraction of the dead bolt **22** to an unlocked position, the other cable length **32** having slackened as it is being unwound from pulley **28** and **29.** Conversely rotating the door knob spindle **18** in a clockwise direction C will cause cable length **32** to wind about pulley **29** which also causes pulley **28** to rotate in a counterclockwise direction B to retract the dead bolt **22** from its locked position, cable length **31** being slackened as it unwinds from pulley **28** and **29.** Thus it will be noted that with the dead bolt **22** extended and locked, quick exit can be effected by rotating the door spindle **18** in either direction, such rotation simultaneously effecting the retraction of the dead bolt **22** and the door latch **15** whereby exit can be readily achieved. The construction is such that exit can be instinctively achieved even under conditions where panic is prevlaent without sacrificing the need for securing against unlawful entry.

A cover **37** enclosing the pulley arrangement **27** is provided. As seen in FIG. **5** the cover **37** abuts the door surface **11A.**

In the embodiment of FIG. **1,** the retraction of the dead bolt **22** from its locked position can be achieved by rotation of either door knob **16** or **17** in either direction of rotation.

FIG. **2** illustrates a modified embodiment. This embodiment is identical to that described with respect to FIG. **1** except that the door knob spindle **38** is split. Thus when the free ends **38A, 38B** of the split door knob spindles are extended into the door latch housing **13A** (FIG. **2**) the actuation of the pulley means **27A** to retract the dead bolt **22** can only be achieved by rotation of the inner door handle or knob **17A.** In all other respects the construction and operation of the embodiment of FIG. **2** is similar to that described with respect to FIG. **1.**

It will be noted that the pulley and cable assembly **27** can be utilized with the well known lever type door handles or pitcher type door handles with equal ease.

From the foregoing the door latch and dead bolt assembly enables the dead bolt **22** to be unlocked by the actuation of the door knobs or handle **16, 17** when rotated in either direction. For this reason the dead bolt **22** can be actuated simultaneously with the operation of the door handle with an instinctive type door opening motion and thereby prohibit panic from preventing one from making an escape or rapid exit.

While the instant invention has been described with respect to several embodiments thereof it will be readily understood and appreciated that variations and modifications may be formed without departing from the spirit or scope of the invention.

What is claimed is:

1. A door lock and dead bolt assembly comprising:
a door latch means including a latch spindle,
a door knob connected to each end of said latch spindle,
a dead bolt means including a dead bolt spindle,
a turn knob connected to said dead bolt spindle for operating said dead bolt means between a locked and unlocked position,
means interconnected between said dead bolt means and said door latch means whereby said dead bolt means can be retracted from a locked to unlocked position by rotation of said latch spindle in either direction of rotation thereof and whereby said dead bolt means can be operated between locked and unlocked positions independently of said door latch means,
said interconnecting means comprising,
a first means connected to said dead bolt spindle,
a second means connected to said latch spindle,
and a flexible cable means interconnecting said first and second mentioned means.

2. The invention as defined in claim **1** wherein said latch spindle is split to permit actuation of said interconnecting means between a locked and unlocked position of said dead bolt by rotation of only one door knob in either direction.

3. The invention as defined in claim **1** wherein said door knobs are connected to a common latch spindle to permit actuation of said dead bolt means between a locked and unlocked position by rotation of either door knob in either direction of rotation.

4. A door lock and dead bolt assembly comprising:
a door latch means including a latch spindle,
a door knob connected to each end of said latch spindle,
a dead bolt means including a dead bolt spindle,
a turn knob connected to said dead bolt spindle for operating said dead bolt means between a locked and unlocked position,
means interconnected between said dead bolt means and said door latch means whereby said dead bolt means can be retracted from a locked to unlocked position by rotation of said latch spindle in either direction of rotation thereof and whereby said dead bolt means can be operated between locked and unlocked positions independently of said door latch means,
said interconnecting means comprising,
a first means connected to said dead bolt spindle,
a second means connected to said latch spindle,

and a flexible cable means interconnecting said first and second mentioned means,

said first mentioned means comprising:

a pulley connected to said dead bolt spindle to rotate therewith when said dead bolt knob is actuated between locked and unlocked position,

said second means comprising a complementary pulley connected to said door knob spindle to rotate therewith when said door knob is actuated,

and said flexible cable means connected between said pulleys whereby rotation of said dead bolt spindle between locked and unlocked position causes said flexible cable means to be drawn between a tight and loose position relative to said pulleys.

5. The invention as defined in claim **4** wherein said latch means and dead bolt means are adapted to be mortised in a door, and said interconnecting means are adapted to be disposed exteriorly of a door.

6. The invention as defined in claim **5** wherein said cable means includes a first cable connected between said pulleys and a second cable connected between said pulleys,

said first and second cables having one end thereof disposed to opposite sides of said door knob pulley,

and said first and second cables having their respective other ends disposed to the same side of said dead bolt pulley.

7. The invention as defined in claim **6** wherein said first and second cables have one corresponding end portion thereof extending to opposite sides of said door knob pulley and fixed thereto at an attachment point, and having their other corresponding end portions fixed at an attachment point to said dead bolt pulley.

8. The invention as defined in claim **7** wherein said other corresponding end points of said first and second cables are connected at a common attachment point on said dead bolt pulley.

9. A door lock and anti panic dead bolt assembly comprising:

a door latch means including a door latch, a latch spindle operatively connected to said door latch, and a door knob operatively connected to each opposed end of said latch spindle for actuating said door latch from either side of said door,

a dead bolt means

said dead bolt means being spaced from said latch means, said dead bolt means being mortised in a door, and

said dead bolt means including a dead bolt, a dead bolt spindle operatively connected to said dead bolt; a dead bolt knob connected to said dead bolt spindle for protracting and retracting said dead bolt between a locked and unlocked position, and a key controlled locking means for operating said dead bolt between a locked and unlocked position,

means interconnecting said dead bolt spindle and said latch spindle whereby said dead bolt is retracted from locked to unlocked position upon actuation of at least one of said door knobs to effect rotation of said door knob spindle in either direction of rotation, and whereby said dead bolt spindle can be rotated to lock and unlock positions independently of said door latch means,

said interconnecting means including a first pulley connected to said dead bolt spindle to rotate therewith,

a second pulley connected to said latch spindle,

said pulleys being disposed to the same side of a door exteriorly thereof,

a pair of flexible cables interconnected between said pulleys,

said cables having their respective end portions connected to the respective pulleys at a fixed point of attachment,

whereby said cables are tautly wound about said pulleys in the locked position of said dead bolt, and loosened in the retracted unlocked position of said dead bolt.

10. The invention as defined in claim **9** wherein said pair of cables includes a first and second cable,

said first and second cables being wound at one end to opposite sides of said second pulley and having their other corresponding end portions wound to the same side of said first pulley.

11. The invention as defined in claim **10** wherein the ends of said cables are fixedly attached at a point of attachment to each of said pulleys.

12. A door lock and anti panic dead bolt assembly comprising:

a door latch means including a door latch mortised in a door, a spindle operatively connected to said latch, and a door knob connected to the opposed ends of said latch spindle for actuating said latch from either side of said door, and a locking means for key locking said latch between a locked and unlocked position,

a dead bolt means spaced from said latch means, said dead bolt being mortised in a door, and

said dead bolt means including a dead bolt, a spindle operatively connected to said dead bolt, a dead bolt knob connected to said dead bolt spindle for protracting and retracting said dead bolt between a locked and unlocked position, and a locking means for key locking said dead bolt between a locked and unlocked position,

means interconnecting said dead bolt spindle to said door knob spindle whereby said dead bolt is retracted from locked to unlocked position upon actuation of at least one of said door knobs to effect rotation of said door knob spindle in either direction of rotation, and whereby said dead bolt spindle can be rotated to lock and unlock positions independently of said door latch means,

said interconnecting means including a first pulley connected to said dead bolt spindle to rotate therewith,

a second pulley connected to said door knob spindle,

said pulleys being disposed to the same side of a door exteriorly thereof,

a pair of flexible cables interconnected between said pulleys,

said cables having their respective end portions connected to the respective pulleys to a fixed point of attachment,

said cables having corresponding end portions disposed to opposite sides of said second pulley,

and said cables having their other corresponding end portion threaded about the same side of said first pulley whereby said cables are wound taut about said pulleys in the protracted locked position of said dead bolt, and a loosened unwound position in the retracted unlocked position of said dead bolt,

and a cover means adapted to be connected to the side of a door for concealing said pulleys and associated cables.

* * * * *