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DOOR LATCH AND LOCK

Filed Feb. 9, 1959

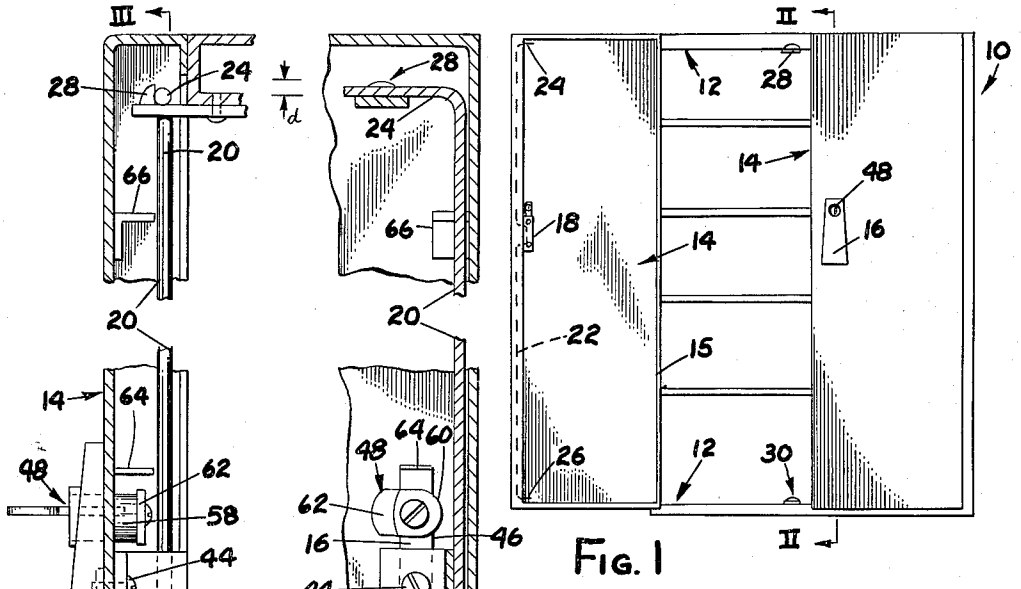


FIG. 1

FIG. 2

FIG. 3

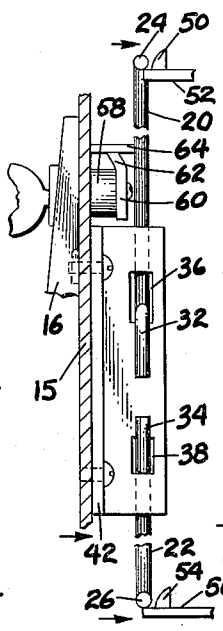


FIG. 4

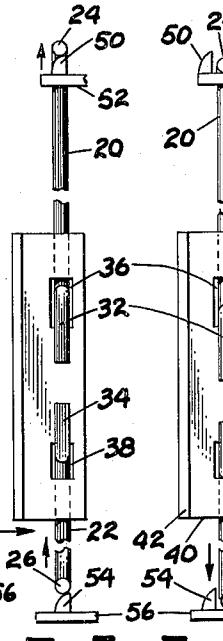


FIG. 5

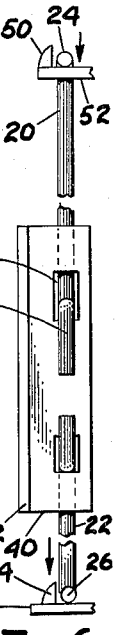


FIG. 6

INVENTOR.
JOHN PIPE
BY Price & Heneveld
ATTORNEYS

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DOOR LATCH AND LOCK

John Pipe, Grand Rapids, Mich., assignor to Steelcase Inc., Grand Rapids, Mich., a corporation of Michigan

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This invention relates to a door latch and lock assembly. More particularly, it relates to a door latch and lock assembly especially suitable for office storage cabinets, lockers and the like.

The door latch and lock assemblies heretofore involved in lockers, office storage cabinets and the like have been rather complex, are difficult to assemble and usually involve an unmanageable number of component parts.

A general object of this invention is to provide a door latch and lock assembly for lockers, office storage cabinets and the like, which is characterized by a relatively few component parts of simple construction and by a relatively simple and quick mode of assembly.

A primary object of this invention is to provide a door latch assembly for lockers, office storage cabinets and the like, which is positive acting.

Another object of this invention is to provide a door latch assembly which will automatically latch a door upon the closing thereof without manual manipulation of the door handle and the like.

Another object of this invention is to provide a door latch assembly comprising means for locking the same.

Still another object of this invention is to provide a door latch assembly comprising means for locking the same, which permits the door to be closed and latched while the assembly is in locked condition.

These and other objects which may appear as this specification proceeds are achieved by this invention which shall be described with reference to the drawings wherein:

FIG. 1 is a front elevation of an office storage cabinet comprising a preferred embodiment of the door latch and lock assembly of this invention;

FIG. 2 is a side view of the door latch and lock assembly from the cutting plane II—II of FIG. 1;

FIG. 3 is a rear sectional view taken along the cutting plane III—III of FIG. 2; and

FIGS. 4, 5 and 6 are side views of pertinent portions of the door latch and lock assembly, taken as along the plane II—I of FIG. 1, and illustrating the action of the assembly in locked condition upon closing of a door in which the assembly is installed.

In general, the drawings disclose a door latch and lock assembly which utilizes the forces of gravity for latching and manually applied lift forces for unlatching. The door latch and lock assembly illustrated broadly comprises vertically disposed, vertically movable, rod means. Said rod means comprise a transverse bend or offset portion disposed in a vertically elongated aperture through a vertically movable lifter means secured to a vertically movable door handle means. Said rod means also comprise a lateral bend portion for engagement with, and, upon vertical movement of said lifter means, for disengagement from, a catch assembly means secured to the door frame of the door. Said assembly also comprises lock means for preventing, when desired, vertical movement of said lifter means.

Structure

More specifically, FIG. 1 of the drawings discloses a cabinet 10 having a door frame 12 and a pair of doors 14 hingedly secured to said frame. On the front side of each of the doors 14 and adjacent the unhinged side of each is a door handle 16. On the backside of each door 14 and associated with the door handle 16 is a latch and lock assembly 18. The provision of two doors 14 is merely for purposes of illustration only inasmuch as this invention is applicable to a cabinet with one door or with more than two doors. Moreover, it is not necessary when two doors are involved, as in FIG. 1, that both doors be provided with the latch and lock assembly 18. Only one door need be provided with the latch and lock assembly 18, there being other ways and means well-known to the art for securing the second door when only one door of a pair is provided with a latch and lock assembly.

Each latch and lock assembly 18, as shown in FIGS. 2 and 3, comprises an upper, vertically disposed, rigid rod member 20 and a lower, vertically disposed, rigid rod member 22. The top end of the upper rod 20 and the bottom end of the lower rod 22 comprise terminal lateral bend portions 24 and 26, respectively. Each of the lateral bend portions 24 and 26 is disposed in a plane of the respective rod substantially parallel to the door panel 15. Secured to the top cross bar of the door frame 12 is a catch assembly 28. Secured to the bottom crossbar of the door frame 12 is a bottom catch assembly 30. Each of the catch assemblies 28 and 30 cooperate with the top lateral bend portion 24 and the bottom lateral bend portion 26 of the respective rod members to latch the door 14 upon closing of the same.

In each latch and lock assembly 18 the bottom terminal region of the upper rod 20 comprises a transverse bend portion or offset portion 32 and the top terminal region of the lower rod 22 comprises a transverse bend portion or offset portion 34. Each of said transverse bend portions 32 and 34 are disposed in corresponding, vertically elongated, slot-like apertures 36 and 38 of a plate means 40.

As shown in FIGS. 2 and 3, the plate means 40 is vertically aligned in a plane perpendicular to the door panel 15. The plate means 40 comprises a flange member 42 disposed adjacent to the back side of the door panel 15. The door handle 16 is secured to the flange member 42 by suitable fastener means, such as bolts 44, passing through a vertically disposed slot 46 in the door panel 15. The combination of the door handle 16 and the flange member 42 is vertically movable except when the lock assembly 48 to be described hereinafter is turned to the "locked" position.

The latch assembly 28 at the top of the cabinet 10 comprises (FIGS. 4–6) a strike member 50 and a keeper member 52. It will be observed that the front side of the strike member 50 is inclined and preferably spherical in shape while the back side of the strike member 50 is linear and disposed in a substantially vertical plane. The keeper member 52 is secured to the top horizontal cross bar of the door frame 12.

Similarly, the bottom catch assembly comprises (FIGS. 4–6) a strike member 54 and a keeper member 56. Again, the front side of the strike member 54 is inclined and preferably spherical in shape and the back side thereof is linear and substantially vertically aligned. The keeper member 56 is likewise secured to the bottom, horizontal cross bar member of the door frame 12.

In the case of each catch assembly 28 and 30, the distance from the uppermost portion of the strike members 50 and 54 to the top surface of the keeper members 52 and 56 is a distance *d*.

With this distance *d* in mind, it will be observed in FIG. 3 that with the transverse bend portions 34 and 36 of the rigid rods 20 and 22 seated at the bottom of the apertures 36 and 38, respectively, of the plate means 40, the length of the apertures 36 and 28 from the top of the transverse bend portion in each case to the top thereof is at least equal to the distance *d*. Thus, without vertical

movement of the plate means 40, the rigid rods 20 and 22 can be vertically moved by at least a distance corresponding to the distance *d*.

The lock assembly 48 comprises a conventional, key operated, cylinder lock member. The cylinder member is mounted in the upper region of the handle 16 in a horizontal position, the back portion of the cylinder extending through the slot 46 in the door panel 15. The back end of the cylinder lock member comprises a rotatable cam member 60 having an offset portion 62. The cam member is secured to the revolvable catch 58 of the cylinder lock member. The offset portion 62 of the cam member 60 is rotatable through at least a 90° arc. Above and over the cam member 60 and secured to the door panel 15 is a horizontally disposed stop member 64. The distance from the stop member 64 to the center of the cam member 60 corresponds to the distance from said center to the outside of said offset portion 62. Turning the cam member 60 to the upright position causes the offset portion 62 to be seated against the top member 64 and thereby to prevent vertical movement of the door handle 16 and thus of the plate means 40. Turning of the cam member 60 to the side causes the offset portion 62 to unseat from the stop member 64 and thereby to permit vertical movement of the door handle 16.

In order that the latch assembly 18 can be used with door panels of any suitable height, it is within the concept of this invention to provide means for establishing and maintaining the vertically aligned position of each of the rod means 20 and 22. In door panels of large heights, there is a tendency for the rigid rod means 20 and 22 to sway towards the plane of the door panel upon closing of the door 14. Accordingly, means may be provided for establishing and maintaining the vertically aligned position of the rigid rod means 20 and 22. In FIGS. 2 and 3 such means comprise a top angle bar 66, disposed in the terminal region of the rigid rod means 20 and a bottom angle bar 68 disposed in the terminal region of the rod means 22. Both angle bars 66 and 68 are secured to the backside of the door panel 15 and are in addition to the oppositely disposed wall of the vertical, inside, side channel of the door panel 15 in which the rigid rod means 20 and 22 are preferably disposed.

Operation

Assuming that the door 14 is open, as in the case of the left hand door of the cabinet 10 in FIG. 1, it will be observed from FIG. 4 that the transverse bend portion 32 of the upper rod means 20 and the transverse bend portion 34 of the lower rod means 22 are seated by the forces of gravity at the bottom of the respective apertures 36 and 38 in plate 40.

To close a door 14, all that need be done, regardless of whether the offset portion 62 of the cam member 60 of the lock assembly 48 is in erected position or not, is to merely close the door by manual pushing. The action that occurs is illustrated in FIGS. 4–6 wherein the lock assembly 48 is shown in "locked" position, that is, the offset member 62 is erected and is in contact with the member 64.

Thus, in closing a door 14 as shown in FIG. 4 when the lateral bend portions 24 and 26 of the upper and lower rod means 20 and 22 contact the front side of the corresponding strike members 50 and 54, they commence to ride up the front inclined surfaces of the strike members 50 and 54. Accordingly, the upper and lower rod means 20 and 22 are lifted, the transverse bend portions 32 and 34 rising within the apertures 36 and 38 (FIG. 5). Further closing of the door causes the lateral bend portions 26 and 28 to move over the top of the strike members 50 and 54. The force of gravity, however, causes the lateral bend portions 24 and 26 to fall down in back of the strike members 50 and 54 to the keepers 52 and 56. Because of the vertical distance of each of the apertures 36 and 38 in the plate means 40, there need be no movement of the plate means 40 and thus of the door handle 16 in closing the door 14.

To open the cabinet door 14 from the "locked" condition, the appropriate key is inserted into the lock assembly 48 and turned, whereby the cam member 60 is rotated. This causes the offset portion 62 to move away from its engagement with stop member 64. The door handle is then merely lifted at least through the distance *d* and usually to the full extent of the vertical distance available in slot 46. This causes the plate means 40 to be lifted the same distance. Since the plate means 40 bears against the transverse bend portions 32 and 34 at the bottom of the apertures 36 and 38, the rod means 20 and 22 are raised the same distance. The lateral bend portions 24 and 26 of the rods are raised at least to the top of the strike members 50 and 54. With the door handle 16 in raised position, and thus with the lateral bend portions 24 and 26 in raised position, the door handle is then pulled whereupon the door opens. Simply releasing the door handle 16 causes the same, under the effect of the weight of the movable parts of the latch assembly 18, to fall back to its rest position.

To assemble the door latch and lock assembly 18, as shown in the drawings, the transverse bend portions 32 and 34 of the rigid rod means 20 and 22 are inserted into position through the apertures 36 and 38, respectively, of the plate means 40. The plate means 40 is then placed with the flange member 42 vertically disposed adjacent the backside of the door panel 15 in alignment with the slot 46 thereof. In this position, the lateral bend portions 24 and 26 are in proper position with respect to the catch assemblies 28 and 30. The door handle 16, with the lock assembly 48 mounted thereon, is then placed into position on the front side of the door panel 15 and the fasteners 44 with washers and the like, when desired, are inserted through the flange member 42 into the handle 16 and tightened. Enough play is left between the door panel 15 and the door handle 16 as well as between the door panel 15 and the flange member 42 to permit easy vertical movement of the handle 16 and flange member 42. The catch assemblies 28 and 30 may be secured at any time in the assembly procedure to the top and bottom horizontal cross members of the door frame 12.

In light of the foregoing description, it will be seen that the door latch and lock assembly of this invention is characterized by simplicity of construction and ease of assembly. The latch and lock assembly is positive in action. It facilitates easy and rapid closing of the door with which it is associated without manipulation of the handle. It may also be closed without turning of the lock. Unlatching of the door having the latch and lock assembly of this invention is easy and rapid, since it merely involves lift and pull motion.

This invention may be embodied in several forms without departing from the spirit or essential characteristics thereof. For example, the rod means 20 and 22 may be a single integral structural element with the ends of the transverse bend portions 32 and 34 being joined. The embodiment just described is therefore illustrative and not restrictive, since the scope of the invention is defined by the appended claims rather than by the description preceding them, and all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents, are intended to be embraced by those claims.

I claim:

1. A door latch assembly for a door hingedly mounted in a door frame, which comprises: an upper and a lower, generally linear, rigid rod means vertically disposed adjacent the unhinged side of said door on the back side thereof, said upper rod means having a top terminal lateral bend portion at the top end thereof and a bottom transverse bend portion at the bottom end thereof, said

lower rod means having a bottom terminal lateral bend portion at the bottom end thereof and a top transverse bend portion at the top end thereof; an open top catch assembly means secured to an upper portion of said door frame for receiving said top terminal lateral bend portion; an open top catch assembly means secured to a lower portion of said door frame for receiving said bottom terminal lateral bend portion; a vertically movable, lifter plate means vertically disposed in a plane adjacent generally to said rod means and vertically arranged relative to said door, said plate means comprising a pair of vertically elongated apertures therethrough with said bottom offset portion seated in one of said apertures and having a lost motion connection therewith and said top offset portion seated in the other of said apertures and having a lost motion connection therewith, whereby upward movement of said lifter plate means causes each of said rod means to move upwardly and thus said lateral bend portions to move above said catch assembly means upon opening said door; said rod means moving independently of said lifter plate upon closing said door to latch said door, and vertically movable door handle means secured to said lifter means.

2. A cabinet having a door frame, a door hingedly connected thereto and a latch assembly for said door, said assembly comprising: a vertically movable plate on the back side of said door adjacent the unhinged side thereof and disposed vertically and perpendicularly thereto, said plate having a flange member parallel to said door and said plate having a pair of vertically elongated apertures; a generally linear, rigid, upper rod extending vertically along a side of said plate to the top region of said door, said rod having an offset portion extending from said side of said plate through one of said apertures and thence downwardly and having at the top end thereof a terminal lateral bend portion parallel to the back side of said door; a generally linear, rigid, lower rod extending vertically along a side of said plate to the bottom region of said door, said rod having an offset portion extending from said side of said plate through the other of said apertures and thence upwardly and having at the bottom end thereof a terminal lateral bend portion parallel to the back side of said door; a top catch secured to said door frame for receiving said terminal portion of said upper rod, said catch comprising a strike member on top of a keeper member; a bottom catch secured to said door frame for receiving said terminal portion of said lower rod, said catch comprising a strike member on top of the keeper member; a vertically movable door handle on the outside of said door; fastener means passing through a slot opening in said door between said door handle and said flange member of said plate for transmitting vertical motion of said handle to said plate, the up movement of said plate causing said vertical rods to move upwardly and lift said terminal portions thereof above said strike members.

3. A cabinet according to claim 1 wherein said door comprises on the back side thereof means for maintaining the upper and lower portions of said rods in spaced relationship from said back side.

4. A door latch assembly for a door hingedly mounted in a door frame, which comprises: a generally linear, rigid rod means vertically disposed adjacent the unhinged side of said door on the back side thereof, said rod means having a terminal lateral bent portion at one end thereof and an offset bent portion at the other end thereof, an open catch assembly means secured to a portion of said door frame adjacent said one end of said rod for receiving said terminal lateral bent portion; a vertically movable, lifter plate means vertically disposed in a plane adjacent generally to said rod means and vertically arranged relative to said door, said plate means comprising a vertically elongated aperture therethrough with said offset bent portion seated in one of said apertures and having a lost motion connection therewith whereby upward movement of said lifter plate means causes said rod means to move upwardly and thus said lateral bent portion to move above said catch assembly means upon opening said door; said rod means moving independently of said lifter plate upon closing said door to latch said door, and vertically movable door handle means secured to said lifter means; and releasable lock means on said handle for preventing vertical movement of said handle.

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