June 19, 1962 C. F. DUSING ETAL 3,039,291

DOOR LOCK SUPPORT CONSTRUCTION

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Fig. 5.

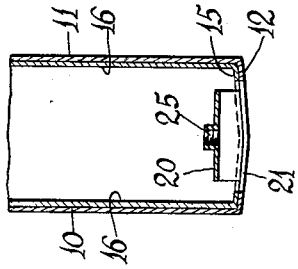


Fig. 4.

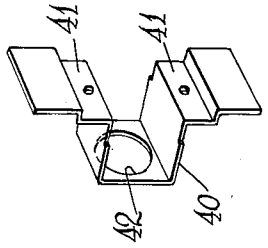


Fig. 3.

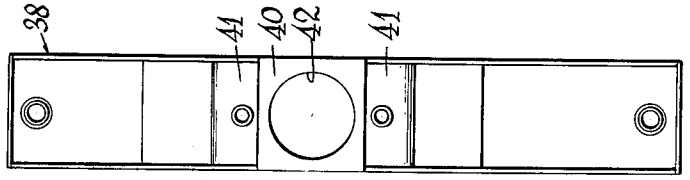


Fig. 2.

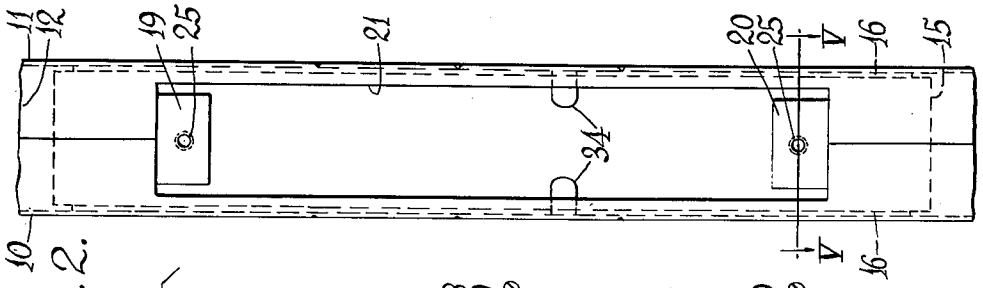
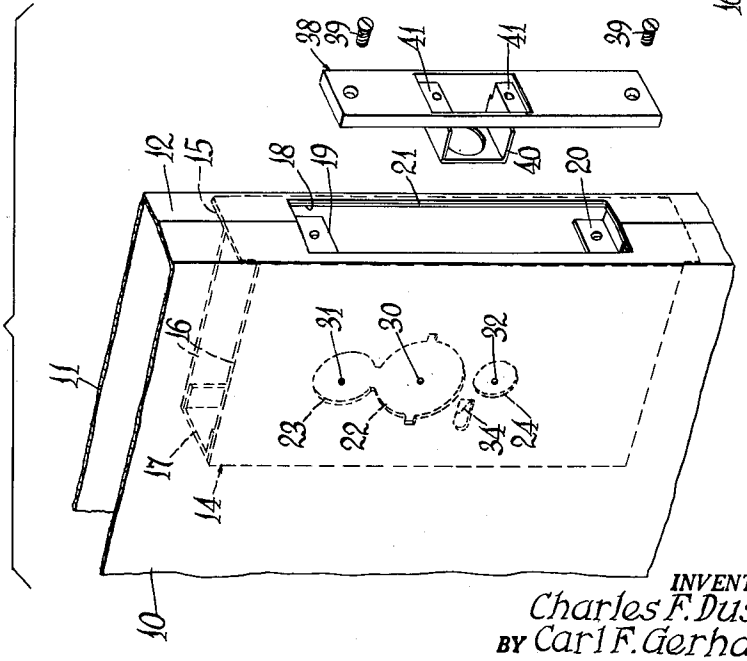


Fig. 1.



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Fig. 7.

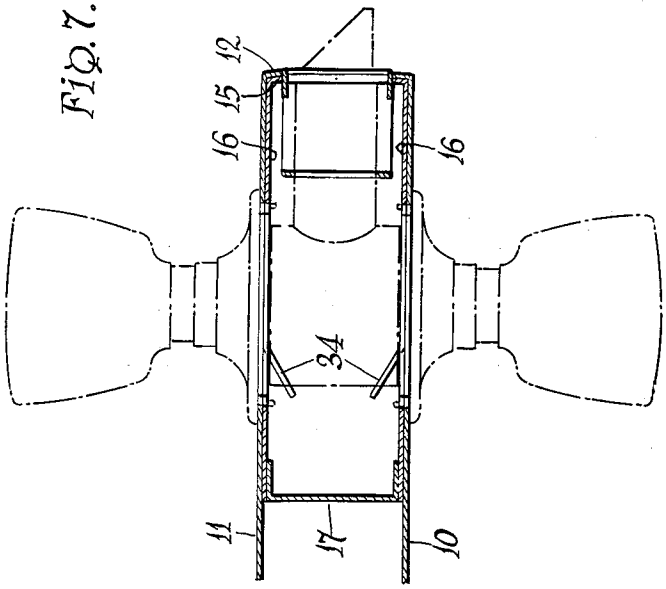


Fig. 8.

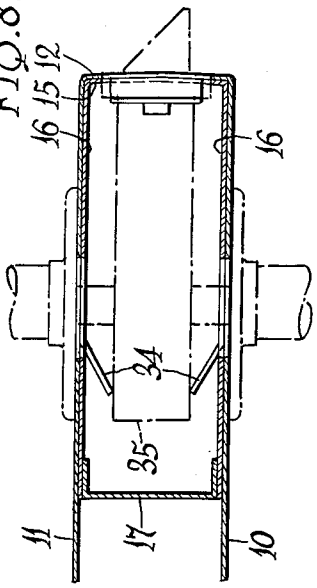
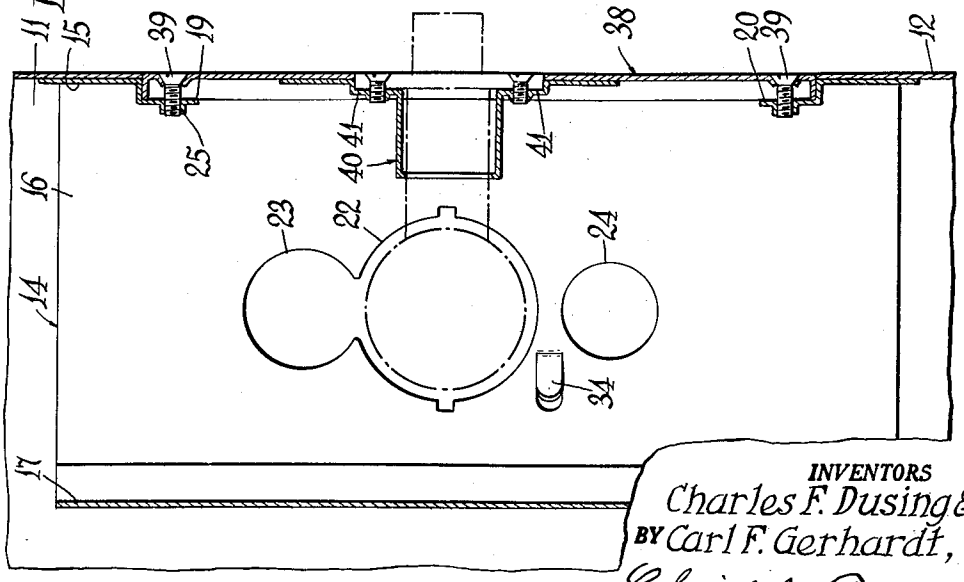


Fig. 6.



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United States Patent Office 3,039,291 Patented June 19, 1962

3,039,291

DOOR LOCK SUPPORT CONSTRUCTION

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Filed June 2, 1961, Ser. No. 114,412
8 Claims. (Cl. 70—451)

This invention relates to door constructions and more particularly to novel sheet metal positioning and supporting structures for door lock mechanisms.

While the application of the principles of the present invention is not necessarily thus limited, the advantages thereof are particularly present in the case of metal type swing doors. Metal doors of this general type and description are becoming more and more widely used and with such increasing use stock doors in various sizes are manufactured and are kept in stock at building supply distributors and the like.

As is generally the case in stocking a line of standard or semi-standard articles, variations in styles, types and specifications multiply the number of different articles which must be kept in stock if a full line of sizes and types is to be made available. In the case of stock metal doors it is obviously necessary to maintain a line of doors of different sizes and types.

A further complicating factor arises due to the fact that swing doors are commonly used with either cylindrical locks or mortise locks and ordinarily different doors having different lock receiving and supporting structures are required for accommodating locks of these two different types. It is therefore ordinarily necessary to maintain in stock twice as many doors if both of these lock types are to be made available to purchasers as would be required if only one lock type were in ordinary use.

The present invention provides a door lock support structure and arrangement whereby relatively simple adaptation may be accomplished by relatively unskilled workers without special machinery to adapt a given door for receiving either a cylindrical lock or a mortise lock. This adaptation procedure is such that it can be carried on at a building material supply point which may be far removed from the place at which the doors are manufactured where no sheet metal working machinery is available.

Adaptation for either type of lock may thus be effected as such doors are ordered from stock by builders or other ultimate users thereof. The advantage in reduction in inventory of this procedure will be so clear to those skilled in the builder supply art and the stock door construction field as to require no further discussion.

In addition to the economic advantages incident to the great reduction in the inventory which would otherwise be required to make a full line of stock metal doors available, the door lock supporting structure of the present invention is economical to produce, is readily incorporated in a sheet metal door structure, serves as a reinforcement of the lock receiving and supporting portion of such door structure, and facilitates the mounting and accurate location of either a cylindrical or mortise lock in the door structure.

Various other objects and advantages of the lock mounting and supporting structure of the present invention will become apparent from a consideration of the form of the invention illustrated in the accompanying drawings and described in detail in the following specification. However, it is to be understood that such embodiment is set forth by way of example only and that various mechanical modifications may be effected without departing from the underlying principles of the invention, the scope of the invention being limited only as defined in the appended claims.

In the drawings:

FIG. 1 is a fragmentary perspective view of the lock carrying edge portion of a metal door structure provided with one form of the lock mounting and supporting instrumentalities of the present invention and with portions of the latter shown in exploded or disassembled relationship;

FIG. 2 is an edge elevational view of the door structure of FIG. 1;

FIG. 3 is a similar elevational view of the inner surface of an adaptor element employed in converting the door and particularly the lock support structure thereof for use in mounting a cylindrical lock;

FIG. 4 is a detailed perspective view of one of the parts of the adaptor structure of FIG. 3;

FIG. 5 is a horizontal cross sectional view on the line V—V of FIG. 2;

FIG. 6 is a vertical generally central cross sectional view through the lock supporting structure of the preceding figures taken generally in the plane of the door itself;

FIG. 7 is a horizontal cross sectional view taken substantially centrally through the structure of FIG. 6 showing a cylindrical lock assembled therewith; and

FIG. 8 is a view similar to FIG. 7 but showing a mortise type lock assembled therewith.

Like characters of reference denote like parts throughout the several figures of the drawings and the numerals **10** and **11** designate the opposite face portions of a sheet metal door structure which may be of any desired design and arrangement, the edge portion of the sheet metal door being designated **12**. In the illustrated instance the edges of the face portions **10** and **11** are flanged inwardly to form the edge portion **12** and welded along a central vertical line but this is merely incidental to the lock support structure disclosed herein.

The main body member of the lock support structure of the present example comprises a vertically extending relatively heavy sheet metal channel designated generally by the numeral **14** and having a web portion **15** and a pair of relatively deep flange formations **16**. In the present embodiment the channel **14** is reinforced and stiffened by a channel member **17** which fits into the open end of channel **14** and may be spot welded or otherwise fixed thereto to form a vertically extending rectangular tubular lock housing and support.

The web portion **15** of the body member **14** has a vertically elongated rectangular opening **18** which is proportioned to receive a standard mortise lock front or face plate which conventionally lies substantially flush with the edge surface of the door proper. A pair of inwardly offset flanges **19** and **20** at the upper and lower ends of the opening **18** provide seating surfaces for the mortise lock mounting plate and the flanges **19** and **20** are internally threaded as shown at **25** in FIG. 5 to receive the mortise lock front plate screws when the door is to be fitted with that type of lock.

The lock support body member **14** is permanently fitted and secured within the door structure proper as by spot welding or otherwise and as shown in FIG. 1, the edge portion **12** of the sheet metal door is provided with an opening **21** which registers with the opening **18** of the body member **14**. In the present example the metal of the member **14** is substantially heavier than the metal of the door faces **10** and **11** and the member **14** substantially reinforces the door in the vicinity of the lock and serves as a sort of anvil when the lock openings are cut in the door face sheets as described later herein.

The body member **14** is provided at each of its opposite faces with three generally circular openings **22**, **23** and **24**, the opening **22** being used to permit the insertion of a lock cylinder in installing a cylindrical lock and the openings **23** and **24** being used to accommodate the lock

spindle and the key cylinder in installing a mortise type lock. Opening 22 may also be used when installing mortise locks equipped with thumb turns. It will be noted from FIG. 1 that these openings are initially completely covered by opposite face portions 10 and 11 of the door proper and it is in this condition that doors are delivered from the factory and kept in stock at various supply and distribution points.

When a door of a given size and type is ordered from a dealer's stock the specifications will designate whether it is to receive a cylindrical lock or a mortise lock. Stencils or templates may be employed at the warehouse or elsewhere for marking the outer surfaces of the door to locate the necessary circular openings for the particular lock style. If a cylindrical lock is specified the markings will generally coincide with the circular openings 22 of the body member 14 at opposite sides of the door and if a mortise lock is specified, two openings will be marked at each side of the door to coincide with the openings 23 and 24 of the body member 14.

Openings 23 and 24 for the key cylinder and knob spindle may be cut at either or both sides of a door as may be required. On occasion a mortise lock may be fitted with a thumb turn at either side of the door, in which case one or both openings 22 will receive the thumb turn spindle.

The template may readily be adapted to locate the required openings with respect to the openings 18 and 21 as reference points and may merely locate the center of the desired openings. It is a relatively simple matter to cut these openings through the face sheets 10 and 11 of the door proper with circle or hole saws or the like.

As an alternative to the template or stencil method of locating the holes the doors may be provided with relatively inconspicuous markings such as are indicated in FIG. 1 at 30, 31 and 32, which markings indicate the centers of the respective openings 22, 23 and 24. In this case the openings for either type lock may be formed by center punching at the required markings and employing a hole saw as above. Notches corresponding to the lateral notches in the hole 22 may be formed on the door faces 10 and 11 by filing, using the underlying body member 14 as a guide.

If a mortise lock is to be installed and the holes in the door surface which register with the holes 23 and 24 of the body member 14 have been cut, the door is ready to receive the lock and the manner of installation is entirely conventional. If a thumb turn mechanism is to be used the hole or holes 22 will of course also be cut. Complete installation is illustrated in FIG. 8. It will be noted that the opposite flanges 16 of the body member 14 are provided with inwardly bent ears 34 at opposite sides and, as illustrated in FIG. 8, the ears 34 center and support a mortise lock casing shown in dot and dash lines at 35. As stated previously, the front plate of the mortise lock fits snugly within the openings 18 and 21 and is seated upon and screwed to the flanges 19 and 20 of body member 14.

When a cylindrical lock is to be fitted to a particular door, openings will of course be formed through the face sheets 10 and 11 in registry with the openings 22 of the lock support member 14. In this instance an adaptor member designated generally by the reference numeral 38 in FIG. 1 is seated in the openings 18 and 21 and against the flanges 19 and 20 and is attached by screws designated 39 in FIGS. 1 and 6. Adaptor plate 38 is of the same height and width as a standard mortise lock front plate and is flanged along its edges as clearly shown in FIGS. 3 and 6 so that its effective thickness is likewise the same as that of a standard mortise lock front plate.

A U-shaped member 40 is shown in detail in FIG. 4 and is fixed to the inside of adaptor plate 38 as shown in FIG. 1. Member 40 is provided with offset ledges 41 formed and proportioned to receive the usual lock front or face plate of a standard cylindrical lock which is conventionally attached to the edge surface of a door fitted with that type of lock. The member 40 is also provided with a clearance hole 42 for the bolt of such lock and FIG. 7 shows schematically in dot and dash lines the relative positions of the parts of a standard cylindrical lock installed in a door having the lock support structure of the present invention incorporated therein.

We claim:

1. In a door lock support structure for a door comprising opposed face sheets and an edge portion connecting the same, a rigid housing member comprising spaced vertical side walls and a vertical end wall connecting the same, said side walls being adapted to fit closely between the face sheets of said door with said end wall interiorly against said edge portion, said end wall and said door edge portion having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be positioned in said openings in place thereof, said adaptor member having an opening therein for passage of a cylindrical lock bolt, and openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

2. In a door lock support structure for a door comprising opposed face sheets and an edge portion connecting the same, a lock support member comprising vertical side walls and means rigidly connecting the same in spaced parallel relation, said side walls being adapted to fit closely between the face sheets of said door adjacent to the lock receiving edge thereof, said door edge portion having a vertically elongated opening for receiving a mortise lock front plate, said lock support member having seating surfaces for such mortise lock front plate registering with said door edge opening, an adaptor member of substantially the size of such mortise lock front plate adapted to be positioned in said door edge opening in place thereof, said adaptor member having an opening therein for passage of a cylindrical lock bolt, and openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

3. In a door lock support structure for a door comprising opposed face sheets and an edge portion connecting the same, a rigid housing member comprising spaced vertical side walls and a vertical end wall connecting the same, said side walls being adapted to fit closely between the face sheets of said door with said end wall interiorly against said edge portion, said end wall and said door edge portion having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be positioned in said openings in place thereof, said adaptor member having seating surfaces formed therein for the front plate of a cylindrical lock, and openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

4. In a door lock support structure for a door comprising opposed face sheets and an edge portion connecting the same, a lock support member comprising vertical side walls and means rigidly connecting the same in spaced parallel relation, said side walls being adapted to fit closely between the face sheets of said door adjacent to the lock receiving edge thereof, said door edge portion having a vertically elongated opening for receiving a mortise lock front plate, said lock support member having seating surfaces for such mortise lock front plate registering with said door edge opening, an adaptor member of substantially the size of such mortise lock front

plate adapted to be positioned in said door edge opening in place thereof, said adaptor member having seating surfaces formed therein for receiving the front plate of a cylindrical lock, and openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

5. In a door lock support structure for a sheet metal door, a rigid housing member comprising a vertically extending rectangular tube having spaced vertical side walls connecting vertical end walls, said side walls being adapted to fit closely within said door with one of said end walls adjacent to the lock receiving edge thereof, said end wall and said door edge having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be secured in said openings in place thereof, said adaptor member having an opening therein for passage of a cylindrical lock bolt, and preformed openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

6. In a door lock support structure for a sheet metal door, a rigid housing member comprising a vertically extending rectangular tube having spaced vertical side walls and connecting vertical end walls, said side walls being adapted to fit closely within said door with one of said end walls adjacent to the lock receiving edge thereof, said end wall and said door edge having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be secured in said openings in place thereof, said adaptor member having seating surfaces for receiving the front plate of a cylindrical lock, and preformed openings in said housing member side walls for receiving either cylindrical lock or mortise lock spindle and lock means.

7. In a door lock support structure for a sheet metal door, a rigid housing member comprising spaced vertical side walls and a vertical end wall connecting the same, said

side walls being adapted to fit closely within said door with said end wall adjacent to the locked receiving edge thereof, said end wall and said door edge having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be secured in said openings in place thereof, said adaptor member having an opening therein for passage of a cylindrical lock bolt, and preformed openings in said housing member side walls for receiving either cylindrical lock means or mortise lock spindle and lock means, portions of said housing member side walls being formed inwardly toward each other to engage opposite sides of a mortise lock casing to position the same medially between said side walls.

8. In a door lock support structure for a sheet metal door, a rigid housing member comprising spaced vertical side walls and a vertical end wall connecting the same, said side walls being adapted to fit closely within said door with said end wall adjacent to the lock receiving edge thereof, said end wall and said door edge having registering vertically elongated openings for receiving a mortise lock front plate, inwardly offset flanges at the upper and lower ends of said housing member end wall opening providing seating surfaces for such mortise lock front plate, an adaptor member of substantially the size of such mortise lock front plate adapted to be secured in said openings in place thereof, said adaptor member having seating surfaces for receiving the front plate of a cylindrical lock, and preformed openings in said housing member side walls for receiving either cylindrical lock means or mortise lock spindle and lock means, portions of said housing member side walls being formed inwardly toward each other to engage opposite sides of a mortise lock casing to position the same medially between said side walls.

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