

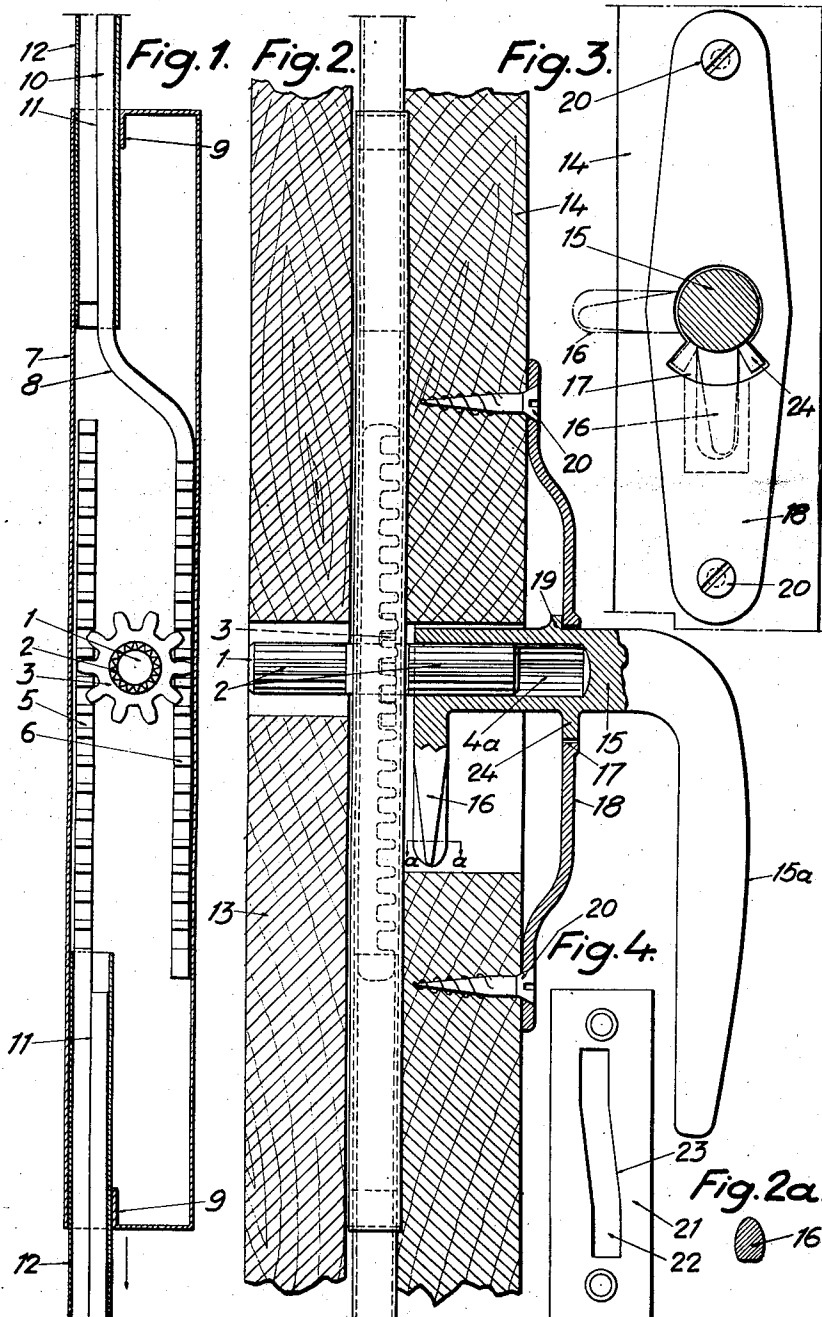
July 18, 1939.

E. SÄRENHOLM ET AL
LOCK FOR DOORS AND THE LIKE

2,166,535

Filed Nov. 18, 1937

3 Sheets-Sheet 1



INVENTOR:
EINAR SÄRENHOLM
HELGE WARROL
BY *Haseltine, Lake & Co.*
ATTORNEYS

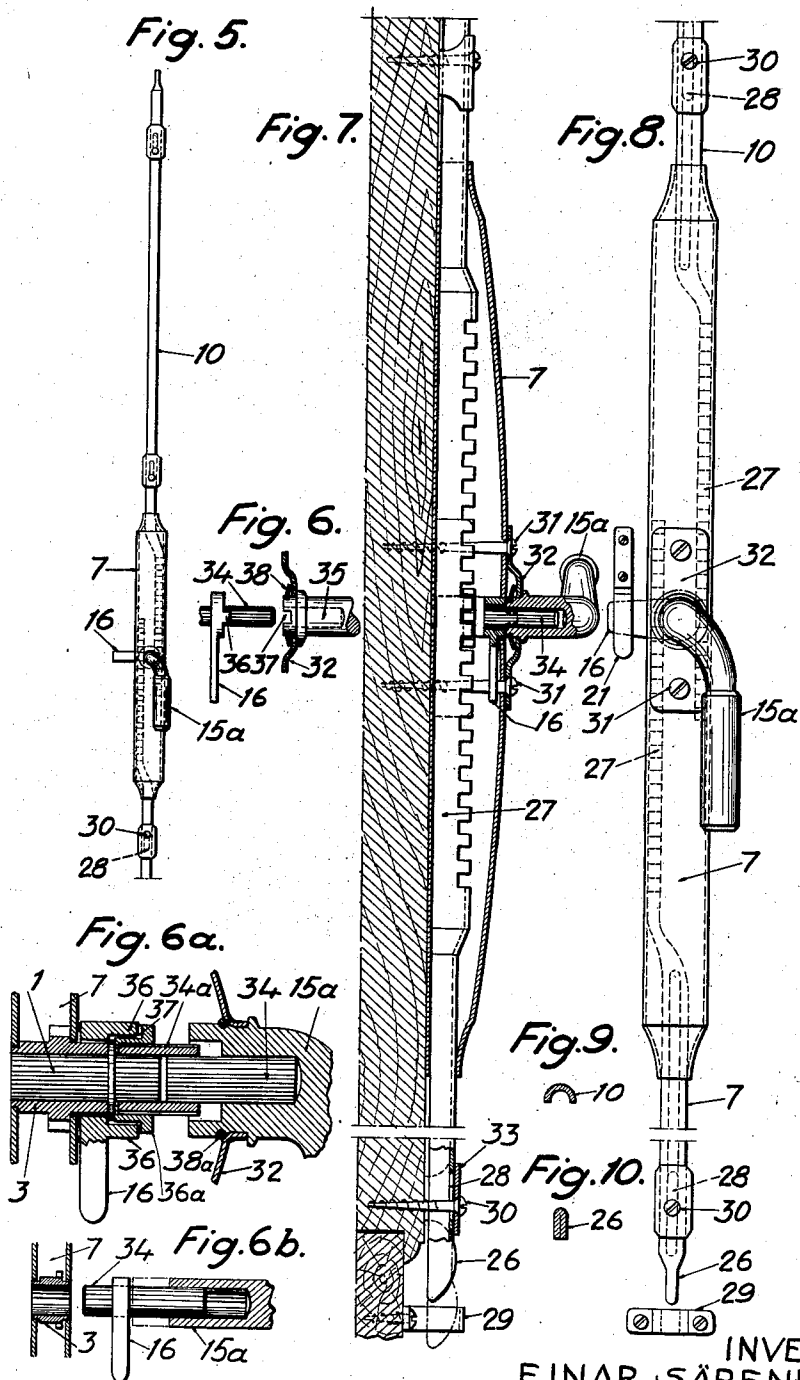
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3 Sheets-Sheet 3

Fig. 11.

Fig. 12.

Fig. 13.

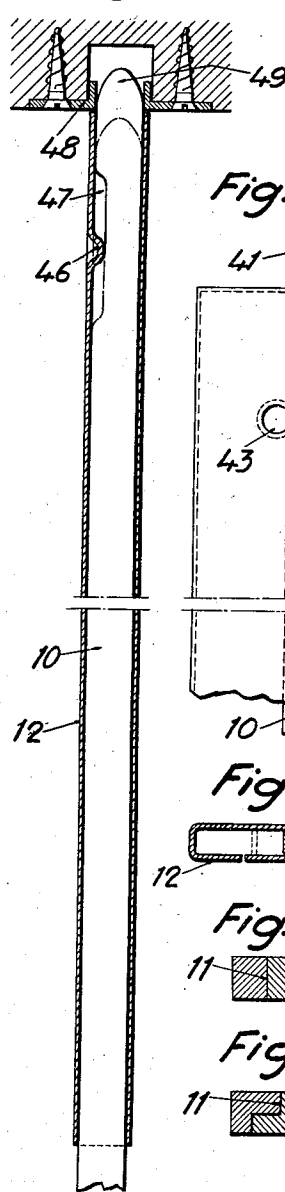
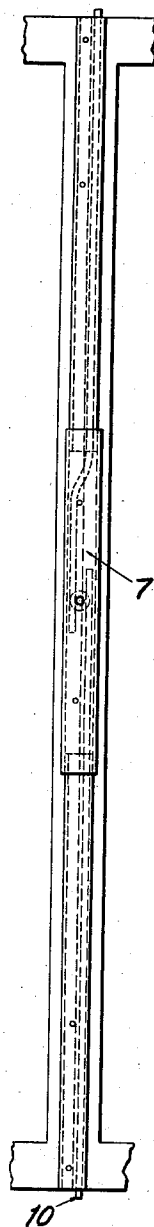
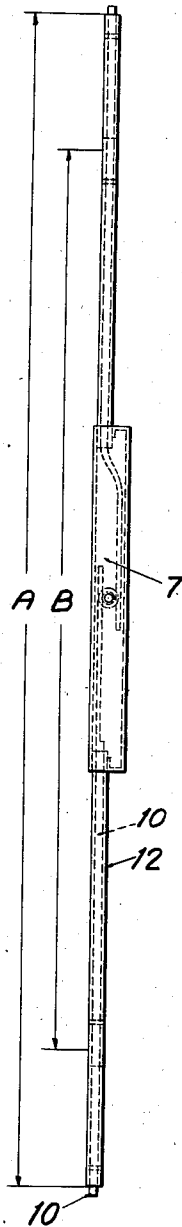


Fig. 14. Fig. 15.

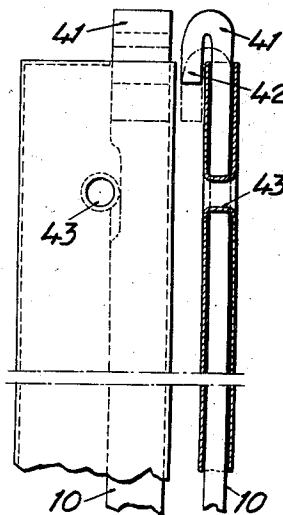


Fig. 16.

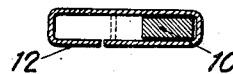


Fig. 17.



Fig. 18.



INVENTOR:
EINAR SÄRENHOLM
HELGE WARROL

BY *Haseltine, Lake & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE

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LOCK FOR DOORS AND THE LIKE

Einar Särenholm and Helge Warrol,
Eskilstuna, SwedenApplication November 18, 1937, Serial No. 175,178
In Sweden April 30, 1936

10 Claims. (Cl. 292—5)

This invention relates to locks for doors, windows and the like and more particularly to locks of the bascule type the lengths of which are adjustable within certain predetermined limits and each of which comprises two locking bolts or rods movable relatively to each other one end of each of said rods being adapted to project into a casing or the like and being formed as a rack, which racks are disposed parallel to each other and are adapted to be moved up and down in opposite directions through the medium of a cogwheel or pinion which is situated therebetween and operated by means of an operating handle removably attached to said cogwheel or pinion.

It is the chief object of the invention to evolve an improved lock of the type above referred to and in accordance therewith the length of the racks on the locking rods is greater than that required to produce the actual locking movement of said rods so that by moving the bolts or rods, the parts of which outside the lock casing are wholly or partially enclosed in guide casings or the like movable within certain limits relatively to the rods, the lock may be adjusted for application to different sizes of windows, doors or the like, the pinion or cogwheel being mounted on a shaft which is journaled within the lock casing and provided at one or both ends projecting therefrom with axially extending riflings, grooves or the like around its whole periphery while a hollow spindle associated with an operating handle is also provided on its interior with similar grooves or riflings so that when the locking bolts or rods are adjusted to the required length by pushing them into or withdrawing them from the casing the handle may be placed in position on the pinion shaft with the handle part itself in an approximately vertical or horizontal position from which it may be turned thereafter to a horizontal or vertical position respectively to move the locking bolts either into or out of their locking position.

In locks of this type, especially when the door or window is of considerable height, it is often desirable that said door or window to which the lock is applied should be pressed against the jamb or frame or against the opposite door or window-half at approximately the mid-point of its length. For this purpose it is preferable to incorporate in the lock according to the invention a latch or bolt which is associated with the handle shank and adapted to co-operate with a striker plate on the adjacent window or door or on the jamb having a notch or the like adapted to receive said latch or bolt. The latch may be

of known form for example of substantially wedge shape and the notch in the striking-plate may be so bevelled in known manner that the latch or bolt on being moved to its locking position will press the window-frame or door-half against the opposite window-frame or door-half or the door or window against the jamb. The handle shank is preferably provided at a point about the middle of its length with a collar, against which a plate, pushed on the handle before the application of the latter to the pin or shaft, is adapted to abut the arrangement being such that after the plate is secured in position for example by means of screws or the like it will retain the handle on the pin or shaft so that it will be impossible to withdraw said handle from the shaft. In order that the turning movement of the handle may be limited to about a quarter of a turn the plate is preferably provided with a curved recess or the like the periphery of which subtends an angle of about 90° a peg or the like being mounted on the handle shank and adapted to engage in said recess in order to limit the turning of the handle spindle to about 90°.

In one preferred embodiment the end of the handle shank adjacent the lock casing may have recesses or projections formed therein adapted when the handle is placed on the pin or shaft to co-operate with projections or recesses respectively formed on a latch which is freely rotatable on said pin or shaft so that after the locking-rods are adjusted according to the height of the window or the door, the handle may be coupled with the freely mounted latch which will of course hang downwardly.

In a modified embodiment the freely mounted latch which is provided with projections or recesses may be arranged outside the lock casing on the pin or shaft carrying the pinion or on an extension of the hub of said pinion the aperture in which latter is formed around its periphery with fine rifles or grooves adapted to co-operate with corresponding rifles or grooves on said shaft which may in turn be pushed into or withdrawn from said hub as required. In this case the pinion shaft is provided with a collar disposed outside the lock casing and adapted to hold the latch in position when the shaft is inserted in the hub of the pinion within the lock casing. The recesses or projections co-operating with the projections or recesses respectively on the latch are in this case not arranged on the hollow handle shank, but on a coupling element which is provided on its inner cylindrical surface with fine rifles or grooves and is adapted to surround

a small cylinder, the inner and outer surfaces of which are similarly rifled or grooved. The inner rifling of the small cylinder corresponds to the rifles on the shaft carrying the pinion and also to rifles or grooves on a spindle mounted in the inner end of the handle-shank.

In yet another embodiment the handle-shank may be provided on its inner surface with longitudinally extending rifles or grooves corresponding to the rifling on the exterior of the pinion shaft, which latter may be pushed into or withdrawn from the handle-shank and the pinion as required the pinion being journaled in the lock casing and the hub thereof being provided around its interior surface with corresponding rifles or grooves the latch in this case being rigidly mounted on the shaft. In order to prevent the handle from being withdrawn from the pinion shaft when the lock is in position on a window or a door a retaining plate is provided which is firstly pushed on the handle-shank and is thereafter secured in position by means of a fastening plate adapted to bear against said retaining plate, which when the lock is in position is secured by means of screws or the like to the window or the door. Instead of being retained by the fastening plate the retaining plate may be held in position on the handle-shank by a metal-ring or the like which is adapted to engage in a peripheral groove around the inner end of said shank. A collar is suitably disposed on the handle-shank and is adapted to lie on the other side of the retaining plate, so that said plate will be retained in position by both the collar on the one side and the fastening plate on the other side.

The lock according to the invention is equally adapted to be mounted on inwardly swinging doors or windows as well as on those which open outwardly. Further, since the lock casing is of relatively great length as are the racks on the locking bolts or rods, the lock, that is to say, the locking rods, may be adjusted within very wide limits, which may for example vary between about 30 cm. and more. This is of a very great practical importance from a manufacturing point of view since the manufacturer only need produce and store locks in a few standard sizes, the different sized locks being readily adjustable to suit windows or doors of practically any height.

The parts of the locking bolts or rods which project from the lock casing may be crescent shaped or semi-circular in cross section but the extreme ends thereof are preferably so flattened that in cross section they are in the form of a flattened U. Further, those portions of the rods projecting from the lock casing are preferably formed with one or more oblong slots or the like of a length corresponding to the length of the locking movement, a screw being passed through the slots and inserted into the window or the door. Preferably a shield or guide is disposed around the locking rods at every slot the screw being passed through said shield or guide before insertion into the slot.

The locking rods or bolts may be wholly or partially enclosed in guide-casings or the like which after mounting of the lock on a window, door or the like are let into or are disposed on the outer surface of said door or window. Each casing may be associated with its respective locking bolt in such a manner that it may move with the bolt during adjustment of the length thereof but after such adjustment is completed will permit said bolt to move into or out of its locking position without partaking in such movement. Fur-

ther, each bolt casing may have a projection or the like in the form of a depression, peg, pin or the like, which is adapted to enter a recess in the locking bolt or rod said recess being of such a length that when the lock is adjusted to its required length according to the height of the door or the window the rod will be movable relatively to the casing a distance corresponding to the movement of the locking rod into or out of its locking position. In order that the bolt casing which may be in the form of a strip bent around the locking rod will not be withdrawn from the lock casing in which one end is inserted, it is preferably formed with an outwardly directed flange or the like adapted on withdrawal to engage an abutment on said lock casing to prevent complete withdrawal thereof.

The abutment on the lock casing which is adapted to co-operate with the flange or the like on the bolt-casing preferably comprises a flap bent inwardly from the lock casing and adapted together with the opposite wall and eventually also the adjacent walls of the lock casing to serve as a guide for the bolt casing during movement into or out of the lock casing. The bolt-casing which may surround its locking-rod only at the outer end of the latter may be formed with an outbent flange or the like or with two or more such flanges adapted to facilitate mounting thereof on the window-frame or the door, when the lock is adjusted to the required length. When the bolt casing is situated at the side of a window-frame or door it may together with the lock casing be of flattened form and constitute a tightening fillet extending down one edge of the frame or door and further it may be formed with an annular socket or recess adapted to replace the projection or the like, above mentioned. The ring-shaped socket or the like formed in the bolt-casing and if desired on the lock-casing, may constitute holes for fastening screws or the like and form at the same time guides for the movable locking-rods.

In order that the said invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to the accompanying drawings, which show several embodiments by way of example:

Figure 1 shows a section through the lock casing.

Figure 2 shows a vertical section taken at right angles to that shown in Figure 1 through a window or a door fitted with a lock according to the invention.

Figure 2^a shows a section on the line a-a in Figure 2.

Figure 3 shows a retaining plate for the handle.

Figure 4 shows a striker plate for the turning bolt or latch.

Figure 5 shows a front view of a modified form of bascule lock.

Figure 6 shows a detail.

Figure 6^a shows a modified form of the arrangement illustrated in Figure 6.

Figure 6^b shows a further modification of the arrangement illustrated in Figure 6.

Figures 7 and 8 show in vertical longitudinal section respectively the embodiment illustrated in Figure 5.

Figures 9 and 10 show sections of a locking rod.

Figures 11 and 12 show front views of two more different forms of lock according to the invention.

Figure 13 shows on a larger scale the upper end of a locking rod illustrated in Figure 11, the guide casing being shown in section.

Figures 14 to 16 show also on a larger scale details of the construction illustrated in Figure 12.

Figures 17 and 18 show in sections two different forms of locking rod formed of two single rods, welded together.

Referring to the drawings, 1 designates the pin or shaft, which when the lock is applied to a door is adapted to project from both sides of the lock casing, mortised in the door, so that the handle may be applied to the shaft from either side of said door. When the lock is to be applied to windows where the handle can be disposed only on the inside thereof the shaft will project only from one side of the casing, the inner end thereof being journalled on the inside of one wall of said case. The shaft 1 is, as will be seen from the drawings, formed at one or on both ends 2, which project from the casing with relatively fine axial rifles or grooves 4 around its whole periphery. A pinion 3 is rigidly mounted on the shaft 1 and is adapted to mesh with racks which are formed one on each end of the locking rods 5 and 6 and situated on both sides of the pinion. One of the rods, namely the rod 6, as will be seen from Figure 1, is provided with a bent or curved portion 8 in order that those portions of said rods outside the lock casing 7 will lie approximately in line with each other. The rods 5 and 6 are guided at the points where they leave the casing by means of guides 9 formed integrally with said casing. In order that those portions of the locking rods situated outside the casing 7 will be sufficiently rigid while at the same time as light as possible, said portions preferably consist of two rods 10 united together for instance by welding along the line 11. 12 denotes a guide casing formed of sheet metal or the like which is adapted to surround every locking-rod and is mortised or otherwise mounted on the door or window frame. The guide casings 12 facilitate movement of the locking rods most effectively since they prevent damp from getting to the rods and thus prevent jamming of said rods in their grooves formed for instance in the door 13 or window frame 14 which would otherwise occur if the door or window were made wet, for instance by rain. The spindle or shank 15 of an operating handle 15a is hollow and is provided on its interior with rifles or grooves 4a corresponding to the grooves or rifles on the shaft 1, so that with the handle in a certain predetermined position the spindle or shank may be pushed on the shaft 1 which may thereafter be turned by the handle. On the inner end of the handle-shank 15 a latch 16 is preferably mounted. The free end of the latch 16 is preferably so formed that it will have a section corresponding to that illustrated in Figure 2, in order that it may easily engage in a striker plate 21 mounted on the opposite frame or on the jamb. The striker plate 21 may be provided with a bevelled notch 22 adapted to receive the latch 16, which in its locking position is adapted to press against the bevelled side 23. The handle may be retained in position on the shaft 1 by means of a retaining plate 18, which, however, is adapted to be pushed over the handle 15a until it abuts against a collar 19 formed on the shank 15 before said handle is applied to the shaft 1, and after the locking rods 5 and 6 are adjusted to their required lengths in accordance with the height of the window or the door. The retaining plate 18 is secured to the window 14 or the door 13 after the handle is in position by means of screws 20. Further, the plate 18

is formed with an arc-shaped or curved notch 17, in which a peg 24 on the handle shank 15 is adapted to engage in order to limit the turning movement to be imparted to the handle to for instance a quarter of a turn.

When applying a lock according to the invention to a window or a door of a certain height a stock sized lock is chosen which is nearest or approximately corresponds to the height in question, and the locking rods are then drawn out or pushed together until the correct total length is obtained, whereafter the handle 15a is placed in position on the shaft 1. Each rod is movable relatively to its socket or guide-casing 12 only such a distance as will correspond to the locking movement. During the pushing together or the drawing out of the locking rods the pinion 3 will rotate freely, since the handle 15a has not been placed in position on the shaft 1.

In the embodiment according to Figures 5 to 10 the handle which is also designated 15a is as in the previous embodiment provided with a latch 16, which while being of different construction co-operates in its locking position with the striker plate 21. 26 designates the composite part of each locking rod, which lies outside the casing and is in this case of semi-circular or crescent shape in cross-section, while 27 denotes the inner parts which are provided with racks. 28 denotes a slot or the like which may be formed in one or both of the rods a screw 30 being inserted through a socket 33 and through said slot 28 for the purpose of pressing the rod against the door or window frame. 29 denotes a staple or the like adapted to be fastened to the jamb and to receive the bevelled end of the rod when the latter is moved to its locking position. The retaining-plate for the handle is indicated at 32 said plate being adapted to be secured in position by means of screws or the like 31, after the handle-shank has been pushed over the shaft 34 which corresponds to the shaft 1. The inner end 35 of the handle-shank is in this embodiment formed with recesses or notches 37 adapted to co-operate with projections 36 formed on the hub of the latch 16, which latter hangs freely on the shaft 34. The retaining-plate 32 is retained in position on the handle-shank by means of a fastening-plate 33 which is adapted to push said plate 32 against a collar on said shank, as will be seen from Figures 6 and 7. If desired the end of the handle-shank may be formed with projections adapted to engage in recesses formed in the hub of the latch 16.

In the embodiment shown in Figure 6a, the cogwheel or pinion 3 is, as will be seen from the drawings, rotatably mounted in the lock casing 7 and is formed with an extended boss, on which the latch 16 is freely mounted, said latch being in this instance outside the lock casing. The latch may, however, if the pinion 3 has not such an extension, be mounted directly on the shaft 34 outside the lock casing 7. In the embodiment illustrated in Figure 6a the hub of the latch 16 is formed with two projections 36 adapted to co-operate with notches 37 which are formed in a coupling element 37a mounted on a small cylinder 34a, which latter is provided both on its inner and outer surface with rifles or grooves. The cylinder 34a is pushed on to the rifed shaft 1, which is thereafter inserted into the central aperture of the pinion 3, which latter is also provided with axial rifles or grooves corresponding to the rifles on the shaft 1. The shaft 1 is formed at approximately the mid-point of its

length with a collar, which is adapted to retain the latch 16 on the extension of the pinion 3. A rifled or grooved pin or shaft 34 is rigidly mounted in the end of the handle 15a and the free end of said pin is adapted to be pushed into the cylinder 34a, when the handle is placed in position on the lock. Instead of being retained by a fastening-plate such as 38 (Figure 6) the retaining plate 32 is in this case retained on the handle shank by a metal-ring or the like 38a, which is adapted partly to enter a peripheral groove around the inner end 35 of the handle. Further, if desired in this case also the hub of the latch 16 may be formed with recesses or notches adapted to receive corresponding projections formed on the element 37a.

Figure 6b shows another modification wherein the pinion is also journaled in the lock-casing and the central hole therein is formed with axial rifles or grooves similarly to the inner surface of the hollow handle-shank. These rifles or grooves correspond to the rifles or grooves on the exterior of the shaft 34, which latter may be introduced into or withdrawn from the handle-shank and the pinion 3 as desired. The latch 16 is rigidly mounted on the shaft and is in this case also disposed outside the lock casing 7. By virtue of these modifications it will be seen that the lock may be applied to any window, door or the like, whatever the thickness thereof.

Referring to Figure 11, A indicates the greatest effective length to which the locking rods may be adjusted while B indicates the shortest effective length of said rods. 10 indicates the locking rods 12, guide casings surrounding the same, and 7 the lock-casing. In the embodiments illustrated in Figures 11 and 13 each casing 12 has a depression 46 formed therein or if desired a pin, peg or the like may be provided while the locking rod has a recess 47. The end of the rod is indicated at 49 and said end is adapted on movement of the rod to its locking position to enter a socket formed in a fitting 48 on the jamb. In Figures 12, 14, 15 and 16, a peg or the like is formed integrally with each guide casing 12 by providing an annular socket or the like 43 in said casing and the end 41 of each rod is bent through 180° in such a manner that the part 42 will bear against the outer face of the corresponding end or edge of the casing 12 and will be guided thereby during movement of the rod. When the guide casings 12 of the lock are mounted in a recess in a door or window it is not necessary that they should surround their respective locking rods throughout the whole length thereof since they may be so dimensioned that they will only surround the outer ends of the rods, in which case after adjustment of the locking rods they may be fastened to the door or window by means of screws or the like, which may be passed through apertures formed in flaps, in turn formed integrally with said casings.

The locking rods may if desired each be formed throughout a portion of their lengths of two single rods of square rectangular or other suitable section which are for example secured together by welding (spot welding). Figures 17 and 18 show in cross-section a pair of rods, welded together in the manner above indicated. By constructing the rods in this manner it is possible to provide lighter rods without sacrificing anything in the way of rigidity.

What we claim and desire to secure by Letters Patent of the United States is:

1. In a lock of the type set forth for windows,

doors or the like, a lock casing, a locking rod projecting from each end of the casing with a rack on the inner end of each locking rod within the casing, a shaft journaled through the casing with at least one end of the shaft projecting outwardly of the casing, a pinion on said shaft in meshing engagement with said racks and said racks being of normally greater length than required for the operation of said locking bolts carried thereby whereby the locking rods and racks may be initially set to accommodate the mounting of the lock on windows, doors or the like of different sizes, a guide casing through which each locking rod extends associated with the lock casing and being movable relative to the locking rods and lock casing, said shaft being longitudinally corrugated over its entire periphery, and an operating handle carrying a hollow spindle and having interior corrugations mating with the corrugations on the shaft for the operation of the shaft, pinion and locking bolts.

2. A lock as specified in claim 1, characterized by a collar on the handle spindle substantially midway the ends thereof and a plate for retaining the handle spindle engaged with the shaft mounted on said handle spindle and engaged with said collar, the plate being secured to the window, door or the like.

3. A lock as specified in claim 1, characterized by a collar on the handle spindle substantially midway the ends thereof and a plate for retaining the handle spindle engaged with the shaft mounted on said handle spindle and engaged with said collar, the plate being secured to the window, door or the like, said plate having an arcuate recess therein in proximity of the handle spindle and a lug carried by the handle spindle in the plane of said plate and movable in said recess for engagement with the end walls of said recess to limit turning movement of the handle through an arc of substantially 90°.

4. A lock of the type set forth in claim 1, characterized by a boss on the pinion extending exteriorly of the casing and being internally corrugated for interlocking engagement with said shaft, a latch arm supported on said boss and a collar on said shaft engageable with one side of said latch arm and cooperable with the adjacent wall of the casing for holding the latch in position.

5. A lock of the type set forth in claim 1, characterized by a boss on the pinion extending exteriorly of the casing and being internally corrugated for interlocking engagement with said shaft, a latch arm supported on said boss and a collar on said shaft engageable with one side of said latch arm and cooperable with the adjacent wall of the casing for holding the latch in position, a coupling element being internally and externally corrugated mounted on the projecting end of said shaft and a corrugated extension shaft mounted in the coupling element for the support of the handle spindle.

6. A lock of the type set forth in claim 1, characterized by that portion of each locking rod projecting from the casing being of substantially semi-circular form in cross section and the rack at the inner end of each locking rod within the casing being of substantially flattened U-shape in cross section with the rack teeth formed in the bases thereof.

7. A lock as specified in claim 1, characterized by the guide casings being adjustable relative to the lock casing during initial adjustments of the

locking rods with the locking rods thereafter movable independently of the guide casings.

5 8. A lock as specified in claim 1, characterized by the guide casings being adjustable relative to the lock casing during initial adjustments of the locking rods with the locking rods thereafter movable independently of the guide casings, each locking rod having a longitudinally extending recess therein, an inwardly directed projection on each guide casing extending into the recess of its associated locking rod, the recess being of such length that the end walls thereof move into engagement with said projection at the limits of locking and unlocking movements of the locking rod.

10 9. A lock as specified in claim 1, characterized by the guide casings being adjustable relative to the lock casing during initial adjustments of the locking rods with the locking rods thereafter movable independently of the guide casings, each

guide casing comprising a strip of sheet metal bent into tubular form for inclosing the locking rod.

10. A lock as specified in claim 1, characterized by the guide casings being adjustable relative to the lock casing during initial adjustments of the locking rods with the locking rods thereafter movable independently of the guide casings, each locking rod having a longitudinally extending recess therein, an inwardly directed projection on each guide casing extending into the recess of its associated locking rod, the recess being of such length that the end walls thereof move into engagement with said projection at the limits of locking and unlocking movements of the locking rod, each guide casing comprising a strip of sheet metal bent into tubular form for inclosing the locking rod.

EINAR SÄRENHOLM.

HELGE WARROL.

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