

July 23, 1940.

M. MARIANI

2,208,592

LOCK

Filed Oct. 30, 1936

2 Sheets-Sheet 1

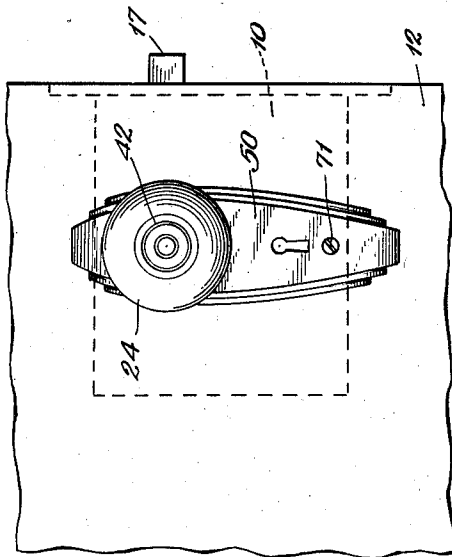


Fig. 2.

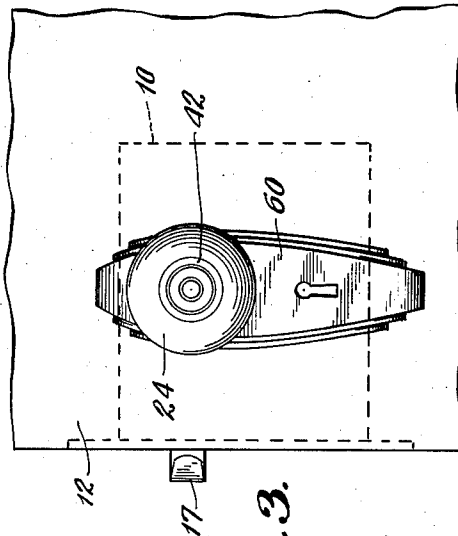


Fig. 3.

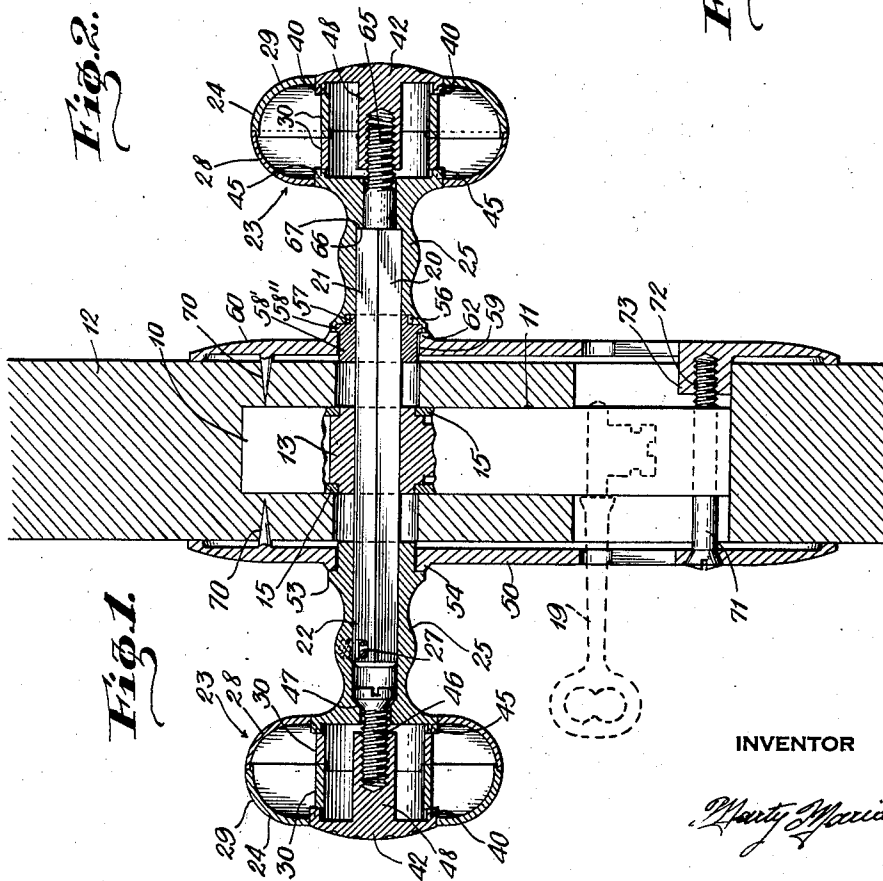


Fig. 1.

INVENTOR

Mary Mariani

July 23, 1940.

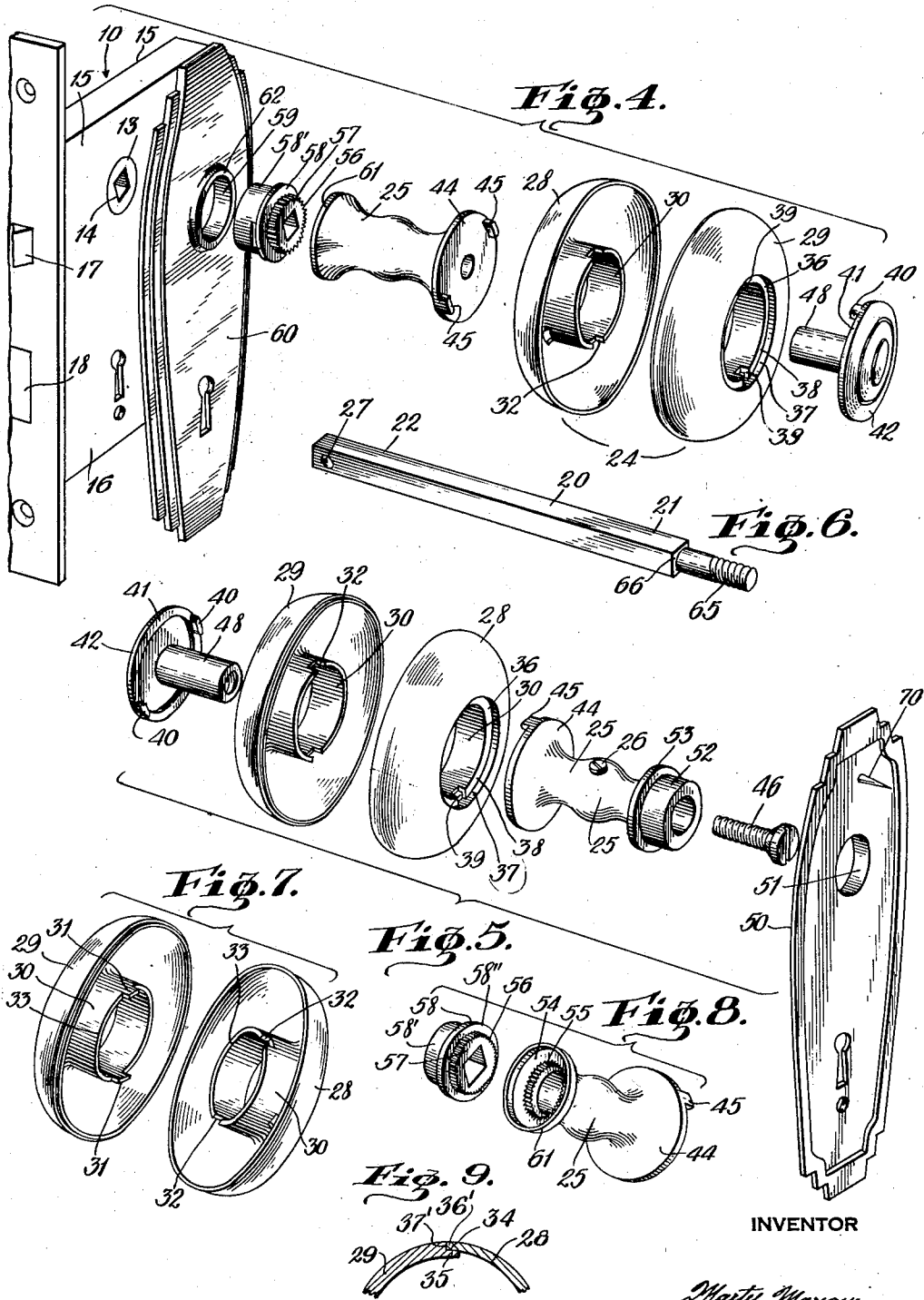
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,208,592

LOCK

Marty Mariani, New York, N. Y., assignor to
Accurate Hardware Company, Inc., New York,
N. Y., a corporation of New York

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11 Claims. (Cl. 292-348)

The present invention is directed to locks and more particularly to mortise locks although the invention is not limited in this respect.

The invention has as one object to provide a novel die cast lock having improved handles adapted to be secured to the opposite ends of a spindle which if rotated causes latch operating means of the lock to be readily actuated.

The invention has as another object the provision of a sectional handle comprising interlocking hollow complementary sections defining a substantially toroidal shell adapted to be closed by opposing end members which if moved towards one another clamp the complementary sections together.

The invention has as a further object the provision of a simplified handle comprising complementary hollow sections having annularly arranged flanges adapted to interlock when assembled and abut upon the movement of shank and cap of the handle towards each other.

The invention further comprehends as an object the provision of a serviceable handle comprising a hollow knob having conveniently attachable complementary sections one of which has means for readily positioning the other in interlocking relation therewith.

The invention has as a further object the provision of a sectional handle having hollow complementary disconnectable interlocking sections defining a longitudinally disposed bore in which an adjustable member is disposed for moving the shank of the handle and the cap of the latter towards each other to close the ends of the bore.

The invention has as another object the provision of a handle in which a pair of complementary interlocking sections define a substantially toroidal shaped knob which includes means for positioning the shank of the handle relative to the inner section of the pair and includes other means for positioning the cap of the knob relative to the outer section of the pair.

The invention has as another object to provide a sectional but simplified handle in which the cap thereof interlocks with an outer section of the hollow knob, in which the inner section of the knob interlocks with the outer section, in which the shank of the handle interlocks with the inner section, in which a plug serves as a closure for the shank, and in which the plug is provided with positive means to interlock with the shank.

The invention comprehends as another object the provision of an improved handle adapted to be readily assembled and of the type which may be readily die cast, having a plug comprising a

toothed member frictionally cooperating with one end of the shank to prevent longitudinal displacement thereof relative to the knob and to prevent rotational displacement of the plug relative to the shank.

Other objects, advantages and features of the invention are in part obvious and in part herein-after more particularly set forth and for a clearer understanding of the invention, attention is directed to the herein specification and the accompanying drawings in which:

Fig. 1 is a transverse sectional elevational view of the lock according to the invention shown mounted on a swingable door.

Fig. 2 is a fragmentary inside elevational view of the door and lock.

Fig. 3 is a fragmentary outside elevational view of the door and lock.

Fig. 4 is an exploded view in perspective, particularly illustrating parts of the outside handle which as shown is disconnected from the outside escutcheon.

Fig. 5 is an exploded view in perspective, illustrating parts of the inside handle and the inside escutcheon.

Fig. 6 is a perspective view of the non-circular spindle which is adapted to interconnect the inside and outside handles.

Fig. 7 is an exploded view of one of the hollow knobs.

Fig. 8 is an exploded view of the shank of the outside handle and its trunnion.

Fig. 9 is a fragmentary sectional view of one of the knobs showing the overlapped connection between the complementary sections thereof.

The lock 10 which may be formed by die casting is appropriately arranged and secured within recess or mortise 11 in a swingable door 12. Associated with lock 10 is a suitable collar 13 having the square shaped opening 14. This collar 13 is rotatably sustained in spaced sides 15 of the lock casing 16. When rotated collar 13 controls suitable mechanism (not shown) within the casing for moving latch bolt 17 within the latter to disengage it from its keeper (not shown) mounted on the door frame or jamb as is well understood.

Slidable lock bolt 18 is controlled by a removable key 19 which actuates appropriate bolt operating means (not shown) within the casing. The specific latch operating means and bolt operating means are well known in the art dealing with mortise locks and form no part of the present invention.

The invention, however, comprehends the uti-

lization of the rotatable collar 13 to support the square rod or spindle 20 which if rotated in either direction drives or rotates collar 13. Spindle 20 is so arranged that its ends 21 and 22 overhang the sides of the door. End 21 projects beyond the outside face of the door while end 22 extends beyond the inside face of the door. Secured to each of these ends is a die cast sectional handle generally designated 23 although the invention is not limited to the particular manner of forming the parts of the sectional handles.

Each of these handles includes a knob 24 and a hollow shank or sleeve 25. The knob mounted on inner end 22 of the non-circular spindle is provided with an adjustable set screw 26 adapted to project into opening 27 of the spindle to prevent displacement of its associated shank 25 longitudinally of the spindle.

Each knob 24 comprises a hollow shell including complementary disconnectably associated but interchangeable sections 28 and 29 defining when assembled a substantially toroidal configuration. Complementary hollow sections 28 and 29 each embody an inwardly extending but depending annular flange 30, the companion flanges 30 of adjacent complementary sections being provided with a readily detachable interlocking connection comprising diametrically disposed lugs or tenons 31 integral with the flange 30 of section 29 and adapted to removably and conveniently fit into diametrically arranged notches or recesses 32 in the companion flange 30 of the adjacent complementary section 28 and with sections 28 and 29 assembled, end faces 33 thereof are in contact with one another.

Each section 29 of each knob is provided with a groove 34 defining the annular attenuated flange 35 serving as an annular seat adapted to guide and overlap rim 36' of the companion complementary section 28 while shoulder 37' of groove 34 limits movement of section 28 on the companion section 29.

In the assembled relation of the knobs or shells 24 a toroidal figuration is formed although the adjacent disconnectably interlocking flanges 30 constitute a bore extending longitudinally of its respective knob.

The complementary sections 28 and 29 of each toroid or knob are provided with a rabbeted portion 36 defining an annular groove forming an annular seat 37 and annular shoulder 38 and each shoulder 38 is provided with diametrically disposed notches 39.

Notches 39 of the outer section 29 cooperate to receive and interlock with the lugs or tenons 40 depending from annular flange 41 integral with the disc shaped cap closure 42. Cap 42 fits closely but removably within the annular rabbeted groove 36 of an associated outer section 29 and in such manner that the circumferential surface of the annular seat 37 fits closely but removably around the circumferential surface of the rim of cap 42 while the inner surface of flange 41 abuts the annular stop shoulder 38.

Each sleeve or shank 25 of the sectional handles includes expanded circular closure means 44 adapted to closely but removably fit into the axially disposed opening of its associated section 28 and each closure means 44 includes diametrically disposed lugs or tenons 45 adapted to closely but removably interlock with notches 39 of flange 30 of its associated section 28.

Having assembled hollow sections 28 and 29 to form the knob of the inside handle these are clamped together by means of a screw 46 adapted

to have its head disposed in the bore of the associated sleeve or shank 25 and its beveled portion is disposed in the tapered or countersunk seat 47 while the shank of screw 46 is threadably and adjustably interconnected with a threaded bore of an axially disposed bushing 48 integral with and extending from its closure disc or cap 42.

Sleeve or shank 25 on the inside of the door also serves as means for spacing its knob from the inner escutcheon or plate 50 mounted on the inner face of the door. To this end escutcheon 50 is provided with bearing 51 for receiving and rotatably supporting annular boss or trunnion 52 while the annular stop flange 53 cooperates with annular hub or rim 54 on the inside escutcheon 50 to limit displacement of the inner sleeve or shank 25 towards the inner face of the door.

The knob 24 together with its sleeve or shank 25 and cap 42 of the outer handle are assembled in a similar manner. However, the hollow sleeve 25 (Figs. 1 and 8) thereof includes an annular flange 54 having a closed band of teeth or serrations 55 for readily but disconnectably interlocking with circumferentially disposed teeth 56 of a disc shaped member or ratchet 57 integral with and projecting from closure plug generally denoted 58 having its reduced or trunnion portion 58' rotatably mounted in bearing 59 in the outer escutcheon or plate 60 fastened to the outside face of the door.

The expanded part or flange 58'' of plug 58 fits closely but removably within the skirt or annular flange 61 of the outer shank or sleeve 25 and also serves as stop means in cooperation with the annular hub or flange 62 of the outer escutcheon to limit movement of reduced portion 58' towards the outer escutcheon 60.

In assembling the outer handle, complementary sections 28 and 29 thereof are attached to form the knob. Thereafter cap 42 is fitted into the outer section 29 and closure 44 is positioned to interlock with section 28. Spindle 21 is then projected into shank 25 whereby the threaded portion 65 engages the threaded bore of bushing 48. If this spindle be rotated cap 42 and shank 25 move towards each other and shoulder 66 of the spindle ultimately abuts the inside shoulder 67 of shank 25. Further rotation of the spindle causes sections 28 and 29 to be clamped together and shank 25 and cap 42 are held clamped against these sections to provide a unitary assembly. Subsequently ratchet 57 of the closure plug 58 is moved in part into skirt 61 of the shank 25 to interlock with teeth 55 of the serrated annular flange 54. Thereafter the expanded part of flange 58'' of plug 58 is frictionally forced into the annular skirt or flange 61. In such relation cap 42 and shank 25 are interlocked with the outer knob and closure plug 58 is held tightly and locked to shank 25 and consequently these parts are now non-rotatably associated in respect to each other.

It follows therefore that a unitary handle assembly is now retained by the non-circular spindle. In such relation the free or other end of the spindle is passed into bearing 59 of the outside escutcheon and through opening 14 of the rotatable collar 13 of the lock until flange 58'' of the closure plug 58 strikes hub 62 of the outside escutcheon.

However, preparatory to mounting the spindle on the door, escutcheons or plates 50 and 60 are mounted on opposite faces of the door but in horizontal alinement. In this connection each

of these escutcheons is provided at its upper end with a prong 70 adapted to penetrate the door while the lower ends of the escutcheons are clamped against the door by means of a single threaded bolt or screw 71 having its head accessible only on the inside face of the door while its threaded shank portion cooperates with an internally threaded bore 72 of boss 73 integral with the outside escutcheon. By the present arrangement it will be appreciated that only a single screw is necessary to retain the opposing escutcheons in proper but set position. Also by this arrangement it is apparent that the outside escutcheon cannot be tampered with in the matter of removing accessible screws or the like. Hence resistance to removal of the lock or unauthorized use thereof is increased. By reason of the elimination of accessible adjustable fastening members on the outside escutcheon, the appearance of the latter is considerably enhanced.

With the free end of the spindle overhanging the inside escutcheon, the inside handle is slidably mounted thereon until flange 53 of its shank 25 abuts hub 54 of this escutcheon. At this time, set screw 26 is in alinement with opening or indentation 27 in the non-circular spindle. In such relation set screw 26 is actuated to enter opening 27 and hence lateral displacement of the inside handle is prevented.

When the inside or outside knob is turned, the spindle rotates collar 13 and hence latch bolt 17 is actuated. Upon removal of manual pressure from one of the knobs, the latch bolt is automatically projected as is well known.

It is apparent that with the present arrangement hereinbefore disclosed it is possible to do away with exposed screws or other exposed fastening means on the outside escutcheon and in respect thereto the fastening means is concealed. Hence the resistance to unauthorized tampering or removing the outside escutcheon is increased and hence ready removal of the outside escutcheon to obtain unauthorized access to the lock mechanism is precluded.

By the present invention, time is saved in the matter of setting the lock and the escutcheons to the door in that the carpenters or mechanics save considerable amount of labor in that a multiplicity of fastening means, such as screws or the like need not be set on the inside and outside faces of the door and through the elimination of exposed screws on the outside escutcheon the appearance of the latter is considerably improved.

Further in accordance with the present invention it is realized from the teaching thereof, that a simplified lock assembly is provided, for in practice the outside handle as a unit may be mounted and secured to the spindle which can conveniently be arranged in the escutcheons which hitherto have been correctly positioned on the door after which the inside handle as a unit is readily attached in proper relation to the free portion of the spindle.

As a further advantage, it is apparent, that when the handles are secured to the spindle a compact arrangement is provided in which there is no play between the parts of the cap, knob, the shank thereof, and no play exists between the bearings of the escutcheons and the closures or trunnions of the shanks.

For purposes of specification, the sections 28 of the knobs are herein referred to as the inner sections thereof since they are nearest to the door,

while companion sections 29 are termed as the outer sections for they are furthest away from the door.

Without further analysis, the foregoing disclosure will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it to various applications without omitting certain features that from the standpoint of the prior art fairly constitute the essential characteristics of the generic and specific aspect of the invention and therefore such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims:

I claim:

1. In a lock, a spindle, a handle mounted on said spindle comprising a knob having complementary interlocking hollow inner and outer sections, a cap having means for interlocking with said outer section and including a bushing, a shank having means for interlocking with said inner section, and means upon rotation of said spindle for moving said bushing and shank towards each other for clamping said shank and cap against said sections.

2. In a lock, a spindle, a handle mounted on said spindle comprising a knob having complementary interlocking hollow inner and outer sections, a cap for closing said outer section, a shank mounted on said spindle and having means for interlocking with said inner section, cooperative means for clamping said sections together upon rotation of said spindle in one direction, a plug, and means for locking said plug to said shank.

3. In a lock, a spindle, a handle mounted on said spindle comprising a knob having complementary hollow inner and outer sections each of which includes an inwardly extending hollow flange, the flanges of said sections having interlocking means to prevent relative rotation of said sections, a cap for closing said outer section, and a shank mounted on said spindle and having means for interlocking with said inner section and including other means cooperating with said shank for moving the latter and said cap towards each other to cause adjacent ends of said flanges to abut and said cap and shank to clamp against said sections.

4. In a lock, a spindle, a handle mounted on said spindle comprising a hollow knob having inner and outer sections each of which includes a horizontally disposed annular flange, said flanges having cooperating lugs and recesses for interlocking said flanges, a cap having a bushing, means for interlocking said cap to said outer section, and a shank mounted on said spindle and having means to interlock with said inner section, said spindle having a shoulder adapted to abut said shank and having an adjustable portion operatively connected to said bushing, said shank and bushing adapted to move towards each other upon rotation of said spindle in one direction to clamp said shank and cap against said sections.

5. In a lock, a spindle, a handle mounted on said spindle comprising a hollow shell substantially of toroidal configuration including complementary sections, each having an annular substantially horizontally disposed flange, said flanges having removably interlocking tenons and recesses to prevent relative rotation of said sections and having ends adapted to abut, a cap having a bushing including a threaded bore, means for interlocking said cap to said outer section, a shank mounted on said spindle and having means to interlock with said inner section,

said spindle having a shoulder adapted to abut an inner portion of said shank and having a threaded portion cooperating with said bore upon rotation of said spindle in one direction to clamp said abutting ends and clamp said shank and cap against said sections.

6. In a lock, a spindle, a handle mounted on said spindle comprising a hollow shell of substantially toroidal configuration comprising complementary sections each having an annular horizontally disposed flange, said flanges having removably interlocking tenons and recesses to prevent relative rotation of said sections and including end portions adapted to abut, a cap having a bushing including a threaded bore, means for interlocking said cap to said outer section, a shank mounted on said spindle and having means to interlock with said inner section, said spindle having a shoulder adapted to abut an inner portion of said shank and having a threaded portion cooperating with said threaded bore upon rotation of said spindle in one direction to clamp said abutting end portions and clamp said shank and cap against said sections, said shank having an internally serrated portion, and a closure member having a ratchet interlocking with said serrated portion to prevent rotation of said closure member relative to said shank.

7. In a lock, a spindle, a handle mounted on said spindle comprising a hollow shell substantially of toroidal configuration and including complementary sections each having an annular substantially horizontal flange, said flanges having removably interlocking tenons and recesses to prevent relative rotation of said sections and having ends adapted to abut, a cap having a bushing including a threaded bore, means for interlocking said cap to said outer section, a shank mounted on said spindle and having means to interlock with said inner section, said spindle having a shoulder adapted to abut an inner portion of said shank and having a threaded portion cooperating with said bore upon rotation of said spindle in one direction to clamp said abutting ends and clamp said shank and cap against said sections, said shank having an internally arranged serrated portion, and a closure plug nonrotatably mounted on said spindle and having a toothed means cooperating with said serrated portion to prevent rotation of said closure plug means relative to said shank.

8. In a lock, a spindle, a handle mounted on said spindle comprising a shell substantially toroidal in configuration and formed of complementary sections each having an annular flange, said flanges having removably interlocking tenons and recesses to prevent relative rotation of said sections, said flanges having end portions adapted to abut, a cap having a bushing including a threaded bore, means for interlocking said cap with said outer section, a shank rotatably mounted on said spindle and having means to interlock with said inner section, said spindle

having a shoulder adapted to abut an inner portion of said shank and having a threaded portion cooperating with said bore upon rotation of said spindle in one direction to clamp said abutting ends together and clamp said shank and cap against said sections, said shank having a serrated portion and a skirt overhanging said serrated portion, a closure plug nonrotatably mounted relative to said spindle and including toothed means cooperating with said serrated portion to prevent rotation of said plug on said shank, and means to prevent longitudinal displacement of said skirt relative to said closure.

9. In combination, a spindle, a handle mounted on said spindle and comprising complementary inner and outer sections defining a hollow knob, one of said sections having a groove defining a seat and stop means, the other of said sections having a rim adapted to be mounted on said seat and prevented from movement in one direction by said stop means, a cap having means interlocking with said outer section, a shank having means for interlocking with said inner section, and a bushing carried by said cap, said spindle having means cooperating with said shank and bushing for moving said shank and cap towards each other to clamp against said sections.

10. In combination, a spindle, a handle mounted on said spindle and comprising complementary inner and outer sections defining a hollow knob, one of said sections having a groove defining a seat and stop means, the other of said sections having a rim adapted to be mounted on said seat and prevented from movement in one direction by said stop means, said sections having inner flanges provided with interlocking means, a cap having means for removably interlocking with said outer section, a bushing carried by said cap and projecting into said flanges, said spindle having means cooperating with said shank and bushing for moving said shank and cap towards each other to clamp said sections and to hold said flanges in abutting relationship.

11. In combination, a spindle, a handle mounted on said spindle and comprising complementary inner and outer sections defining a hollow knob, one of said sections having a groove defining a seat and stop means, the other of said sections having a rim adapted to be mounted on said seat and prevented from movement in one direction by said stop means, said sections having inner flanges provided with interlocking means, a cap having means for removably interlocking with said outer section, a shank having means for interlocking with said inner section, a bushing carried by said cap and projecting into said flanges, said spindle having means cooperating with said shank and bushing for moving said shank and cap towards each other to clamp said sections and to hold said flanges in abutting relationship, a trunnion, and means for locking said trunnion to said shank.

MARTY MARIANI.