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[56]

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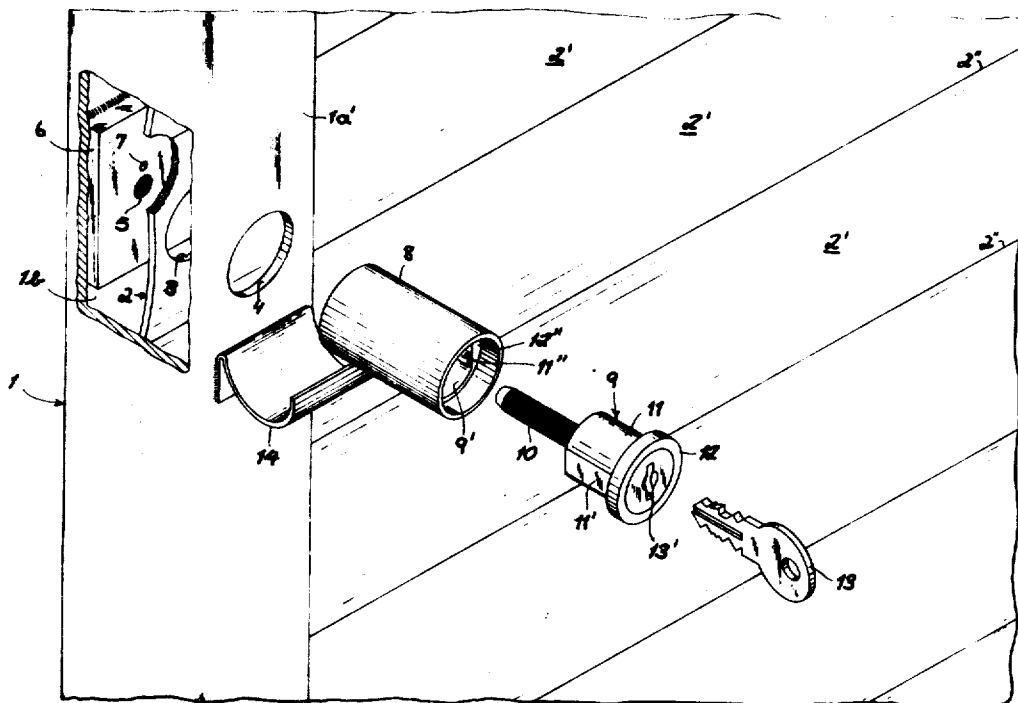
Primary Examiner—Albert G. Craig, Jr.

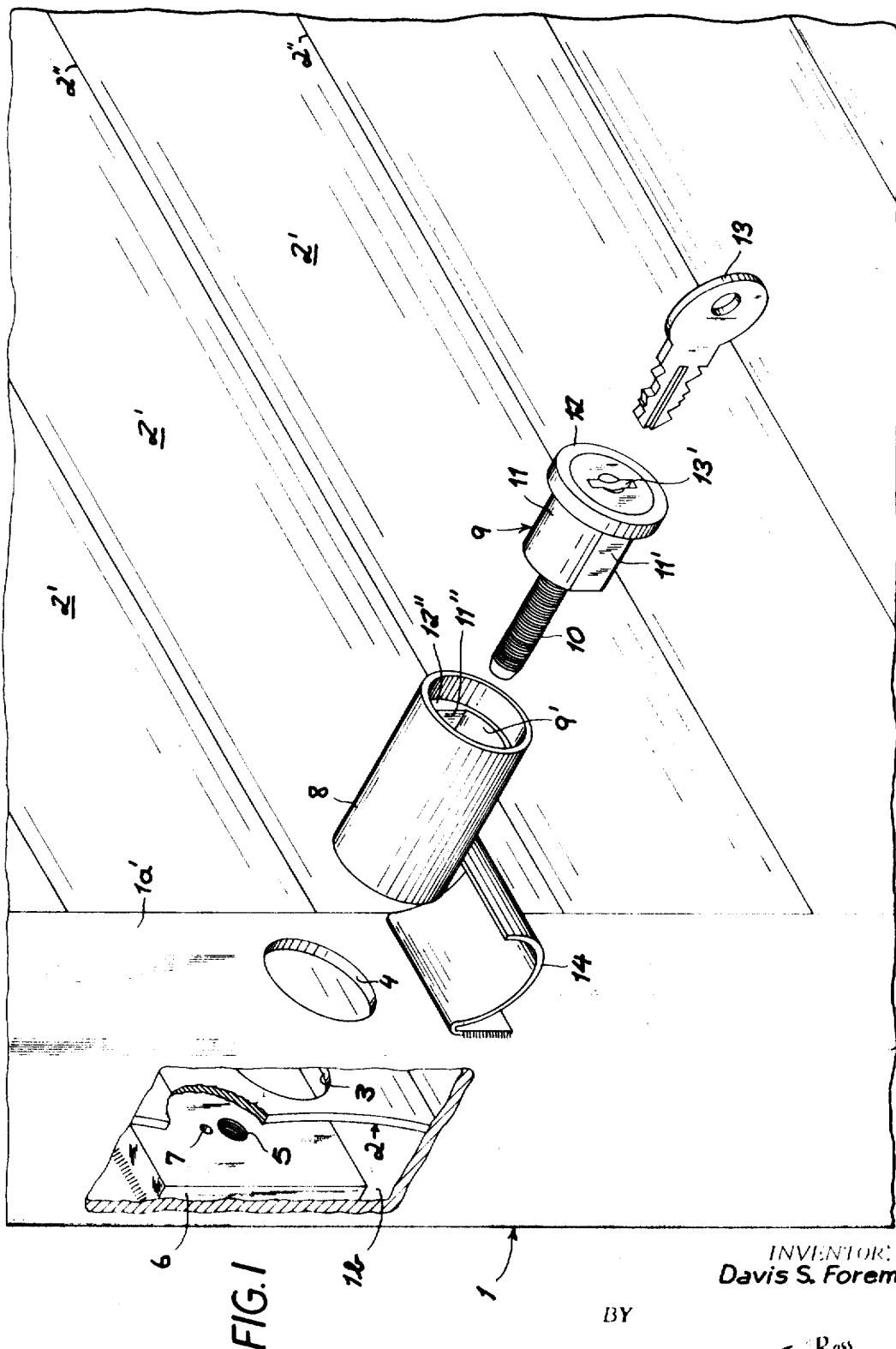
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[54] **SCREW-TYPE LOCK ASSEMBLY**
 10 Claims, 8 Drawing Figs.

[52] U.S. CL. 70/77,
 70/230, 70/371, 292/251
 [51] Int. Cl. E05b 65/02,
 E05c 19/18
 [50] Field of Search 70/77, 371,
 230, 90, 95, DIG. 19, DIG. 72; 292/251, 261, 149,
 288, 291

ABSTRACT: A screw-type lock assembly for sliding shutters where the shutter is guided between the flanges of a U-shaped channel, the shutter and one flange having axially aligned openings in the closed position of the shutter. A removable sleeve of the lock assembly is received in the aligned openings to prevent shifting of the shutter. A removable screw-type lock has a rod passing through the sleeve into engagement with the channel and locks against the sleeve.





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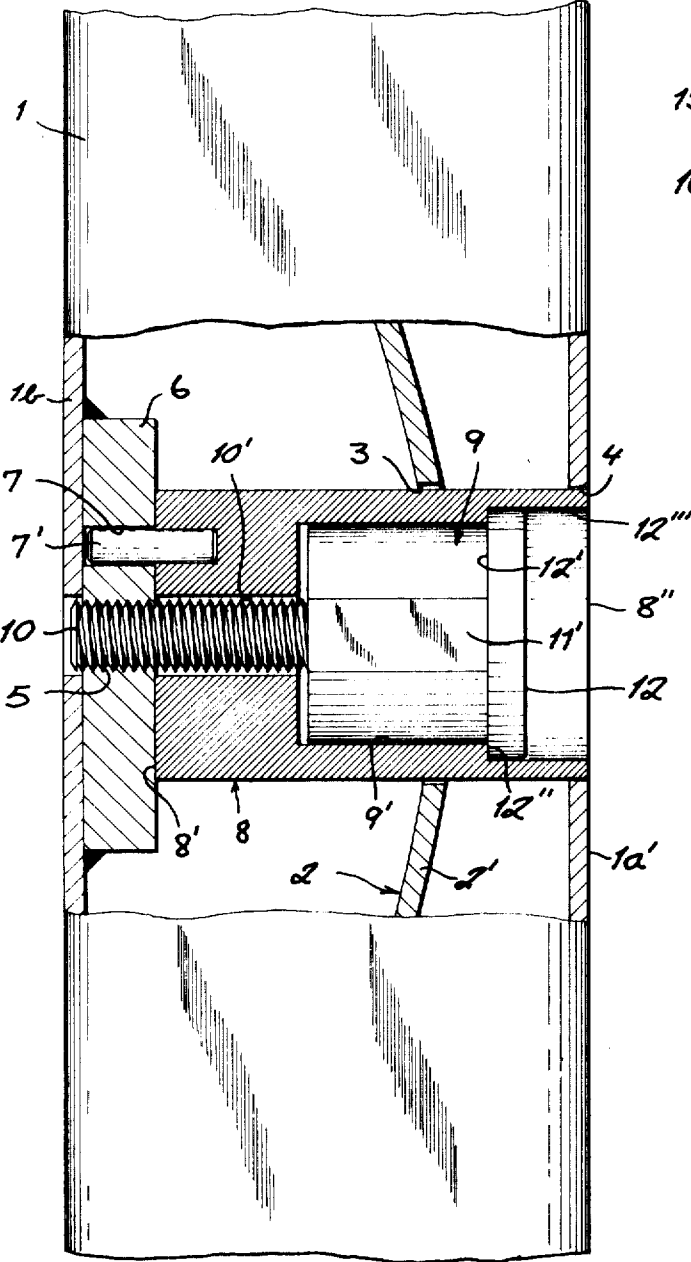


FIG. 2

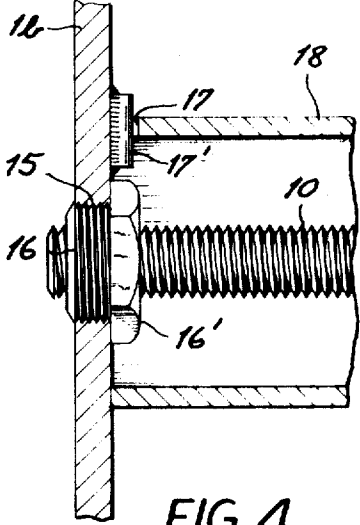


FIG. 4

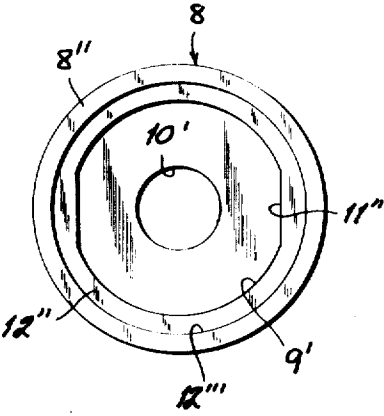


FIG. 3

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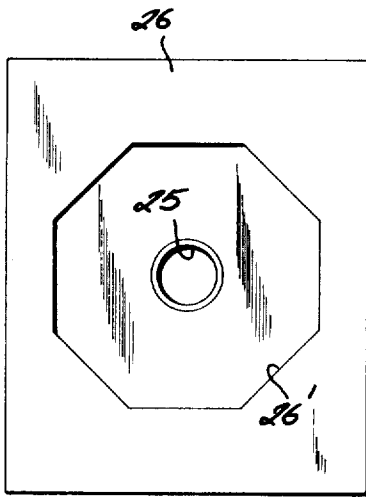


FIG. 6

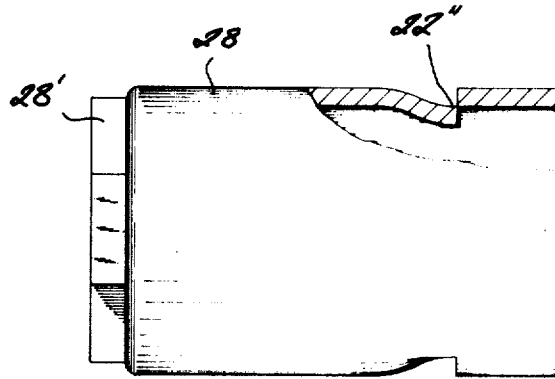


FIG. 5

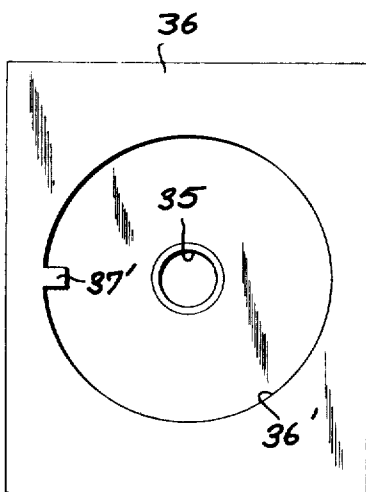


FIG. 8

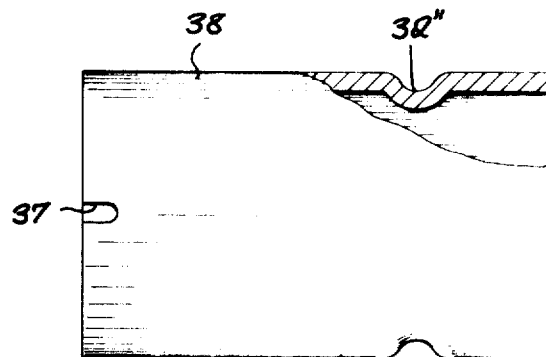


FIG. 7

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SCREW-TYPE LOCK ASSEMBLY

The present invention relates, in general, to lock assemblies and more particularly to lock assemblies for relatively sliding members.

Desirable features for lock assemblies of this type are strength, simplicity and resistance to tampering, and these features, with the exception of resistance to tampering, are generally obtained with present lock assemblies.

One method for locking sliding members is to use a threaded bolt with an eyelet at one end. The bolt is inserted through a hole provided in one of the members and threaded into a hole in the other member, thereby limiting the sliding movement of the members. The eyelet of the bolt is brought into alignment with eyelets provided alongside the hole of the one member. A hasp-type lock is then inserted through the aligned eyelets, thereby limiting rotary movement of the bolt within the sliding members and preventing withdrawal.

However, this type of lock assembly is highly susceptible to tampering, either by the insertion of a bar through the hasp of the lock and turning it until the hasp breaks, by direct blows to the lock with a heavy object, or by the introduction of a chisel between the sliding members to shear the bolt.

It is, therefore, an object of the invention to provide a lock assembly which is highly resistant to tampering by direct engagement and rotation until breakage occurs.

Another object of the invention is to provide a lock assembly which is highly resistant to damage from direct blows with a heavy object.

Another object of the invention is to provide a lock assembly which is resistant to opening by shearing.

The above-mentioned object, and others which will become apparent hereinafter, are achieved in a lock assembly or system comprising a pair of relatively slideable members, one of which is provided with a throughgoing hole, the other member being provided with a threaded hole. In one position of the slidable members, the throughgoing hole and the threaded hole are in axial alignment and able to removably receive a tamper-resistant sleeve, the sleeve being provided with external indexing means at one end for limiting rotation within the holes.

A screw-type lock received in the sleeve, threadably engages the threaded hole and bears upon a seat provided within the sleeve, while engaging indexing means also provided within the sleeve. Screw-type locks of this general type comprise a tumbler barrel rotatable in a casing when the appropriate key is inserted into the barrel. The barrel is provided with a threaded rod, spindle or stem which rotates with the key to enable the lock to be threaded into a female thread element when the outer casing is held fixed, but which is immobilized with respect to the casing when the key is withdrawn.

The above and other objects, features and advantages of the invention will become more readily apparent from the following description, reference being made to the accompanying drawing, in which:

FIG. 1 is an exploded perspective view of a lock assembly according to the invention;

FIG. 2 is a side view in section of the lock assembly of FIG. 1 in an assembled condition;

FIG. 3 is an end view of the sleeve of FIG. 2;

FIG. 4 is a sectional view of another embodiment of the invention;

FIG. 5 is a side view partly in section of a further embodiment of the sleeve.

FIG. 6 is a front view of a seat for the sleeve of FIG. 5;

FIG. 7 is a side view, partly in section of still another embodiment of the sleeve; and

FIG. 8 is a front view of a seat for the sleeve of FIG. 7.

FIG. 1 and FIG. 2 show a vertical U-shaped channel 1 having a pair of flanges 1a and 1b for guiding a flexible slidable shutter 2 of the type commonly used to protect store fronts.

The shutter 2 is formed by a series of elongated slats 2' hingedly joined along their edges 2'', thereby giving the shutter 2,

great flexibility and allowing it to be stored on a roll (not shown) usually located across the top of the shutter assembly. When the shutter is drawn down into a closed position, a hole 3 provided in one of the slats 2' of the shutter 2, is brought into axial alignment with a further hole 4 provided in flange 1a of the channel 1, both holes 3 and 4 being located at a convenient height above the bottom of the shutter assembly.

Also in axial alignment with the holes 3 and 4 is a threaded hole 5 provided in a threaded element or plate 6 which is welded to the flange 1b, the plate 6 being further provided with an indexing hole 7.

A cylindrical sleeve 8, having ends 8' and 8'', is fitted into the aligned holes 3 and 4, the end 8' being brought to rest against plate 6. An indexing pin 7', provided in end 8' of sleeve 8, is received within indexing hole 7, thereby limiting rotation of sleeve 8, with respect to the shutter assembly, while the end 8'' of sleeve 8 lies flush with surface 1a' of flange 1a. The sleeve bridges completely the width of the channel.

A screw-type lock 9, fitted within sleeve 8, is provided with a threaded rod 10 which is threadably received within the hole 5 at one end, the other end of rod 10 being releasably locked against rotation within a stationary portion or casing 11, the rod 10 passing through a bore 10' in sleeve 8.

The stationary portion 11 is of generally cylindrical configuration and is provided with a pair of diametrically opposed indexing flats 11' on its cylindrical surface; the stationary portion 11 lies within a cylindrical bore 9' provided with indexing flats 11'' which engage the flats 11', thereby limiting rotation of the stationary portion 11 with respect to the sleeve 8.

The stationary portion 11 is further provided with a cylindrical flange 12 whose underside 12' is seated against a shoulder 12'' formed within a circular bore 12''' in sleeve 8, the lock 9 being recessed within the bore 12'''.

In operation, the shutter 2 is drawn down from its rolled-up "open" position to a "closed" position where the hole 3 is axially aligned with the holes 4 and 5.

The removable sleeve 8 is then inserted through the holes 3 and 4 until it abuts the plate 6, whereupon the sleeve 8 is rotated until the pin 7' enters the hole 7.

The lock 9 is then inserted into the sleeve 8, such that the threaded rod 10 passes through the bore 10' until it reaches the threaded hole 5. The key 13 is then inserted into a keyhole 13' in the lock 9, the key 13 releasing the rod 10 so that it, and the tumbler barrel, can be rotated with respect to stationary portion 11, the rod 10 threadably engaging the hole 5 and drawing the entire lock 9 further into the sleeve 8 until the underside 12' of flange 12 engages the shoulder 12''; the indexing flats 11' and 11'' engage and limit the rotation of portion 11 while the rod 10 is being tightened.

The key 13 is then removed from the keyhole 13', locking the rod 10 and its tumbler barrel to the cylindrical casing, the lock 9 being recessed within sleeve 8 from the end 8' which lies flush with surface 1a', thereby presenting no projecting portions by which the lock assembly can be attached.

The structure of the sleeve 8 is such that it is extremely difficult to break the lock assembly by shearing the sleeve 8, which may in fact collapse, if struck extremely hard with a shearing tool, thereby slamming the lock assembly within the channel 1 and preventing the shutter 2 from being opened surreptitiously. The sleeve may be made of hardened steel or the like so as to be virtually immune to attack by a chisel or conventional burglars tools.

When not in use, the lock assembly can be stored in a U-shaped trough 14 provided on the flange 1a of the channel 1.

In the embodiment shown in FIG. 4, the plate 6 is replaced by a nipple 16 having external and internal threads, and further provided with a hexagonal end 16'. The nipple 16 is threaded into a threaded hole 15 provided in flange 1b and tightened securely by means of a wrench applied to the hexagonal head 16', the rod 10 being internally threaded into the nipple 16. A pin 17' welded to flange 1b, serves as indexing means for the sleeve 18, the pin 17' engaging in a slot 17 in the sleeve 18.

The sleeve 28 of FIG. 5 has a hexagonal end 28' which fits into the mating hexagonal recess 26' in plate 26 of FIG. 6. In the center of recess 26' is a threaded hole 25 for engaging rod 10. The sleeve 28 is further provided with a seat 22'', formed by cutting a short slot in the wall of sleeve 28 and squeezing the slotted portion.

The sleeve 38 of FIG. 7 is provided with a slot 37 cut in the wall of 38 at one end. The slot 37 engages a tongue 32' in a recess 36' provided in the plate 36 of FIG. 8. A seat 32'' is formed in the wall of sleeve 38 by mechanical deformation thereof. A threaded hole 35 is provided in the center of recess 36' for engagement with rod 10.

The invention described and illustrated is believed to admit of modifications and variations within the ability of those skilled in the art. Thus sleeve-indexing means of one embodiment may be used with the threaded element or lock-indexing means of another. All such modifications are intended to be included within the spirit and scope of the appended claims.

I claim:

1. A lock assembly comprising a pair of relatively slidable members, a throughgoing hole provided in one of said members, a threaded element provided on the other of said members, said hole and said threaded element being in axial alignment in one position of said members, a sleeve removably receivable in said hole, said sleeve being provided with first indexing means for limiting rotation in said hole, a screw-type lock received in said sleeve and threadedly engaging said element, and second indexing means for limiting rotation of said lock in said sleeve.

2. A lock assembly as defined in claim 1 wherein said sleeve is cylindrical, said first indexing means being external of said sleeve at one end thereof.

3. A lock assembly as defined in claim 2 wherein said second indexing means is provided within said sleeve and said sleeve is further provided with internal seating means clamped by said lock.

4. A lock assembly as defined in claim 3 wherein said sleeve spans both members and lies flush within said throughgoing hole.

5. A lock assembly as defined in claim 1 wherein said screw-type lock is provided with an internal rotatable portion having an elongated threaded rod releasably locked against rotation, and with an external stationary portion engageable with said second indexing means and a seating flange bearing axially upon said sleeve.

6. A lock assembly as defined in claim 5 wherein said screw lock is recessed from the flush end of said sleeve upon inser-

tion therein.

7. A lock assembly as defined in claim 1 wherein a plate affixed to said other member is provided with said threaded element.

8. A lock assembly as defined in claim 1 wherein said threaded element comprises a nipple with internal and external threads and provided with a hexagonal end for engagement with a wrench, said nipple being threadably engageable with said other member.

9. A lock assembly as defined in claim 1 wherein said threaded element is an internally threaded hole formed in said other member.

10. A shutter arrangement, comprising:

a slidable shutter provided with a locking bore;

at least one generally U-section channel having front and rear flanges receiving said shutter between them and flanking said bore in a closed position of said shutter, said front flange being provided with a circular hole of substantially the same diameter as that of said bore and aligned therewith in said closed position of said shutter; a female-thread element affixed to said rear flange in alignment with said bore and said hole;

a cylindrical steel sleeve received snugly in said hole and in said bore in the closed position of said shutter and removable therefrom while spanning said front and rear flanges and lying flush with the external face of said front flange for preventing sliding movement of said shutter relative to said channel, said sleeve being formed with external means limiting rotation of said sleeve in said bore and said hole and internal means defining a noncircular seat; and

a screw-type lock receivable in said sleeve and removable therewith through said bore and said hole from said shutter and said channel, said screw-type lock including:

an outer casing formed with noncircular means engaging said seat for restricting rotation of said casing in said sleeve, and being recessed in said sleeve inwardly from said face,

an inner tumbler barrel in said casing provided with key-operable means enabling rotation of said barrel within said casing upon insertion of a key into said barrel and locking said barrel against rotation in said casing upon withdrawal of said key, and

a threaded rod extending from said barrel and threadedly engaging said element upon rotation of said barrel within said casing to clamp said lock and said sleeve against said rear flange.