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"A DEAD BOLT DOOR LOCK ASSEMBLY"

This invention relates to a dead bolt door lock assembly.

Door lock assemblies require to be solidly attached to a door in a manner such as to make it difficult for a potential intruder either to
5 remove the lock assembly from the door or to force the lock or bolt mechanism. Conventional lock assemblies usually employ a pair of bolt actuating and locking cylinders which extend in end-to-end relationship in a bore opening transversely through the front and rear face of the door for engaging a bolt displaceable parallel to the plane of the door into and
10 out of the side member of the door frame adjoining the side edge of the door. The bolt usually is carried in a housing screwed to the rear or inner face of the door and can readily be removed therefrom. Conventionally the bolt actuating and locking cylinder accessible from the front face of the door is inserted into the bore through the door and connected by a bar
15 to the other lock cylinder so that its outermost end on the front face of the door is recessed into an annular rosette which covers the outermost edge of the bore through the door. Thus the bolt actuating and locking cylinder accessible from the front face of the door is relatively insecurely attached thereto and may be removed therefrom by a lever inserted under
20 the rosette edge to lever the cylinder from the bore by breaking the connecting bar. Alternatively as the annular rosette is relatively small and weak the locking cylinder accessible from the front of the door may be hammered through the door bore and rosette to break the lock assembly.

25 There is thus a need for a generally improved dead bolt door lock assembly which provides improved security against breakage.

According to the present invention there is provided a dead bolt door lock assembly including a bolt housing non-rotatably locatable in a complementary shaped and dimensioned open mouthed slot in the door opening through front and back faces and a side edge of the door so that an elongated bolt in the housing operatively may be extended from or retracted into the bolt housing transverse to the door side edge, through the slot mouth opening through the door side edge, into or out of engagement with a side frame member of a frame in which the door is hingedly mounted or with a striker plate attachable to said side frame member, which bolt housing is thinner than the thickness of the door from front to back faces thereof and is fixedly retained in the slot against movement out of the open slot mouth by an end retaining plate securable to the door side edge across the open slot mouth, and against movement transverse to the door faces by two face plates each dimensioned to cover the slot on one side thereof and overlap the respective front or back face of the door around the slot edges, with the face plates being fixedly securable to the bolt housing one on each side thereof to clamp the front and back faces of the door between the face plates and thus secure the bolt housing therebetween in the slot, the assembly also including two cover plates dimensioned each to overlie one of the face plates to cover the means by which it is secured to the bolt housing and two bolt actuating and locking means locatable in a bore passing transversely through the cover plates, face plates and bolt housing transverse to the direction of operative movement to the bolt, which bolt actuating and locking means are threadably engageable together in end-to-end relationship or securable in end-to-end relationship and each have at or towards one end a shoulder part greater in diameter than said bore so that one bolt actuating and locking means may be inserted in the bore with its shoulder part above the cover plate overlying the face plate on the door front side and the other said bolt actuating and locking means inserted in the bore with its shoulder part abutting the cover plate overlying the face plate on the door rear side and threadably engaged together in end-to-end relationship, or secured in end-to-end relationship, to clamp the cover plates in overlying position against the face plates to prevent unauthorised access to the means securing the face plates to the bolt housing.

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Advantageously the bolt housing is rectangular in plan and made in two halves which together define therein a slideway for the elongate bolt extending transverse to the bore through the housing, a pair of cams being particularly mounted at one end in the bore in the housing for pivotal movement about a pivot axis parallel to the longitudinal axis through the bore in response to operative movement of the bolt actuating and locking means to impart linear displacement to the bolt via a link interconnecting the bolt and the other end of the cams.

Conveniently the slideway and bolt cross-section are such that the bolt is non rotatably slidably located in the slideway. Preferably each bolt actuating and locking means has a drive spline engageable with at least one of the two cams for rotational actuation to extend or retract the bolt.

Conveniently each bolt actuating and locking means has a lock means operative by a key to pivot the respective drive spline to pivot the cam engaged thereby. Each lock means conveniently is in the form of a cylindrical barrel fixed to the shoulder part against rotation relative thereto to extend perpendicularly therefrom, and a cylindrical plug rotatably housed in the barrel with a key slot extending axially in the plug from one end thereof accessible through the shoulder part exterior, for receiving the key, the respective drive spline being fixedly attached to the other end of the plug opposite to the slotted end for rotation with the plug.

Advantageously each barrel is housed in a respective sleeve fixedly attachable by interengaging screw threads to the respective shoulder part to extend perpendicularly therefrom, the sleeve attachable to the bolt actuating and locking means shoulder part which in use is on the front or outermost face of the door being screw threadably engageable in one end of a coupling sleeve which has a generally T-shaped aperture opening radially through a side wall thereof with the stem of the T-shaped aperture opening through the other end of the coupling sleeve,

and the other end of the coupling sleeve being securable to the cover plate beneath the bolt actuating and locking means shoulder part which in use in on the rear or innermost face of the door, or being securable to the latter shoulder part.

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Conveniently the other end of the coupling sleeve is securable to the cover plate by means of a nut screw threadably engaged on the other end of the coupling sleeve and tightenable against the other plate to clamp the two cover plates against the respective face plates between the

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Preferably the surface of each face plate overlaid by its associated cover plate is recessed sufficiently to house the associated cover plate therein to reduce the possibility of a lever being inserted between the cover plate and face plate from the edge of the cover plate to force the associated cover and face plate apart.

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Advantageously the assembly includes a chain fixedly secured at one end in the bolt housing for slidable extension therefrom, against a resilient returning force, through the housing end arranged in the door slot open mouth and through an opening in the end retaining plate, for releasable attachment at the other end to the striker plate attachable to said side frame member, to hold the door ajar against the chain.

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For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which :-

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Figure 1 is a perspective diagrammatic view of a dead bolt door lock assembly according to one embodiment of the invention, shown in operative association with a door and door frame member from the rear or innermost face of the door and with a chain of the assembly being shown in an operative position to retain the door ajar against the chain.

Figure 2 is a cross-sectional view through part of the assembly of Figure 1 taken generally on the line A-A but with the bolt and associated parts omitted for clarity, and

5 Figure 3 is an exploded perspective view of the assembly of Figures 1 and 2 on a reduced scale.

10 A dead bolt door lock assembly according to the present invention includes a bolt housing which is rectangular in plan and made in two halves 1 and 2 which together define therein a slide way 3 for an elongated bolt 4 to slide therein. The bolt housing halves 1 and 2 are secured together in any convenient manner in face-to-face relationship, such as by interengaging screws and is non-rotatably locatable in a complementary shaped and dimensioned open-mouthed slot 5 (see Figure 15 2) in a door 6 opening through a front face 7, a back face 8 and a side edge 9 of the door. Thus the bolt housing made up of the parts 1 and 2 is thinner than the thickness of the door 6 from front to back faces 7 and 8 thereof so as to be housed wholly within the slot 5.

20 The elongated bolt 4 and slide way 3 have complementary cross-sections such that the bolt is non-rotatably slidably located in the slide way. To this end the bolt conveniently has a cross-section which is generally rectangular in shape with rounded corners, as illustrated in Figures 1 and 3. The bolt 4 is extensible from or retractable into the bolt housing transverse to the door side edge 9 through the open mouth of the slot 5 opening through the side edge 9, into or out of engagement with a side frame member 10 of a frame in which the door 6 is hingedly mounted or with a striker plate 11 fixedly attachable to the side frame member 10 in any convenient manner such as by screws 12.

25 The bolt housing is fixedly retained in the slot 5 against movement out of the open slot mouth by an end retaining plate 13 securable to the door side edge 9 across the open slot mouth. Conveniently this end retaining plate is made in two parts, namely an outer 30

part 13 and an inner part 13a as can be seen in Figure 3. Both the outer and inner end retaining plate parts have at least one edge margin extending substantially at right angles to the plane of the part so that the edge margin of the inner end retaining part 13a can overlap part of the assembly on the front face 7 of the door and the edge margin on the outer end retaining plate part 13 can overlap part of the assembly on the back face 8 of the door. Of course the inner end retaining plate 13a is provided with slotted apertures therein so that screws 14 securing the outer part of the end retaining plate to the door side edge 9 can pass through the slotted apertures in the part 13a and allow it to be adjusted in position to accommodate various width doors.

The bolt housing also is fixedly retained in the slot 5 against movement transverse to the door faces 7 and 8 by two face plates 15 each dimensioned to cover the slot 5 on one side thereof and overlap the respective front or back face of the door 6 around the slot edges. These face plates 15 are fixedly securable to the bolt housing halves 1 and 2 one on each side thereof conveniently by screws inserted through apertures such as 16 to clamp the front and back faces of the door 6 between the face plates 15, as can be seen from Figures 1 and 2, and thus secure the bolt housing therebetween in the slot 5.

The assembly of the invention also includes two cover plates 17 dimensioned each to overlie one of the face plates 15 to cover the means, for example screws passed through the apertures 16, by which the face plate is secured to the bolt housing. As can be seen from Figures 1, 2 and 3, the surface of each face plate 15 overlaid by its associated cover plate 17 is recessed at 18 sufficiently to house the associated cover plate 17 therein to reduce the possibility of a lever being inserted between the cover plate 17 and face plate 15 from the edge of the cover plate 17 to force the associated cover and face plates apart to gain access to the means securing the face plates 15 to the bolt housing. Of course when the assembly of the invention is secured to a door the edge margins of the end retaining plate 13 and inner retaining plate part 13a either overlie the

adjoining edges of the face plates 15 and cover plates 17 or abut edge-to-edge with adjoining edges of the cover plates 17 as can be seen for example in Figure 1. This additionally makes the assembly of the invention more difficult for a potential intruder to gain access to the means securing the bolt housing in the door 6. Additionally this method of attachment of the assembly to the door ensures that with the door closed no screws are visible on either side of the assembly. Moreover the lock assembly itself is not secured to the door by screws but merely clamped against the front and back faces of the door and the absence of screw holes strengthens the door itself in the vicinity of the slot 5. Additionally the edge margins of the face plates 15 overlying the door in the vicinity of the slot edges act to reinforce the door around the slots making it very difficult for the lock assembly to be pushed through or torn off the door by heavy blows. To assist in this reinforcement function the face plates 15 and cover plate 17 preferably are made from stainless steel.

To actuate the bolt 4 and to lock it is position two bolts actuating and locking means generally indicated at 19 are provided in a bore 20 passing transversely through the cover plates 17 face plates 15 and bolt housing transverse to the direction of operative movement of the bolt 4. The bolt actuating and locking means 19 are threadably engageable together in end-to-end relationship or securable in end-to-end relationship. To this end each means 19 has at or towards one end a shoulder part 21, conveniently made of stainless steel, and greater in diameter than the bore 20. In this way one of the means 19 can be inserted in the bore 20 with its shoulder part 21 abutting the cover plate 17 overlying the face plate 15 on the front door side 7 and the other means 19 inserted in the bore with its shoulder part 21 abutting the cover plates 17 overlying the face plate 15 on the door rear or back face 8 and threadably engaged together end-to-end relationship, or secured in end-to-end relationship, to clamp the cover plates 17 in overlying position against the face plates 15. This serves additionally to hold the cover plate 17 against the face plate 15 to assist in preventing unauthorised access to the means securing the face plates to the bolt housing. As can be seen from the drawings, the

shoulder parts 21 are outwardly tapered frusto-conical in shape to deflect any blows thereon away from the lock assembly and thus reduce the effect thereon.

5 The slideway 3 extends through the bolt housing halves 1 and 2 transverse to the bore 20 therethrough. A pair of cams 22, as shown in Figure 3, are pivotally mounted at one end 22a in the bore 20 for pivotal movement about a pivot axis parallel to the longitudinal axis through the bore 20. This is achieved by means of two guide plates 23, shown in
10 Figure 3, which are generally T-shaped in plan. One of the guide plates is secured to one of the bolt housing halves by its cross piece and the other similarly to the other bolt housing half by its cross piece so that the two stems of the guide plate depend into the bore 20 and are spaced apart sufficiently for the two cams 22 to be pivotally mounted via their ends
15 22a on the end of the guide plate stems by means of a pivot shaft 24 and spacer or washer 25 as shown in Figure 1. The other end 22b of the cams 22 is pivotally connected to one end 26a of a link 26 connected at its other end to the bolt 4 so that pivotal movement of the cams 22 about the longitudinal axis through the pivot shaft 24 parallel to the longitudinal
20 axis through the bore 20 in response to operative movement of the bolt actuating and locking means 19 imparts linear displacement to the bolt via the link 26 to extend or retract the bolt 4 relative to the slide way 3. In this way the bolt can be moved linearly into and out of engagement with the side frame member 10 or striker plate 11.

25 To enable the bolt actuating means to actuate and lock movement of the bolt 4 each such means 19 has a drive spline 27 engageable with at least one of the two cams 22 about the end 22a thereof for rotational actuation of the cams to extend or retract the bolt
30 4. Each bolt actuating and locking means has a lock operative by a key 28 to pivot the respective drive spline 27 to pivot the cam or cams 22 engaged thereby.

As can be seen particularly from Figures 2 and 3 each lock is in the form of a cylindrical barrel 29 fixed to the shoulder part 21 against rotation relative thereto to extend perpendicularly therefrom. As illustrated each barrel 29 is fixedly housed in a respective sleeve 30, such as by a key or grub screw, which sleeve 30 is fixedly secured to the shoulder part 21 by means of interengaging threads provided at the outermost end of the sleeve 30 and internally in the shoulder part 21 so that the sleeve 30 in each case extends perpendicularly from the associated shoulder part 21. In each lock a cylindrical plug 31 is rotatably housed in the associated barrel 29. Each plug 31 has a key slot 32 extending axially in the plug from one end thereof accessible through the exterior of the shoulder part 21, for receiving the key 28. The respective drive spline 27 is fixedly attached to the other end of the plug 31 at the other end at the barrel 29 in which the plug 32 is housed. As illustrated the drive spline 27 is attached to the plug by means of screws passing through an end face of the drive spline 27 and into bores provided in the adjoining end of the plug 31. The drive spline 27 thus rotates with the plug 31 and by virtue of it being larger in diameter than the plug 31 prevents the latter being pulled back through the barrel 29 in the direction of the shoulder part 21.

Each barrel 29 is provided with a plurality of radially extending bores 33 opening from the inner cylindrical surface thereof for alignment with corresponding bores 34 provided radially through the plug 31 from the outer cylindrical surface thereof to the slot 32 therein. Slidably housed in the aligned barrel and plug bores 33 and 34 are a plurality of pins 35 forming tumblers for the lock and preferably made from nickel silver steel. These pins 35 are resiliently biased towards the slot interior by springs 36 housed in the respective barrel bores 33 and exerting biasing pressure on the associated pin 35 via a slide member 37 housed in the respective barrel bore 33 or at least partially in the associated plug bore 34 between the spring 36 and pin 35. Each pin 35, slide member 37 and plug and barrel bores 34 and 33 are dimensioned such that in the locked position at least some of the pins 35 project at least partially from the associated plug bore 34 into the aligned barrel bore 33

and/or at least some of the slide members 37 project at least partially from the associated barrel bores 33 into the aligned plug bore 34 to prevent rotation of the plug 31 in the barrel 29. In the locked position of the means 19 each of the pins 35 project from the bores 34 in the plug into the key slot 32 therein for engagement by the key 28. The projecting pin ends 35a, as can be seen from Figure 2, are frustoconical in shape for engagement by correspondingly shaped depressions 38 in the key 28 whereby the pins 35 and slide members 37 are displaced sufficiently against the resilient bias of the springs 36, on insertion of the key 28 in the plug slot 32, to align all the pins and slide member contact faces with the interface between the outer cylindrical surface of the plug 31 and the inner cylindrical surface of the barrel 29 and thereby free the plug 31 for rotation in the barrel 29 to advance or retract the bolt 4 via the respective drive spline 27 and cam 22. Alternatively, although not shown, some of the depressions 38 in the key 28 can be replaced by protrusions for actuating and displacing the projecting pin ends 35a. However in general by choice of depth of depressions 38 and length of pins 35 it is possible to provide, for example at least six different lengths of pin and any desired number of pins at any position around the barrel and plug peripheries. In this way a great many variations in the position of the lock tumblers provided by the pins 35 is possible. Additionally the key 38 may be made insertable either way up and yet still actuate the means 19. Additionally as can be appreciated the plug 31 and barrel 29 of each means 19 is completely housed within the door and shoulder part 21 so as to be effectively shielded thereby against interference from a potential intruder. The use of the pins 35 additionally makes the lock difficult to pick. If necessary up to twelve pins 35 can be provided in each lock.

As can be seen particularly from Figures 2 and 3 the sleeve 30 attached to the shoulder part 21 which, in use, is on the front or outermost face 7 of the door is screw threadably engageable at its end 30a in one end of a coupling sleeve 39. The coupling sleeve has a generally T-shaped aperture 40 opening radially through a side wall thereof with the stem 40a of the aperture 40 opening through the other

end 39a of the coupling sleeve 39. In the illustrated embodiment the other end 39a of the coupling sleeve 39 is securable to the cover plate 17 on the innermost or back face 8 of the door beneath the adjacent shoulder part 21 of the inner means 19. Thus the other end 39a of the coupling sleeve 39 is secured to the associated cover plate 17 by means of a nut 41 screw threadably engaged on the end 39a of the coupling sleeve and tightenable against the cover plate 17 to clamp the two cover plates 17 against the respective face plates 15 between the outermost shoulder part 21 and the nut 41. Alternatively, not shown, the end 39a of the coupling sleeve 39 may be screw threadably engaged directly with the surrounding shoulder part 21 which is on the rear or innermost face 8 of the door. In either way the two shoulder parts 21 of the two means 19 are coaxially linked in a rigid manner to resist any attempt to prise them apart and to provide reinforcement for the parts of the assembly lying therebetween.

The T-shaped aperture 40 in the coupling sleeve 39 enables the sleeve to be inserted over the cams 22 in the bore 20 of the bolt housing 4 so that the cam end 22b engaging the bolt link 26 extends out of the coupling sleeve 39 through the cross piece 40b of the T-shaped aperture 40. Thus the assembled lock means including the coupling sleeve 39 attached via the sleeve 30 to the outermost shoulder part 21 can be inserted from the front face of the door into the bore 20 with the open leading end 39a of the coupling sleeve 39 and the T-shaped aperture stem 40a allowing the cams 22 to pass freely into the interior of the coupling sleeve 39 until the cam ends 22b and the attach link 26 project out of the T-shaped aperture cross piece 40. In this position the two barrels 29 project into the interior of the coupling sleeve 39 to terminate short of the cams 22 and T-shaped aperture cross piece 40b as can be seen in Figure 2. In this position the other assembled lock may be introduced into the bore 20 from the back or inner face of the door and the shoulder part 21 thereof screw threadably engaged with the threaded end 39a of the projecting coupling sleeve 39. Alternatively the nut 41 can be screw threadably engaged on the threaded end 39a of the coupling sleeve 39 projecting through the bore 20 beyond the cover plate 17 on the back or

inner face 8 of the door and the other assembled lock inserted into the open end of the bore 20 from the inner or back face 8 of the door and the shoulder part 21 thereof located over and in shielding relationship to the nut 41 to prevent access thereto.

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As shown in Figure 3 each shoulder part 21 can be provided with at least two projecting teeth 42 extending parallel to the axis of the bore 20 for insertion in tapered openings 43 in the adjacent cover and face plates 17 and 15. With the teeth 42 projecting into the tapered openings 43 rotation of the shoulder parts 21 drives the teeth 42 into locked engagement with the narrow end of the tapered opening to hold the shoulder parts against the cover plates 17. To prevent rotation of the shoulder parts 21 to disengage the teeth 42 from the openings 43, locking pins 44, only one being shown in Figure 3 for convenience, engageable in a correspondingly threaded passage in the bolt housing are provided. As shown in Figure 3 the threaded locking pin 44 is insertable in the housing half 1 from the edge thereof covered by the end retaining plate 13 to engage one of the teeth 42 on the shoulder part 21 on the inner or back face 8 of the door to secure this shoulder part 21 against rotation relative to the cover plate 17 in the direction to withdraw the teeth from locked engagement in the openings 43.

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As can be seen from the foregoing the two bolt actuating and locking means 19 provide the lock assembly of the invention with a dead bolt capability. The door lock assembly can be actuated or locked with the bolt 4 in the extended position from either side of the door using either of the bolt actuating and locking means 19. As an additional form of security the lock assembly includes a chain 45 fixedly secured at one end 45a in the innermost bolt housing half 1 for slidable extension therefrom, against a resilient returning force provided by a spring 46 attached to the chain end 45a as shown in Figure 3. Conveniently the spring 46 is attached at its other end to a projecting stop 47, half of which is formed on each of the two bolt housing halves 1 and 2, and secured thereto by means of, for example, an encircling ring clip 48. The other

end of the chain 45 extends from the bolt housing through an appropriate aperture in the end retaining plate 13 and is releasably attachable to the striker plate 11 attached to the side frame member 10. To this end the other end 45b of the chain is provided with a hook for engagement with a releasable catch 49 hingedly attached to the striker plate 11, for example by means of a pivot stem 50 passed through an aperture in the striker plate 11 on the back or rear face of the side frame member 10 and engaged by a transverse screw, such as 12, screwed through the striker plate 11 into the side frame member 10 from the edge thereof which is covered by the door in the closed position of the latter. Additionally a further catch 51 can be provided on the exterior of the cover plate 17 on the inner or rear face 8 of the door for slidable actuation to engage with the chain 45 in its passageway in the bolt housing 1 to prevent further extension of the chain 45 from the bolt housing half one or to permit the spring 46 to retract the chain 45 back into the bolt housing half one. The catch 49 is such that the spring end 45b can only be detached therefrom when the door is in the closed position.



CLAIMS:

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1. A dead bolt door lock assembly including a bolt housing non-rotatably locatable in a complementary shaped and dimensioned open-mouthed slot in the door opening through front and back faces and a side edge of the door so that an elongated bolt in the housing operatively may
10 be extended from or retracted to the bolt housing transverse to the door side edge through the slot mouth opening through the door side edge into or out of engagement with a side frame member of a frame in which the door is hingedly mounted or with a striker plate attachable to said side frame member, which bolt housing is thinner than the thickness of the
15 door from front to back faces thereof and is fixedly retained in the slot against movement out of the open slot mouth by an end retaining plate securable to the door side edge across the open slot mouth, and against movement transverse to the door faces by two face plates each dimensioned to cover the slot on one side thereof and overlap the respective
20 front or back face of the door around the slot edges, with the face plates being fixedly securable to the bolt housing one on each side thereof to clamp the front and back faces of the door between the face plates and thus secure the bolt housing there between in the slot, the assembly also including two cover plates dimensioned each to overlie one of the face
25 plates to cover the means by which it is secured to the bolt housing and two bolt actuating and locking means locatable in a bore passing transversely through the cover plates, face plates and bolt housing transverse to the direction of operative movement of the bolt, which bolt actuating and locking means are threadably engageable together in end-to-end relationship or securable in end-to-end relationship and each have at or
30 towards one end a shoulder part greater in diameter than said bore so that one said bolt actuating and locking means may be inserted in the bore with its shoulder part abutting the cover plate overlying the face plate on the door front side and the other said bolt actuating and locking means



5 inserted in the bore with its shoulder part abutting the cover plate overlying the face plate on the door rearside and threadably engaged together in end-to-end relationship, or secured in end-to-end relationship, to clamp the cover plates in overlying position against the face plates to prevent unauthorised access to the means securing the face plates to the bolt housing.

10 2. A door lock assembly according to claim 1, wherein the bolt housing is rectangular in plan and made in two halves which together define therein a slide way for the elongated bolt extending transverse to the bore through the housing, a pair of cams being pivotally mounted at one end in the bore in the housing for pivotal movement about a pivot axis parallel to the longitudinal axis through the bore in response to operative movement of the bolt actuating locking means to impart linear displacement to the bolt via a link interconnecting the bolt and the other end of the cams.

20 3. A door lock assembly according to claim 2, wherein the slide way and bolt cross-sections are such that the bolt is non rotatably slidably located in the slideway.

25 4. A door lock assembly according to claim 3, wherein each bolt actuating and locking means has a drive spline engageable with at least one of the two cams for rotatable actuation to extend or retract the bolt.

5. A door lock assembly according to claim 4, wherein each bolt actuating and locking means has lock means operative by a key to pivot the respective drive spline to pivot the cam engaged thereby.

30 6. A door lock assembly according to claim 5, wherein each lock means is in the form of a cylindrical barrel fixed to the shoulder part against rotation relative thereto to extend perpendicularly therefrom, and a cylindrical plug rotatably housed in the barrel with a key slot extending axially in the plug from one end thereof accessible through the shoulder



part exterior, for receiving the key, the respective drive spline being fixedly attached to the other end of the plug opposite to the slotted end for rotation with the plug.

5 7. A door lock assembly according to claim 6, wherein each barrel is provided with a plurality of radially extending bores opening from the inner cylindrical surface thereof for alignment with corresponding bores provided radially through the plug from the outer cylindrical surface thereof to the slot therein, there being slidably housed in the aligned barrel plug bores a plurality of pins resiliently biased towards the slot interior, with each pin being resiliently biased via a spring housed in the respective barrel bore and exerting biasing pressure on the associated end via a slide member housed in the respective barrel bore or at least partially in the associated plug bore between the spring and pin, and with each pin, slide member and plug and barrel bores being dimensioned such that in the locked position at least some of the pins project at least partially from the associated plug bore into the aligned barrel bore and/or at least some of the slide members project at least partially from the associated barrel bore into the aligned plug bore to prevent rotation of the plug in the barrel.

25 8. A door lock assembly according to claim 7, wherein in the locked position each of the pins project from the bores in the plug into the key slot therein for engagement by the key, said projecting pin ends being frustoconical in shape for engagement by correspondingly shaped depressions in or protrusions on the key whereby the pins and slide members are displaced sufficiently against the resilient bias of the spring, on insertion of the key in the plug slot, to align all the pins and slide member contact faces with the interface between the outer cylindrical surface of the plug and the inner cylindrical surface of the barrel and thereby free the plug for rotation in the barrel to advance or retract the bolt via the respective drive spline and cam.



9. A door lock assembly according to claim 8, wherein each barrel is housed in a respective sleeve fixedly attachable by interengaging screw threads to the respective shoulder part to extend perpendicularly therefrom, the sleeve attachable to the bolt actuating and locking means shoulder part which in use is on the front or outermost face of the door being screw threadably engageable in one end of a coupling sleeve which has a generally T-shaped aperture opening radially through a side wall thereof with the stem of the T-shaped aperture opening through the other end of the coupling sleeve, and the other end of the coupling sleeve being securable to the cover plate beneath the bolt actuating and locking means shoulder part which in use is on the rear or innermost face of the door, or being securable to the latter shoulder part.

10. A door lock assembly according to claim 9, wherein the open stem end of the T-shaped aperture in the coupling sleeve enables it to be inserted over the cams in the bore of the bolt housing so that the cam end engaging the bolt link extends out of the coupling sleeve through the cross piece of the T-shaped aperture, the two barrels of the bolt actuating and locking means projecting in use into the coupling sleeve interior to terminate short of the cams and cross piece of the T-shaped aperture.

11. A door lock assembly according to claim 10, wherein the other end of the coupling sleeve is securable to the cover plate by means of a nut screw threadably engaged on the other end of the coupling sleeve and tightenable against the cover plate to clamp the two cover plates against the respective face plates between the outermost shoulder parts and the nut.

12. A door assembly according to claim 11, wherein the surface of each face plate overlaid by its associated cover plate is recessed sufficiently to house the associated cover plate therein to reduce the possibility of a lever being inserted between the cover plate and face plate from the edge of the cover plate to force the associated cover and face plates apart.



5 13. A door lock assembly according to claim 12, wherein each bolt
actuating and locking means shoulder part is provided with at least two
projecting teeth extending parallel to the bore axis for insertion in
tapered openings in the adjacent cover and face plates so that rotation of
the shoulder parts drives the teeth into locked engagement with the
narrow end of the tapered opening to hold the shoulder parts on the cover
plates, a threaded locking pin being provided for insertion in a corres-
pondingly threaded passage in the bolt housing from the edge thereof
covered by the retaining plate to engage one of the teeth of the shoulder
10 part which in use is on the rear or innermost face of the door, to secure
the shoulder part against rotation relative to the cover plate in the
direction to withdraw the teeth from locked engagement in the opening.

15 14. A door lock assembly according to claim 13, wherein the
shoulder parts are tapered outwardly away from the cover and face plates
to deflect blows thereon away from the assembly.

20 15. A door lock assembly according to claim 14, including a chain
fixedly secured at one end in the bolt housing for slidable extension
therefrom, against a resilient returning force, through the housing end
arranged in the door slot open mouth and through an opening in the end
retaining blade, for releasable attachment at the other end to the striker
plate attachable to said side frame member, to hold the door ajar against
the chain.

25 16. A dead bolt door lock assembly substantially as hereinbefore
described with reference to the accompanying drawing.

30 17. A door and door frame assembly having a dead bolt door lock
assembly according to any one of claims 1 to 16.
