Dec. 4, 1956 S. W. ESMOND 2,772,906

LOCK FASTENER

Filed Oct. 26, 1953

Fig. 1

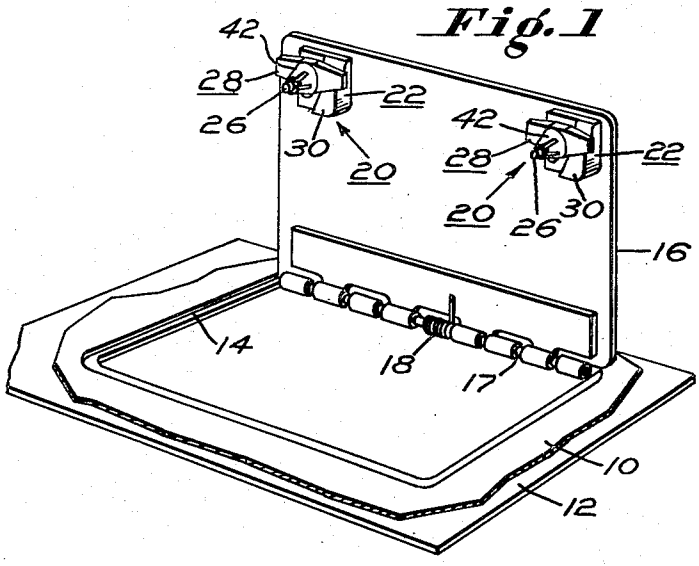


Fig. 2

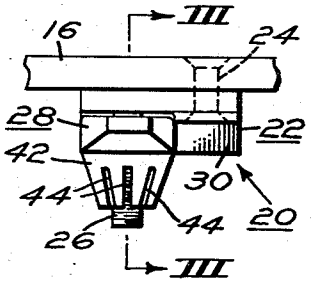


Fig. 3

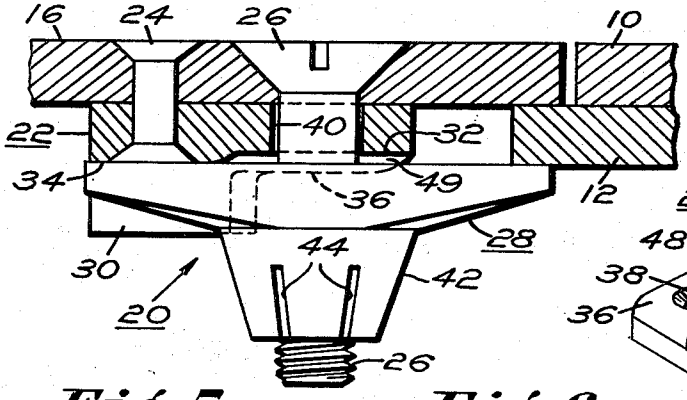


Fig. 4

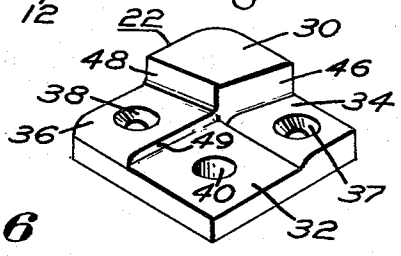


Fig. 5

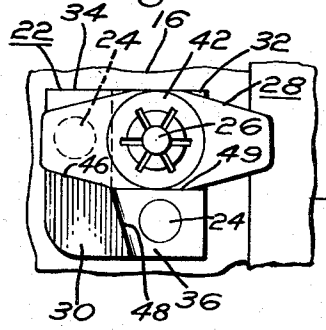
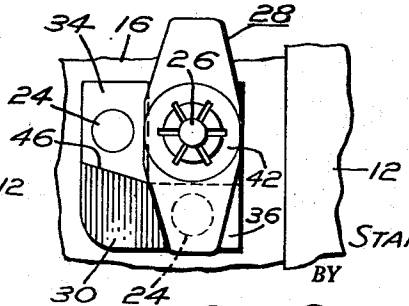


Fig. 6



INVENTOR.
STANLEY W. ESMOND
BY
Beau, Brooke, Buckley & Beau,
ATTORNEYS.

United States Patent Office 2,772,906 Patented Dec. 4, 1956

2,772,906

LOCK FASTENER

Stanley W. Esmond, Buffalo, N. Y., assignor to Bell Aircraft Corporation, Wheatfield, N. Y.

Application October 26, 1953, Serial No. 388,117

2 Claims. (Cl. 292—212)

This invention relates to improved door and panel fasteners, and more particularly to fasteners which are adapted to be fixed to a hinged or removable door or panel or the like, and carried thereby so as to be operable to detachably secure the door or panel to a complementing frame structure. For example, the invention is particularly adapted for use in fastening aircraft inspection or access doors or panels or the like.

It is an object of this invention to provide a strong, durable, improved fastener of simple design which is adapted to be carried by hinged or removable panel parts or the like, and operable for the purpose of detachably retaining the panels in closed position over openings in wall structures or the like.

It is another object of this invention to provide an improved fastener as aforesaid which is operable in quick-acting and positive fashion, and which is self-locking.

It is a still further object of this invention to provide a fastener as aforesaid which is simple to install on a door or panel without special tools so that a minimum number of parts are required, thus making it especially suitable for mass production and resulting in relatively large savings of material.

Other objects and advantages of the invention will appear from the specification hereinafter.

In the drawings:

Fig. 1 is a fragmentary perspective view of a framing structure having a hinged door equipped with fasteners embodying the invention;

Fig. 2 is an enlarged fragmentary side elevational view of a portion of the door and one of the fasteners shown in Fig. 1;

Fig. 3 is an enlarged sectional view taken as along line III—III of Fig. 2, showing the fastener in panel locking position;

Fig. 4 is a disassembled perspective view of one of the elements of the fastener device;

Fig. 5 is a bottom plan view of the fastener device of Fig. 2 shown in locked position; and

Fig. 6 is a bottom plan view of the fastener in unlocked or disengaged position.

Referring now specifically to the drawing, the invention is shown in conjunction with a pair of plate or "skin" structures **10—12** which are formed with different sized openings, so as to provide a ledge margined opening as indicated at **14**. A panel or door **16** is hinged at one side thereof to the inside of the plate members as indicated at **17** and may be biased toward either open or closed position by a spring as indicated at **18** (Fig. 1). The door **16** is dimensioned to seat against the ledge portion **14** when in closed position, and in the case of aircraft construction for example the panel **16** is preferably of a thickness equal to the recessed thickness of the ledge, whereby an uninterrupted outer surface is provided.

As shown in the drawing, a pair of fastener devices of the invention as designated generally at **20—20** are fixed

to the door **16** in spaced relation thereon, and each fastener comprises an anchor block member **22** which is permanently fixed to the door as by means of a pair of flat head rivets **24—24**. A screw **26** is journalled through a drilled opening in the door and in the anchor block member, and a laterally elongate locking bar **28** is mounted in rotatable engagement on the threaded shank of the screw **26** next to the anchor block.

The anchor block **22** is formed with an outstanding rectangular shaped boss portion **30** at one corner thereof, and variously elevated lands **32**, **34** and **36** at the other three corners thereof. The lands **34—36** accommodate the countersunk rivet mounting holes **37—38**, and the land **32** accommodates the aperture **40** in which the screw **26** is journalled (Fig. 4). The anchor block **22** is fixed to the door so that its innermost lands **32—34** are positionally aligned in the direction of the locking bar member when the later is turned to engage under the edge **14** of the mounting frame structure (Figs. 3, 5). Thus, the lands **32**, **36** are aligned with the direction of extension of the locking member when the latter is turned to "open" or released position.

The locking bar member **28** is provided with an integral "elastic nut" portion **42** which is mounted in screw-threaded relation on the screw **26** and which is provided with a series of radially disposed slots **44**. This nut portion **42** is clinched prior to assembly of the device to cause it to elastically grip the screw **26** when in assembled relation therewith. Thus, it will be apparent that turning of the screw **26** tends to rotate the locking bar **28** within the limits defined by the shoulders **46—48** of the boss portion **30** of the anchor block to engage or disengage under the door frame, depending upon the direction of rotation of the screw, as between the position shown in Figs. 5 and 6.

It is a particular feature of the invention that inasmuch as the land surface **36** is at a greater elevation than the land surface **34**, when the locking bar **28** is disposed in alignment with the lands **32** and **34** the side shoulder portion **49** of the land **36** lies alongside the locking bar and functions as a stop device to prevent rotation of the locking bar out of door holding position. This holding action will obtain as long as the screw **26** is threaded snugly into the locking bar so as to hold the bar **28** inwardly alongside the land **49**.

Thus, it will be appreciated that whenever a door or detachable panel or the like which is equipped with a fastener device of the invention is moved into closing position against an aperture frame or the like, the slotted screwhead may be engaged by an ordinary screwdriver and the screw **26** rotated so as to turn the locking bar from the position shown in Fig. 6 into the position shown in Fig. 5 of the drawing. During this operation the elastic grip of the nut **42** on the screw **26** causes the bar to turn with the screw and one end portion of the locking bar is thereby rotated into position under the marginal edge of the opening framing structure as indicated at **12** in Fig. 5. The shoulder portion **46** of the boss **30** of the anchor block thereupon functions as a stop to prevent further rotation of the locking bar, and continued rotation of the screw **26** in the same direction then causes it to move axially and further inwardly of the locking bar so as to draw the latter snugly into bearing contact with the land **34** and the undersurface of the edge of the framing member **12**.

This latter movement of the locking bar causes it to be settled into place alongside the shoulder **49** whereby the shoulder **49** is enabled to function as an automatic lock for holding the locking bar against rotation in any direction away from the door holding position thereof as shown in Fig. 5. Also, the pull of the screw **26** upon the

bar **28** causes the latter to resiliently flex between its supports at its opposite ends, so as to provide a "tension lock" effect. Thus, the device is "self-locking" without particular attention by the operator. To release the fastener device of the invention from holding position, it is simply necessary to again engage the slotted head portion of the screw with an ordinary screwdriver and to turn the screw in the opposite direction. Initially the shoulder portion **49** holds the locking bar against the drag forces thereon due to the elastic grip of the nut portion **42** on the screw until the screw is rotated a turn or two in the locking bar. This causes the locking bar to be lifted out of the holding socket formed by the shoulder portion **49**, whereupon the frictional resistance against relative motion between the screw and the locking bar then causes the locking bar to rotate into the door-unlocked position as shown in Fig. 6 when the side wall **48** of the boss **30** stops and holds the bar in unlocked position. Thus, the device is also automatically "self-unlocking" without attention by the operator.

Although only one specific embodiment of the invention has been described and shown by way of example herein, it will be understood that various changes may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. A fastener device for a door mounted in relation to a door frame comprising, an anchor block mounted adjacent the edge of the door and having upstanding shoulder means thereon, an elongated locking bar having a centrally located boss formed with a threaded aperture, and a screw journaled through the door and said anchor block and engaged in threaded relation with said boss through said locking bar member, whereby turning of said screw rotates said locking bar member within limits defined by said anchor block shoulder means to alternately engage and disengage a portion of the door frame, said anchor block being provided with stepped bearing lands adjacent said upstanding shoulder means thereof, said screw extending through the lower of said lands and one end of said locking bar member bearing on an intermediate land and the other end of said locking bar member bearing against the higher of said lands when said locking bar member is in door frame engaging position, whereby self-locking and self-unlocking of said locking bar member in door frame engaged position is facilitated and whereby continued turning of said screw after said locking bar member is in door frame engaging position will resiliently flex said locking bar member between its ends.

2. A door fastener device including an anchor block carried by a door near the edge thereof, said anchor block being of generally rectangular form having a boss portion in one corner thereof and a relatively low land in the substantially diametrically opposite corner thereof, substantially diametrically opposed intermediate and relatively high lands in the other corners of said anchor block, a screw extending through said door and through the relatively low land of said block in free rotating relation therein, an elongated locking bar extending laterally beyond opposite sides of said screw and carrying a centrally positioned elastic nut threaded upon said screw and clinched thereto to elastically grip the same and frictionally resist rotation thereon, said anchor block and said locking bar being arranged so that turning said screw in one direction rotates said locking bar into a locking position with one end thereof bearing against said boss and continued turning of said screw in said one direction causes said one locking bar end to be pulled against said intermediate land and the other end of said locking bar to be moved into a position for bearing against a side of said relatively high land upon turning said screw in the opposite direction, whereby upon turning said screw in the opposite direction said locking bar moves outwardly along said screw and then is rotated to its unlocking position with said other locking bar end bearing against said boss.

References Cited in the file of this patent

UNITED STATES PATENTS

388,992	Morgan	Sept. 4, 1888
1,327,011	Arndt	Jan. 6, 1920