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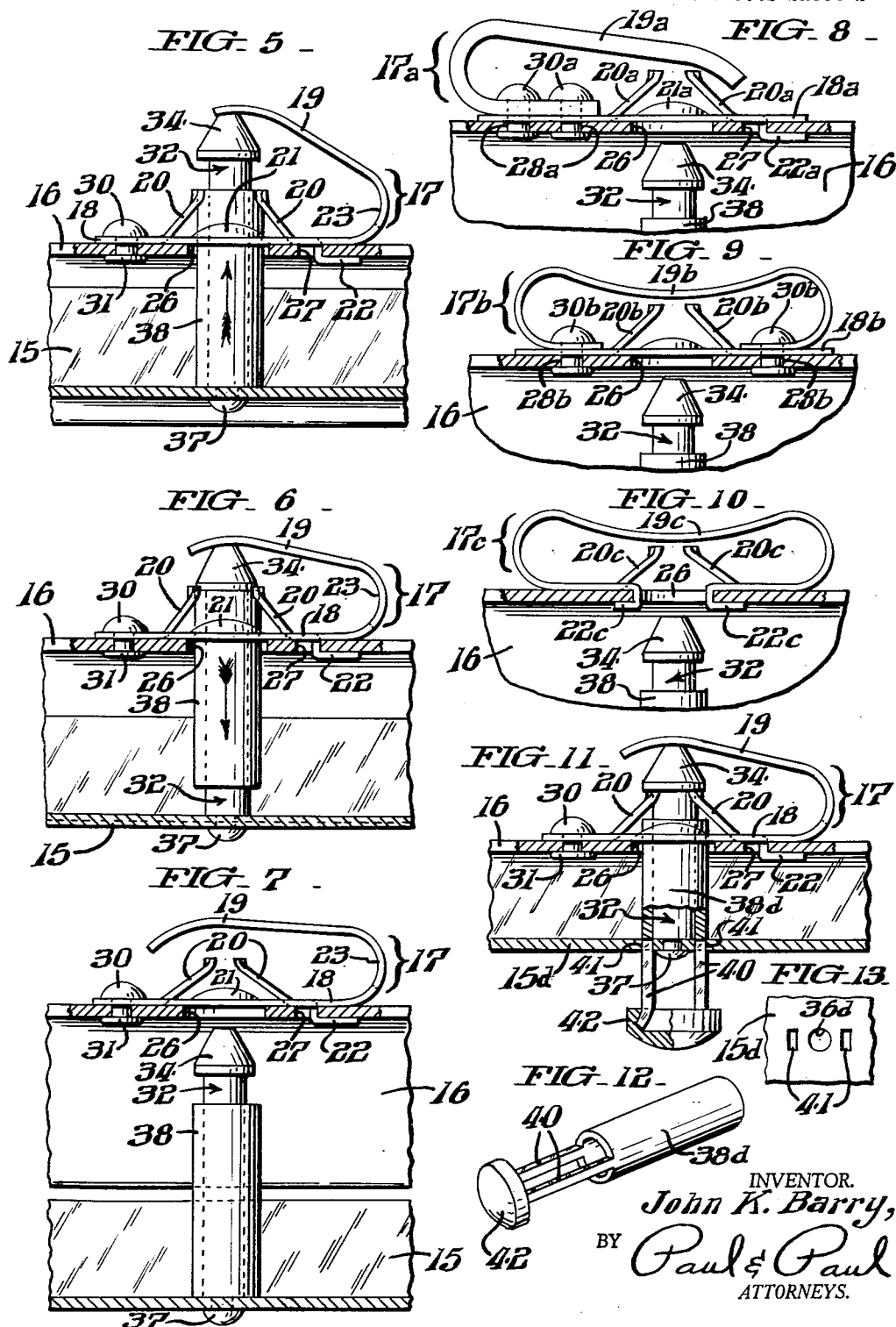
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FASTENING DEVICE

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FASTENING DEVICE

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This invention relates to fastening devices. More specifically, it is concerned with a fastening device useful in releasably holding a door or the like in closed position.

My invention has for its chief aim the provision of a fastening device which is simple in construction; which is easily applied; which lends itself to ready production in quantity at small cost; which automatically latches as the door is moved to closed position; and which can be relied upon to effectively hold the door against accidentally opening under jarring or vibration.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

FIG. 1 is a fragmentary view in vertical section of a metallic door structure conveniently embodying the fastening means of my invention in one form.

FIG. 2 is a fragmentary view in horizontal section taken as indicated by the angled arrows II—II in FIG. 1.

FIG. 3 is a fragmentary view in elevation looking as indicated by the angled arrows III—III in FIG. 1.

FIG. 4 is an exploded view in perspective showing parts of the door and its frame, and also the component elements of the fastening means.

FIGS. 5, 6 and 7 are views corresponding to FIG. 2, showing how the fastening means is operated to release the door.

FIGS. 8, 9 and 10 are fragmentary views corresponding to FIG. 7, showing three different alternative embodiments of my invention.

FIG. 11 is a view similar to FIG. 2, showing still another modification; and

FIGS. 12 and 13 are detailed views of certain of the elements involved in the embodiment of FIG. 11.

With more specific reference first to FIGS. 1-7 of these illustrations, the numeral 15 designates the bottom portion or rail of the door, and the numeral 16 the bottom rail of the door frame both of which are exemplified as being constructed from suitably stiff sheet material which may be of metal. In the form here shown, the fastening device of my invention comprises a latching component 17 which, in practice, is fashioned from an elongate blank of resilient strip metal with a basal portion 18 and a retroverted tongue 19 which is spaced from and overreaches said basal portion. Punched out of the basal portion 18 of the component 17 approximately midway of its length is a pair of opposing outwardly extending fingers 20 which are inclined toward each other at an angle of approximately forty-five degrees and of which the ends are convexly rounded, and also a pair of shorter outwardly bulged guide projections 21 at right angles to said fingers. The component 17 is further characterized by having a small retroverted tab 22 punched out of it adjacent the rounded juncture 23 between the basal portion 18 and the tongue 19 and by being further provided adjacent the distal end of the basal portion with a small hole 25. As shown, the component 17 is applied to the inner face of the upstanding flange of the bottom rail 16 of the door, said rail being provided with three pre-allocated longitudinally-aligned apertures 26, 27 and 28 of which the aperture 26 is circular and comparatively large, the aperture 27 square and corresponding in width to that of the lug 22, and the aperture 28 smaller and round and corresponding in diameter to aperture 25 in said component. To secure the

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component 17 to the bottom rail 16 of the door frame, the lug 22 is engaged in the square aperture 27 as best shown in FIG. 2, and the shank of a rivet 30 is passed through the aperture 25, and the round aperture 28 in the door frame rail and headed over as at 31 at the rear, the cutout by which the fingers 20 and the projections 21 are formed being then centered in relation to the large round aperture 26 in said rail.

The device further comprises a plunger stud 32 of which the shank is diametrically reduced at one end as at 33, and provided with a coned head 34 at the opposite end. The reduced end 33 of the stud 32 is introduced into a pre-allocated hole 36 in the bottom rail of the door 15 and is headed over as best shown at 37 in FIGS. 1 and 2. Before application of the stud 32 as just explained, a slide sleeve 38 is slipped over its shank, the outer diameter of said sleeve being at least equal to or slightly larger than that of the stud head 34 and the length thereof being somewhat less than the length of said stud between its head and the door rail. Normally with the door 15 closed as in FIGS. 1 and 2, the sleeve 38 extends into the large circular opening 26 in the door frame rail 16 and the spring fingers 20 of the component 17 are engaged behind the coned head of the stud 32 with said head contacting and flexing the tongue 19 of said component. It is to be noted that the length of the stud is such as to determine a flush relationship between the door and its frame when the door is closed.

To open the door, it is pressed inwardly or in the direction indicated by the arrow in FIG. 5 as a consequence of which the stud 32 is further thrust inwardly to additionally flex the spring tongue 19. At the same time, the sleeve 38 is advanced by the upstanding flange of the door 15 between the two spring fingers 20 of the component 17 and frictionally held temporarily by said fingers as in FIG. 5. As pressure on the door is removed, spring tongue 19 thrusts the stud 32 back through the sleeve 38 until the stud head 34 contacts said sleeve. The sleeve 38 being flush now with the head 34 of the stud 32, upon release of the door, the stud and the sleeve are thrust outward through the opening 26 in the door frame past the spring fingers 20 by the stored energy of the spring tongue 19 as in FIG. 6, the door being thereby unlatched so that it can be swung to full open position as will be readily understood from FIG. 7. The door can be closed by reversing the above procedure. Upon swinging it inward to closed position, the stud 32 and the sleeve 38 are thrust through the opening 26 in the door frame against the resistance of the spring tongue 19 incident to which the sleeve is restrained by spring fingers 20 and said fingers engage behind the head of said stud as will be readily understood from FIG. 2.

In the modification illustrated in FIG. 8, the spring tongue 19a is separately formed from heavier material than the basal portion 18a of the component 17a, said tongue being secured to said basal portion and the latter to the door frame 16 by two rivets 30a engaged through preallocated holes 28a in said frame.

In the modification of FIG. 9, the spring 19b instead of being formed as a tongue is in the form of a flattened loop of which the ends are secured, together with the basal portion 18b of the component 17b, to the door frame 16 by rivets 30b passed through pre-allocated holes 28b in said frame.

In the alternative embodiment of FIG. 10, the component 17c is formed in one piece with a flattened loop spring 19c of which the ends are outwardly retroverted as at 22c to engage the edge of the hole 26 in the door frame 16 at diametrically opposite points, and from which the spring tongues 20c are punched out. In this instance, securing rivets are dispensed with and the component 17c is held in place by spring action alone.

The alternative construction of FIGS. 11-13 is identical with that of the first described embodiment except for the sleeve 38d (FIG. 12) which is here provided with diametral prolongations 40 which extend outwardly through oblong guide openings 41 (FIG. 13) in the door 15d pre-allocated to opposite sides of the hole 36d in which the reduced end portion of the stud 32d is engaged. To the protruding outer ends of the prongs 40 of the stud 38d is affixed a push button 42. In this instance unlatching of the door is accomplished by pressing the push button 42 to inwardly advance the sleeve 38d and so cause the stud 32 to be released in the same manner as described above in connection with the embodiment of FIGS. 1-7.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the forms of the apparatus described without departing from the spirit and scope of the invention as set forth in the appended claims, and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

Having thus described my invention, I claim:

1. A fastening device for a door or the like, comprising a latching component affixable to a door frame and having a plurality of rearwardly extending spring fingers inclined at angles toward each other over an opening in the door frame; a yieldable ejector spring affixable to said door frame and overreaching the distal ends of said spring fingers; a stud affixed to and extending inwardly from the door and positioned to pass through the frame opening when the door is closed, said stud comprising a shank with a head affixed to the distal end thereof, said head being so positioned as to pass through said frame opening and inwardly beyond the distal ends of said spring fingers when the door is closed, whereby the distal ends of the spring fingers contact the head, thereby providing a latching action; an outer sleeve slidable on the shank, said sleeve extending inwardly toward the spring fingers but short of the head when the door is in normally closed position, said sleeve having an outside diameter at least equal to that of the stud head in the plane of ultimate contact between the sleeve and stud head and having a length sufficient to cause its distal end to extend beyond the distal ends of said fingers when the door is depressed inwardly from its normally closed position, thereby spreading said fingers; said head and ejector spring being positioned so that the head flexes said ejector spring on inward motion of the door, whereby upon subsequent release of inward pressure on the door, the stud head is moved by the ejector spring outwardly between the spring fingers, and the door is thus unlatched and opened.

2. The fastening device of claim 1 wherein the stud head is coned to facilitate its passage between the distal ends of the spring fingers.

3. The fastening device of claim 1 wherein the stud head is in the form of a truncated cone.

4. The fastening device of claim 1 wherein the ejector spring and the spring fingers are formed from a single piece of resilient metal.

5. The fastening device of claim 4 wherein said resilient metal piece includes a base portion with the spring fingers punched out of the base portion and the ejector spring consists of a retroverted portion of said resilient metal.

6. A fastening device according to claim 4, wherein the latching component has a basal portion provided at one end with a punched out tab adapted to hook into an aperture in the door, and at the other end with a perforation for passage of a securing element into the door frame.

7. The fastening device of claim 1 wherein the shank is provided with a reduced portion at the end opposite the head for engagement with said door.

8. The fastening device of claim 1 wherein the head is in contact with the ejector spring when the door is in normally closed position.

9. The fastening device of claim 1 wherein the outer sleeve extends from said door substantially to the forward surfaces of said spring fingers.

10. The fastening device of claim 1 wherein the sleeve is provided with a plurality of prolongations which extend outwardly through guide holes in the door.

11. A fastening device according to claim 1, wherein the latching component has a basal portion fashioned from a blank of resilient strip material from which the spring fingers are punched out, wherein the ejecting spring is likewise fashioned from a length of similar material into the form of a flattened loop with perforations respectively adjacent opposite ends thereof; and wherein the latching component is affixed by headed securing elements of which the shanks are passed through the perforations of the ejecting spring and registering perforations in the basal portion into the door frame.

12. A fastening device according to claim 1, wherein the latching component is fashioned into the form of a flattened loop with the spring fingers punched out of the end portions of said loop, together with outward retroversions for engaging over the edge of the opening in the door frame at diametrically opposite points.

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