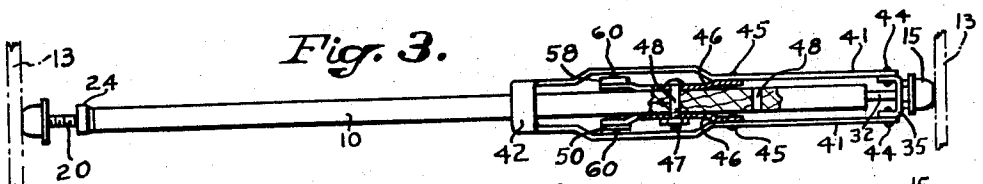
March 15, 1960 H. M. KUNIHOLM 2,928,146

REMOVABLE DOOR GATE

Filed May 7, 1958

Fig. 3.



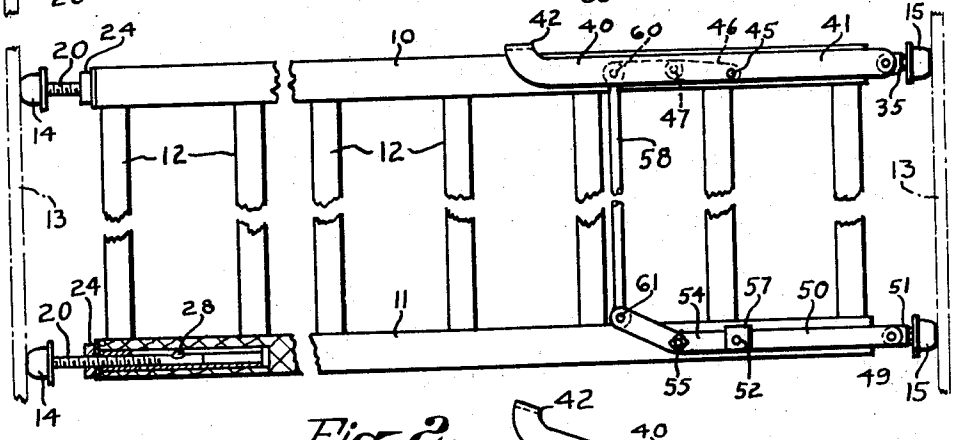


Fig. 2.

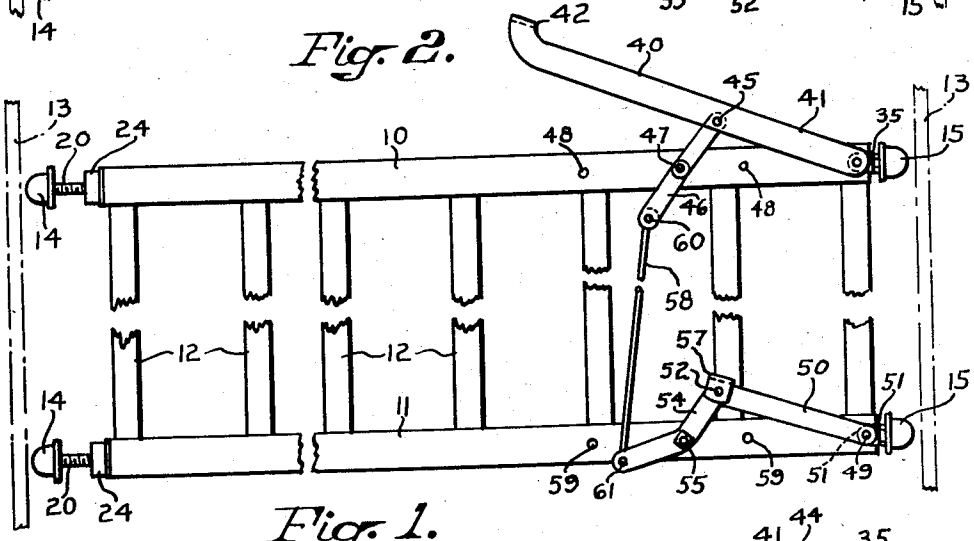


Fig. 1.

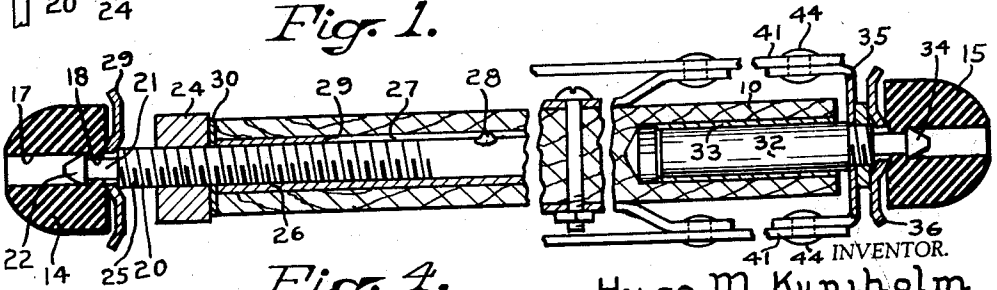


Fig. 4.

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# REMOVABLE DOOR GATE

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Application May 7, 1958, Serial No. 733,722

3 Claims. (Cl. 20—71)

This invention relates to a removable door gate, and more particularly to a barrier gate which may be removably locked in place in a door jamb to hold a small child within the room.

Various constructions have been employed for this purpose, but many have involved disfiguring the door jamb or mounting projecting obstructions therein which interfere with normal passage through the doorway when the gate is absent, or they have comprised locking devices which the child may learn to operate for removing the gate, or other constructional features which may result in injury to the child.

The primary object of this invention is to provide a gate which includes in its construction all of the locking elements required for clamping it firmly in position between opposed door jambs and which may be readily removed or positioned with a minimum of effort.

A further object is to provide a gate construction which may be very quickly adjusted for insertion between the opposed vertical door jambs of different spacings and which may be readily manipulated by an older person but cannot be operated by the child. Other objects will be apparent in the following disclosure.

Referring to the drawings illustrating one embodiment of the invention:

Fig. 1 is a vertical elevation of the gate, partly broken away, and with the locking device in an open unlocked position;

Fig. 2 is a similar view with the parts locked against a door jamb;

Fig. 3 is a top plan view; and

Fig. 4 shows a sectional detail of the bumper slide constructions.

The construction comprises a barrier arranged to form a closure between the door jambs which is held in position by two pairs of bumpers at the top and bottom portions of the barrier. One pair of cushioning bumpers is mounted at one end of the barrier, and these are adjustably positioned in accordance with the spacing of the upright pieces of the door jamb. At the other end of the gate, two cushioning bumpers are mounted to be moved by a toggle construction and thereby lock the two pairs of bumpers firmly and under a compressive cushioning against the opposed uprights of the door jamb.

The gate or barrier, which may be made of suitable material, such as metal or wood, is shown as comprising two spaced upper and lower wooden rails **10** and **11** separated and held together by vertical wooden slats **12** suitably secured thereto and spaced adequately to prevent egress of a child or a small animal to be confined in the room. This gate is to be held in position by frictional engagement with the vertical sides of a door jamb **13** shown diagrammatically in the drawings. The friction elements preferably comprise a pair of vertically separated cushioning bumpers **14** at one end of the gate and a pair of bumpers **15** at the other end. These four bumpers are preferably made of an elastomer such as hard rubber, having a sufficient resiliency so that they



may be compressibly forced into tight and frictional engagement with the door jamb pieces. The bumpers may be made of suitable cushioning material held against the door jambs by their own resilience when compressed or by means of a supplemental helical spring under compression which holds the bumpers in a yielding extended position.

The two bumpers or cushions **14** at one end of the gate are mounted for quick adjustment into contact with the adjacent door jamb. The bumpers **15** at the other end are slidably mounted for being forced by a toggle joint mechanism into firm contact with the door jamb **13**. As shown at the lower left hand corner of Fig. 2 and enlarged in Fig. 4, each bumper **14** is preferably shaped as a part-spherical body of resilient or cushioning rubber. The bumper has a large diameter hole **17** drilled part way through from the front side and terminating at a shoulder **18** adjacent the inside or rear portion. A screw threaded slide shaped as a rod **20** has a reduced portion **21** at its forward end terminating in an enlarged substantially conical head **22** having a smooth rounded nose. The rear face of the head rests against the shoulder **18** of the bumper and thus holds the parts assembled. The rubber has sufficient elasticity so that the conical head may be pressed through the small cylindrical hole in the shoulder **18**, but the head is held from withdrawal by the vertical rear face of the cone.

The bumper **14** is so mounted that it may be held in a desired extended position to provide for different widths of door openings. To this end, a knurled nut **24** is adjustably mounted on the threads **25** of the screw **20**. The cylindrical rod **20** is mounted for a free slidable movement within a tubular casing **26** which has a slot **27** in its upper portion. A lug **28** suitably formed, as by means of an upsetting pressure on the rod, projects upwardly into that slot and thus permits movement of the rod **20** outwardly only until the lug strikes the end shoulder **29** of the slot. This lug **28** is located near the rear end of the rod, and the parts are so proportioned that the rod with its bumper **14** may slide outwardly through several inches to provide for a wide variation in separation of the vertical members of the door jamb. For example, the sleeve **26** and slide **20** may be longe enough to provide for an outward movement of the bumper through 4 or 6 inches, so that the gate may be made to fit within door openings of 30 or 32 and 36 inches width. The upper rail **10** and the lower rail **11** are each bored to provide a cylindrical hole within which the tube **26** is driven with a tight fit. If desired, the tube may be further secured in place by suitable means, such as an outer metal plate fastened to the end of the rail. A metal washer **29** is located at the rear of the bumper **14** so as to transmit the pressure from the bumper to the knurled nut **24**.

It will be understood that when the gate is to be assembled between the door jambs, the bumpers **14** will be positioned against one door jamb when the other bumpers **15** are properly located near the other jamb, and then the freely rotatable nut **24** will be given a spin on the threaded slide **20** and brought into contact with the end of the tube **26** or the wooden bar **10** or **11** or preferably against a metal washer **30** suitably positioned on the end of the rail. Thus the pressure against the bumper will be transmitted through the nut **24** to the rail.

The other pair of bumpers **15** are each mounted, as shown at the right of Fig. 4, on slides **32**, shaped as cylindrical rods, mounted in tubular metal sleeves **33** suitably mounted with a driving fit in a cylindrical hole in that end of the wooden rail **10**. The slide rod **32** is shaped at its outer end to provide the cone-shaped head **34** corresponding with the part **22** at the left hand end

of the gate and the bumper 15 is shaped the same as the bumper 14.

The bumpers 15 are moved by toggle joints into engagement with the adjacent door jamb. A U-shaped plate 35 is mounted on the slide 32 as a part of the toggle mechanism to cause movement of the bumper. A washer 36 may be used to transmit the thrust between the toggle plate 35 and the bumper 15. The metal tube 33 need not be provided with a slot and limiting shoulder corresponding with the tube 27, since the movement of the slide rod 32 is controlled by the toggle mechanism. The depth of the hole and the length of the sleeve 33 are made sufficient to provide adequate support for the slide 32 and bumper 15 as well as for its longitudinal movement by the toggle.

The manually manipulated lever which operates the toggle joint mechanism and serves to slide the rod 32 with its bumper 15 is preferably mounted on the upper rail 10. It comprises a toggle lever 40 having two side arms 41 connected by a transverse U-shaped portion 42. The arms 41 are pivotally mounted by means of the pins 44 on the short extension arms of the U-shaped pieces 35. The transverse length of this U-shaped piece and the length of the connecting portion 42 of the lever are such that the lever arms 41 lie at the outside of and fairly close to the upper rails 10. The two lever arms 41 are each connected by pivot pins 45 to short levers 46 of the first class which are centrally pivoted on a bolt 47 which is removably positioned in one of several holes 48 (Fig. 3) bored transversely through the upper wooden rail 10.

The right hand ends of the parallel arms 41 and the two side levers 46 with their three pivots 44, 45 and 47 constitute the toggle joint. When the left hand end of the toggle lever 40 is raised to the position of Fig. 1, the slide rod 32 which carries the upper bumper 15 is moved inwardly because of the fixed position of the pin 47 and the movability of the other pins 44 and 45. When the left hand end of the toggle lever is thrust downwardly to the position of Fig. 2, at which the connection 42 of the arms 41 lies in engagement with the top rail 10, then the pin 32 is thrust outwardly and the upper bumper 15 is crowded against the door jamb, provided the other bumper 14 has been suitably adjusted, as above described. It is preferred that the parts be so shaped and arranged that the pin 45 passes slightly beyond dead center, so that the inward pressure against the bumper holds the cross piece 42 snugly against the rail 10 and thus makes it impossible for the gate to become dislodged accidentally. It requires effort to pass the pin 45 past dead center for releasing the bumpers 15 as well as to thrust the parts into a locking contact with the door jamb.

The lower bumper 15 on the bottom rail 11 of the gate (Figs. 1 and 2) is slidably mounted the same as the upper bumper 15, and it is positioned by the toggle mechanism mounted on the upper rail. To this end, the U-shaped cross piece 51, corresponding with the part 35 above described, has its arms connected by pins 49 with short links 50 at each side of the rail 11. These links 50 are pivotally connected by pins 52 to slightly curved levers 54 which are mounted as first-class levers on the removable bolts 55 inserted through one of the holes 59 drilled in the lower rail 11, these parts corresponding with bolts 47 and holes 48 in the upper rail. An L-shaped piece of angleiron 57 is pivoted also on the pin 52 and serves as a stop for the movement of the arm 50 to hold the pivots 49, 52 and 55 either in a position of alignment or with the pin 52 passed slightly beyond dead center.

To operate this lower toggle joint by the upper toggle lever 40, a pair of pull rods 58 have their enlarged flat heads pivotally mounted on pins 60 located in the outer ends of the two upper levers 46, their lower ends being pivotally mounted on pins 61 carried by the outer ends of the levers 54. Hence, when the upper toggle lever 40 is raised to the position of Fig. 1, the rods 58 push downwardly on the outer ends of the levers 54 and pull inwardly on the lower bumper 15. When the toggle lever 40 is pushed down into contact with the upper rail 10, the rods 58 serve to pull up on the outer ends of levers 54 to which they are pivoted and thus lower the link 50 and thrust the lower bumper 15 outwardly into tight engagement with the door jamb.

As shown particularly in Fig. 3, there are a plurality of spaced holes 48 in the upper rail 10, and the pin 47 may be moved from one of the holes 48 to another to adjust for a different width of door jamb. Corresponding holes 59 are provided in the lower rail 11. Both the upper and lower slidable rods 32 are made long enough so that any adjustment of the position of the toggle pins 47 and 55 will leave the two bumpers 15 operatively mounted on their associated rails. Hence, if the screw threaded rod 20 cannot be adjusted far enough by twirling the knurled nut 24 to insure a tight fitting gate, then it is a simple matter to take out the bolts 46 and 55 and insert them in another pair of the set of holes 48, 59 in the cross rails. Several holes 48, 59 may be provided to accommodate the different sizes of doors. The rods 20 are preferably made long enough to take care of such different widths as 30" and 36" for the standard door sizes, and the extra holes are to be used only in case of an abnormally sized doorway.

It will now be appreciated that in its operation, it is merely necessary to set the gate into position with the right hand bumpers 15 substantially in contact with the adjacent upright of the door jamb, and then to twirl the nuts 24 on the upper and lower threaded rods 20 until the bumpers 14 are brought into fairly close contact with the adjacent door jamb 13. The toggle joint structure is so made and adjusted relative to the compressibility of the rubber bumpers 14 and 15 or springs behind the bumpers that when the bumpers have been brought initially into fairly close contact with the door jamb for the position of Fig. 1 and the toggle lever 40 is thereafter thrust downwardly to the position of Fig. 2, the bumper structure will be compressed enough to make a very tight frictional engagement with the sides of the door jamb. Even if the toggle lever pivots do not pass a dead center condition but are brought substantially into alignment, nevertheless the inward pressure of the bumpers will hold the toggle joint parts firmly positioned and the gate cannot be dislodged either accidentally or by the pressure of a child leaning or pulling against it. Also, the value of having a single action lever 40 to operate two interconnected clamping devices is apparent. It will also be appreciated that various safety measures may be taken and the toggle parts so made and located that a child cannot get its fingers caught in the mechanism or be otherwise injured. The drawings are, therefore, intended to illustrate clearly the principles of the invention and not as showing the exact shapes and sizes of the parts.

The operation of the device has been made apparent by the above disclosure and it will be appreciated that various modifications may be made in the construction within the scope of the appended claims. For example, the bumpers 14 may be fixed in position and the bumpers 15 may be adjustably moved, by providing an outer threaded end on slide 32 which carries a nut like the nut 24. Thus, both the longitudinal adjustment nut and the toggle clamping device are located at the same end of the gate. The principle of adjusting the gate length and locking the gate in place remains the same whatever may be the locations of these parts. Also, other quick acting clamping constructions may be substituted for the toggle devices illustrated in the drawings, within the scope of the claims. Hence, the above disclosure is to be interpreted as setting forth the principles and a preferred embodiment of the invention and not as imposing limitations on the appended claims.

I claim:

1. A removable gate comprising vertically spaced upper and lower rails and associated parts forming a barrier for a space between two walls which has horizontal holes near the opposite upper and lower corners, a slide mounted in and extending from each of said holes, a cushioning bumper of elastic material on the outer end of each slide, the upper and lower slides at only one end of the gate having threaded portions, a nut on each threaded portion which is engageable with the gate to hold the slide in an adjustably extended position, members arranged to move the slides at the opposite end of the gate, two toggle joints mounted respectively on the upper and lower rails, each toggle joint having a lever arm and a slide arm, a central pivot connecting the arms, a pivot for mounting the lever arm on an associated rail, a pivot which connects the slide arm with one of said members for moving the associated bumper outwardly, and a manually operable handle connected to one of said arms and movable to a final position in contact with a rail, said bumper having a compressibility which provides for movement of the handle into said contact with the rail when all bumpers are initially in contact with the wall, and said central pivot being arranged to pass a dead center line between the other pivots and thereby lock the associated bumpers in outwardly extended positions when the handle contacts the rail.

2. A removable gate comprising upper and lower rails and parts forming a barrier, horizontal slides mounted near the upper and lower corners of the barrier for longitudinal movement to extend outwardly therefrom, a cushioning bumper on the outer end of each slide, the upper and lower slides at one end of the gate having threaded portions, a nut adjustable on each portion and engageable with the gate end to hold the slide in an adjustably extended position, toggle joints connected with the slides at the opposite end of the gate which serve to hold the associated slides and bumpers in an extended position, one toggle joint including a manually manipulatable handle arm pivotally connected to a slide, a toggle arm lever pivotally connected to the handle arm, a removable pivot mounted on a gate rail and carrying said lever, said rail having a plurality of spaced holes in which said removable pivot may be mounted and thereby vary the slide position and the effective length of the barrier, and means connecting the upper and lower toggle joints so that they may be moved together and force all of the bumpers into frictional engagement with opposed walls and hold the gate firmly in position.



3. A removable gate comprising connected upper and lower rails and associated parts forming a barrier having upper and lower horizontal sleeve openings at their opposite ends, a sleeve mounted in each opening, a slide freely movable in each sleeve, a cushioning bumper carried on the outer end of each slide, the two slides at only one end of the gate having threads, a nut rotatably mounted on each threaded portion of the slide and arranged to engage the gate end and hold its associated bumper in an extended position, members mounted to move the slides at the opposite end of the gate, a manually operable toggle joint having two arms, one of which is pivotally mounted on the gate rail and the other pivoted to one of said members to move the same, a central pivot connecting the arms, a link connecting related arms of the two toggle joints so that they operate together, and a handle connected to move the upper toggle joint, said handle and associated toggle arms being arranged so that the pivot connecting the toggle arms passes a dead center line between the other pivots when the handle moves into engagement with the gate and thereby locks the associated bumpers in position.

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