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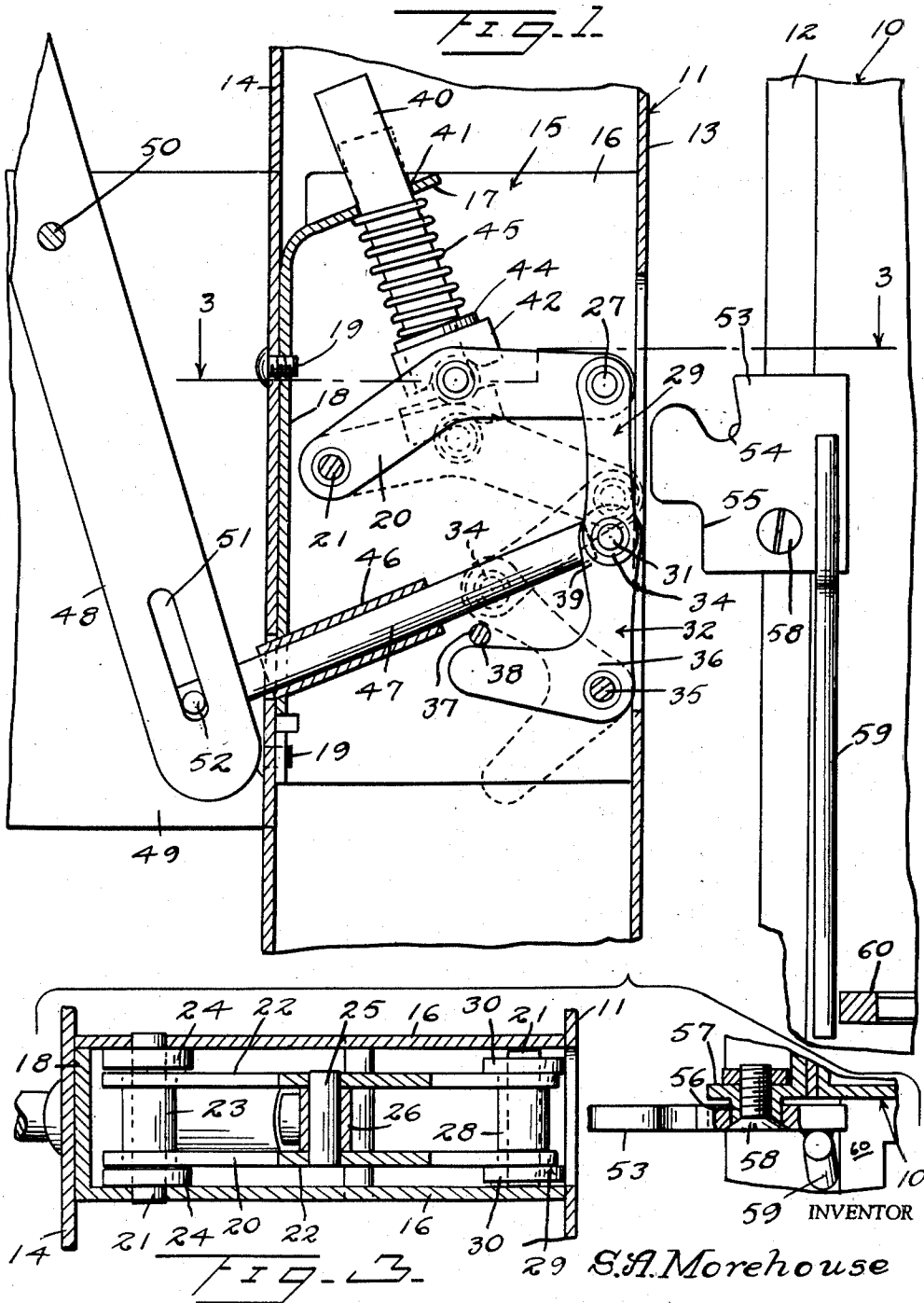
S. A. MOREHOUSE

2,865,313

SAFETY MECHANICAL REFRIGERATOR DOOR CLOSURE

Filed July 15, 1955

4 Sheets-Sheet 1



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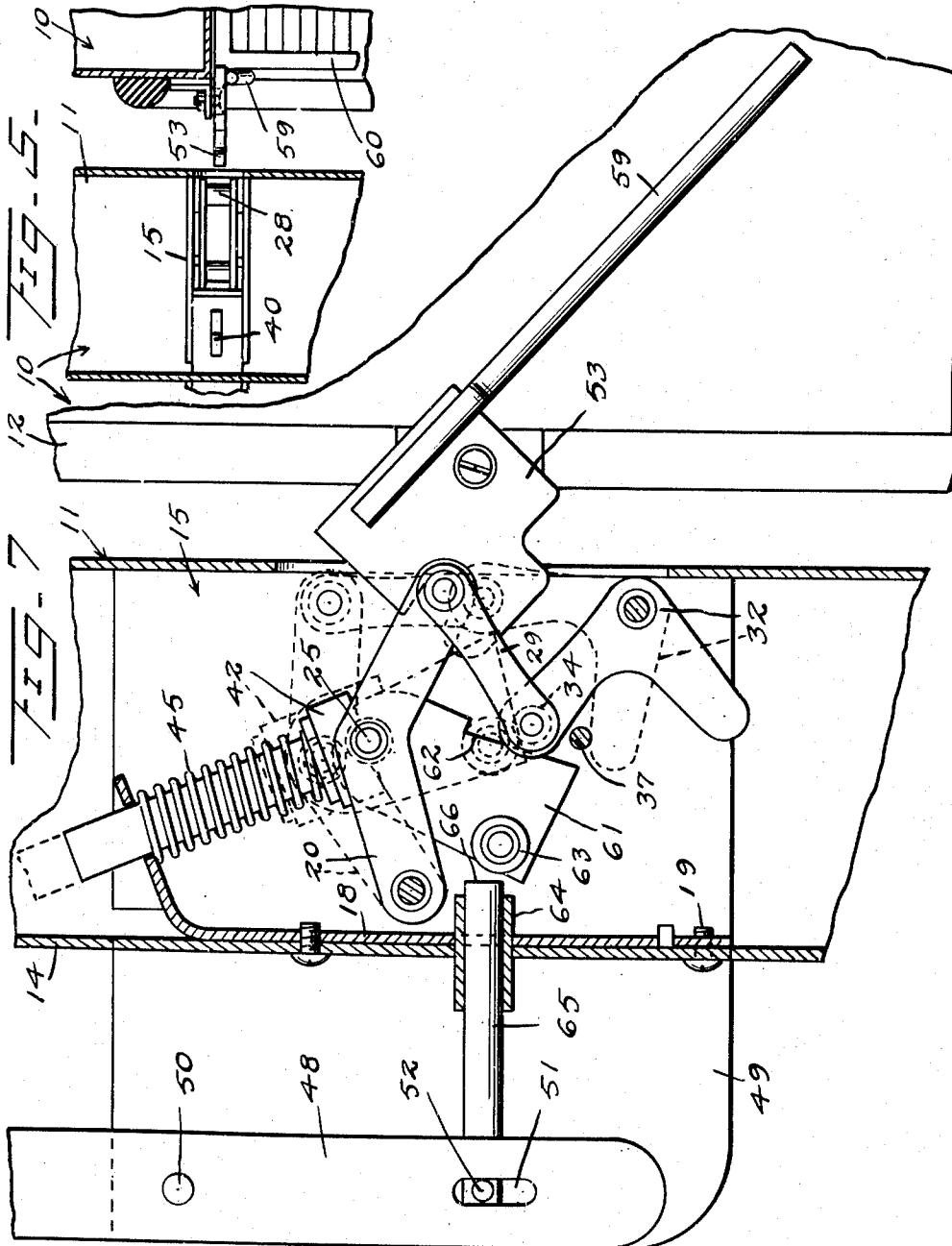
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4 Sheets-Sheet 2



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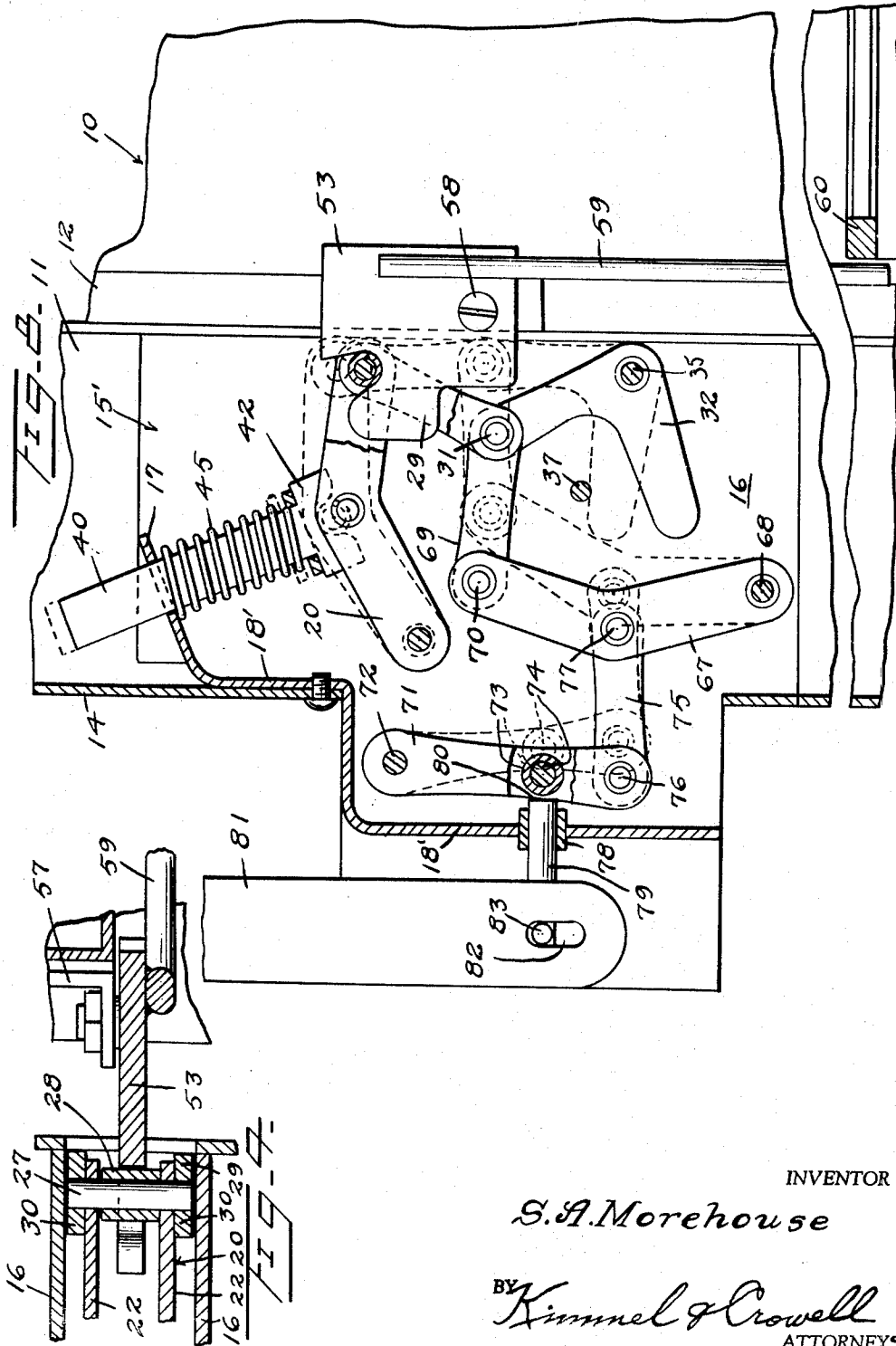
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4 Sheets-Sheet 3



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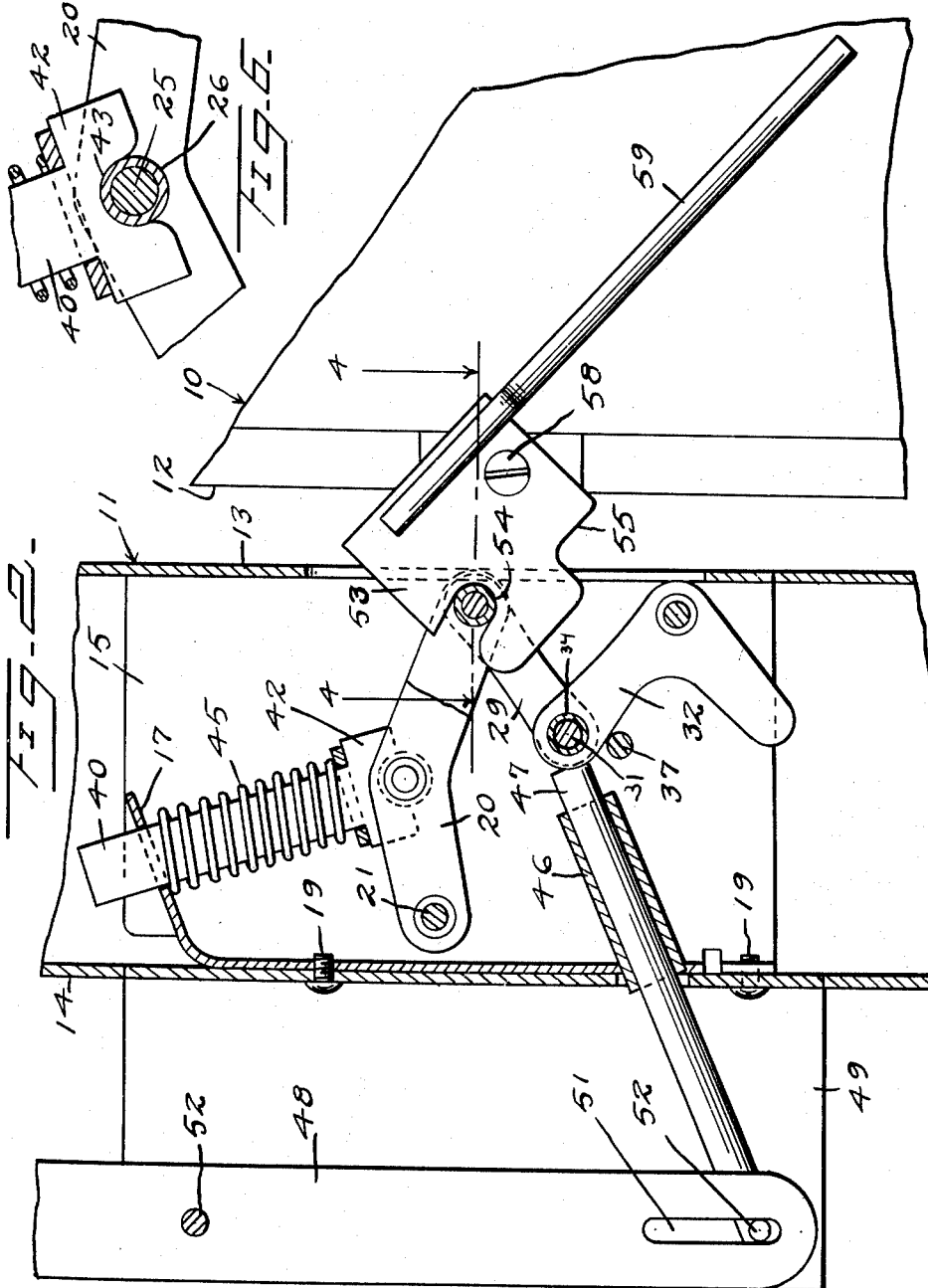
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4 Sheets-Sheet 4



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SAFETY MECHANICAL REFRIGERATOR
DOOR CLOSURE

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Application July 15, 1955, Serial No. 522,260

9 Claims. (Cl. 109—63.5)

The present invention relates to safety mechanical refrigerator door closures, and more particularly to a door closure of this type which completely eliminates the possibility of a child becoming locked in the refrigerator.

The primary object of the invention is to provide a safety mechanical refrigerator door closure which will become unlatched upon the slight movement of a child who has become trapped in the refrigerator.

Another object of the invention is to provide a device of the character described which becomes inoperative upon the removal of a shelf.

A further object of the invention is to provide a safety closure of the class described, in which the refrigerator door cannot be sealed if a shelf cooperating with the closure has been removed.

In the refrigerator field a tragic loss of children's lives have occurred due to the fact that refrigerators have been discarded, containing operative latches, in which children have become locked and suffocated with no means to either extricate themselves or attract attention due to the insulation on the box. Many States have passed laws prohibiting the discarding of refrigerators with the locks in operative condition. This has aided in reducing the problem to some extent. However, due to the complete impossibility of locating the former owner of a discarded box, the problem has not been completely eliminated. The instant invention has been constructed so that the box will be locked as efficiently as is done by the prior art devices, and in addition will not lock should a cooperating shelf be removed or moved from its normal position.

Other objects and advantages will become apparent in the following specification when considered in the light of the attached drawings, in which:

Figure 1 is a side elevation of the invention, with some parts thereof shown in section for purposes of clarity;

Figure 2 is a view similar to Figure 1, showing the latch structure and keeper in safe position;

Figure 3 is an enlarged transverse cross section of the device taken along the line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is an enlarged detailed cross section showing of the latch and keeper in safe position, taken along the line 4—4 of Figure 2, looking in the direction of the arrows;

Figure 5 is a top plan view of the invention, shown attached to a refrigerator door and wall with parts shown in cross section for clarity;

Figure 6 is a detailed view of the latch spring plunger connection to the link, shown partly in cross section for clarity;

Figure 7 is a side elevation of a modified form of the invention, showing a modified form of link-operating mechanism with the links and keeper shown in safe position, and

Figure 8 is a side elevation of a second modified form of the invention, showing a modified link-operating mechanism with the links and keeper shown in locked position.

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Referring now to the drawings in detail, wherein like reference numerals indicate like parts throughout the several figures, the reference numeral 10 indicates generally a conventional refrigerator having a door 11 which is hinged thereto. A gasket 12, shown hereto attached to the refrigerator 10, operates to seal the door 11 to the box 10. The door 11 comprises an inner wall 13 and an outer wall 14. A latch casing 15 is positioned between the inner wall 13 and the outer wall 14 and includes a pair of spaced-apart side walls 16, an inwardly and upwardly sloped top wall 17 and a front wall 18 extending between side walls 16. The latch casing 15 is secured to the front wall 14 of the door 11 by means of securing elements 19.

Within the casing 15, between the side walls 16, a dog leg link 20 is mounted on a pivot 21. The dog leg link 20 comprises a pair of identical side members 22 which are spaced apart at one end by means of a bushing 23 on the pivot 21. Washers 24 are also carried on the pivot 21 to space the side members 22 of the link 20 from the side walls 16 of the casing 15. The link 20 is provided with a cross pin 25 intermediate the ends of the link 20, and a bushing 26 is mounted on the cross pin 25 between the side members 22. The outer end of the dog leg link 20 carries a pivot pin 27 extending between the sides 22 thereof, with a cylindrical latch bolt 28 positioned between the sides 22. A latching link 29 consists of a pair of link arms 30 positioned over the outer ends of the cross pins 27 outside of the side members 22 of the dog leg link 20. The arms 30 of the latching link 29 extend from the cross pin 27 and are provided at their free ends with a cross pin 31 which extend between the arms 30. A bell crank link 32 includes a pair of arms 33, each of which are mounted at one end inside of the arms 30 of the link 29 and spaced apart by a roller bushing 34 on the cross pin 31. A pivot 35 passes through the central portion 36 of the bell crank link 32 and through the side walls 16 of the latch casing 15, pivotally securing the bell crank link 32 to the side walls 16. A stop 37 extends between the side walls 16 and is positioned to engage both legs 38 and 39 of the bell crank link 32 to limit the movement of the link 32 in each direction.

A rectangular shaft 40 extends through a slot 41 in the upwardly sloped top wall 17 and projects downwardly at an angle toward the dog leg link 20. A shaft 40 carries a saddle 42 at the lower end thereof, as is best shown in Figure 6. The saddle 42 is provided with a transverse groove 43 which is adapted to seat on the bushing 26 of the dog leg link 20. A washer 44 is positioned about the shaft 40 and in engagement with the upper surface of the saddle 42. A coil spring 45 is positioned over the shaft 40 in engagement with the washer 44 at one end and the lower face of the sloped top wall 17 at the other end. The coil spring 45 is adapted to press the saddle 42 toward the bushing 26, thus applying pressure on the links 20, 29 and 32. An upwardly and inwardly extending tubular guide 46 is secured to the front wall 18 of the latch casing 15 and carries a latch operator pin 47 therein for sliding reciprocation. The latch pin 47 is adapted to engage the bushing 34, and upon inward movement, to move the links 29 and 32 to the full line position as shown in Figure 1. A hand-operating lever 48 is secured with a pair of spaced plates 49 on the front of the door 11. The lever 48 is pivoted as at 50 and is connected to the pin 47 by means of a slot 51 and a cross pin 52, the cross pin 52 engaging in the slot 51 to move the latch pin 47 inwardly and outwardly upon movement of the lever 48.

A keeper 53 is formed with a keeper slot 54 in the upper outer edge thereof and with a latch tripping surface 55 in the lower outer face thereof. The keeper 53 is pivoted by means of a pivot boss 56 which is carried by an angle iron member 57 secured to the face of the box. A screw 58 engages the outer face of the keeper

53 and prevents the keeper 53 from becoming detached from the pivot boss 56, keeper 53 being freely revolvable about the pivot 56. An arm 59 is secured to the keeper 53 by means of welding or the like and extends outwardly and downwardly to engage the front edge of the shelf 60 contained in the refrigerator 10. The arm 59, in engagement with the shelf 60, prevents the keeper 53 from being revolved in a counterclockwise direction, as shown in Figure 1.

It should be noted particularly in Figure 1 of the drawings that the center of the cross pin 31, with the lock in unlatched position, is forward of the line drawn between the pin 27 and the pin 35, thus it can be seen that when the parts are in this position the downward pressure of the spring 45, on the dog leg link 29, tends to move the pin 31 to the right, as viewed in Figure 1, while the stop 37 engaging with the leg 38 of the bell crank link 32 prevents further movement in this direction. When a refrigerator door 11 is closed, the bushing 34 engages the surface 55 of the keeper 53 and the bushing 34 is moved to the left as viewed in Figure 1. As this movement takes place, the links 29 and 32 "break" and the spring 45 pressing downwardly on the dog leg link 20 causes the cylindrical bolt 28 to move into the keeper 53, assuming the position as shown in Figure 8. In opening the refrigerator door, once it has been locked in this manner, the lever 48 is pulled manually forcing the latch pin 47 inwardly against the bushing 34. This will move the links 32 and 29 connected thereto outwardly at their juncture until they have passed a line drawn through their pivots so that they have become locked in unlatched position.

In Figure 2 of the drawings there is illustrated the safe position of the keeper 53 when the shelf 60 is displaced. If the shelf 60 is in position at the time the refrigerator is closed and a child should move the shelf 60 upwardly and out of position, the arm 59 on the keeper 53 is permitted to swing inwardly of the box 10 and keeper slot 54 will be moved outwardly and downwardly in an arc about the pivot 56 under the pressure exerted downwardly by the cylindrical bolt 28 under the force of the coil spring 45 until the elements are moved into the position as shown in Figure 2 with the inner wall 13 of the door 11 spaced from the gasket 12. It can also be seen that should the door 11 be open while the keeper 53 is in the position as illustrated in Figure 2, and it be swung to a closed position, the keeper 53 will engage the cylindrical bolt 28 to prevent the door 11 from coming into engagement with the gasket 12.

The latch casing 15 is positioned sufficiently high in the door 11 so that the arm 59 of the keeper 53 is in engagement with an upper shelf 60 of the box 10. The shelf 60 is so positioned in the box 10 that a child could not under any circumstances get above the shelf. Hence, it can be readily seen that a child must, if it is going to get into the box 10, get under shelf 60 which is cooperating with the arm 59 of the keeper 53. And in this circumstance, should the door 11 become latched the child, in panic, will naturally raise up against the shelf 60 moving it to a position which will release the keeper 53. Furthermore, if it is desirable to completely prevent the closing of the refrigerator door 11, the shelf 60 can be completely removed and the door 11 cannot then be completely closed.

Referring now to Figure 7, a modified form of link-operating means is disclosed. In this form of the invention the dog leg link 20, latching link 29, bell crank link 32 and stop 37 are each mounted within the casing 15 in the same manner as is disclosed for the preferred form of the invention illustrated in Figures 1 through 6. The link mechanism of the modification is spring biased by spring 45 operating on saddle 42, also in the same manner as illustrated for the preferred form. Furthermore, the box 10 is provided with a keeper 53 having

an arm 59 constructed identically with the keeper 53 and arm 59 of the preferred form of the invention. The cam plate 61, which is pivoted at its upper end to the pivot 25, has an inwardly projecting cam surface 62 which is in engagement with the roller bushing 34 positioned between the latching link 29 and the bell crank link 32. The cam plate 61 carries a roller 63 positioned thereon for rotation. A sleeve 64 extends through the front wall 18 of the casing 15 and carries a latch pin 65 for sliding reciprocation therein. The inner end 66 of the latch pin 65 is adapted to engage the roller 63 to move the cam plate 61 against the bushing 64 so that the movement of the latch pin 65 is multiplied by the cam plate 61 and the bushing 34 will be moved a greater distance than the movement of the end 66 of the latch pin 65. A handle 48 mounted on pivot 50 within side plates 49 is adapted to move the latch pin 65 through the medium of a cross pin 52 and a slot 51 in the same manner as was disclosed by the preferred form of the invention in Figures 1 through 6.

In Figure 8 of the drawings another modification of the source multiplying link operator is disclosed wherein the dog leg link 20, latching link 29 and bell crank 32 are all mounted in a casing 15' in the same manner as the same elements are mounted in the casing 15 of the preferred form of the invention. These elements are spring pressed by the coil spring 45 operating through the saddle 42 carried by the shaft 40 as is the preferred form, and they cooperate with a keeper 53 carrying an arm 59, all as described for the preferred form. In the form of the invention as illustrated in Figure 8, the latch operating mechanism includes a second dog leg link 67 which is pivotally secured between the side walls 16 by means of a pivot 68. A link 69 is pivotally secured by pivot 70 to the upper end of the dog leg link 67 at one end thereof and at the other end is carried by the pivot 31 connecting the links 29 and 32. A link 71 is pivoted in the casing 15' by means of a pivot 72 and carries a roller 73 on a pivot 74 at a mid point of the link 71. A connector link 75 is pivoted by pivot 76 to the lower end of the link 71 and to the central point of the dog leg link 67 by means of pivot 77 which extends through the other end of the connector link 75. A sleeve 78 extends through the front wall 18' of the casing 15' and slidably supports a latch pin 79. The inner end 80 of the latch pin 79 is adapted to engage the roller 73. A handle 81 is pivotally secured to the door 11 by means not shown and carries a slot 82 at the lower end thereof which is in driving engagement with a pin 83 extending transversely through the outer end of the latch pin 79. Upon outward swinging movement of the handle 81, the latch pin 79 engages the roller 73 moving the link inwardly, which in turn moves links 75, 67 and 69 in a direction to move the pivot 31 and the bolt 28 to an unlatched position. It can be seen, with the relationship of elements in this form of the invention, that a very small movement of the latching pin 79 will create a sufficient movement of the bolt 28 to unlatch the door 11 of the box 10.

It should be noted that the operation of the two modified forms of the invention, insofar as the latching and unlatching are concerned, are exactly the same with the additional means to multiply the forces being provided in the two modified forms of the invention.

It should be understood that while the invention has been disclosed as cooperating with a shelf of a mechanical refrigerator it can be used with any movable partition, divider, or wall, in any cabinet having a latched door.

Having thus described the preferred forms of the invention, it should be understood that numerous modifications and structural adaptations may be resorted to without departing from the scope of the appended claims.

What is claimed is:

1. A safety closure for the door of a refrigerator of the type having a shelf comprising: a vertically swing-

ing bolt mounted in said refrigerator door, means operatively associated with said bolt for biasing said bolt in a latching and safety direction, means on said bolt for releasably securing said bolt in unlatched position, manually operative means on said door for moving said bolt to unlatched position, a keeper pivotally secured to said refrigerator, and means on said keeper cooperating with the forward edge of said shelf for maintaining said keeper in position to cooperate with said bolt to maintain said door in closed position, said keeper being adapted upon displacement of said shelf to swing, due to the pressure from said biased bolt, to a position releasing said bolt.

2. A safety closure for the door of a shelf-equipped refrigerator comprising: a movable bolt mounted in said refrigerator door, means associated with said bolt for normally biasing said bolt in a latching and safety direction, manually operative means for moving said bolt in an unlatching direction, a movable keeper secured to said refrigerator and adapted to cooperate with said bolt, and means on said keeper cooperating with said shelf for maintaining said keeper against movement, said keeper being adapted upon displacement of said shelf to move under pressure from said biased bolt to a position releasing said bolt.

3. In a shelf-equipped refrigerator of the type having a hinged door, a safety door closure comprising a bolt mounted in said door and normally biased in a latching direction, manually operative means on said door for moving said bolt in an unlatching direction, and a keeper for said bolt on said refrigerator in contact with a shelf thereof, said keeper being adapted upon displacement of said shelf to release said bolt.

4. A safety closure for the door of a shelf-equipped refrigerator comprising: a bolt, a pair of links pivotally securing said bolt to said door, a second pair of links secured to said door, an operating roller carried by one end of said second pair of links, a third pair of links carried at one end by the end of said second pair of links carrying said operating roller, and at their opposite

ends by the end of said first-named links carrying said bolt, means associated with said operating roller to move said second and said third pair of links to a position beyond a line extending through the axis of the pivot of said second pair of links and said bolt, means biasing said bolt in a latched and safety direction, and a keeper cooperating with said bolt, said keeper normally moving said bolt to latching position upon closing of said door with said keeper cooperating with a shelf in said refrigerator whereby displacement of said shelf will release said bolt.

5. A device as claimed in claim 1, wherein said bolt is carried by link means pivoted to said door.

6. A device as claimed in claim 2, wherein said bolt is pivotally carried by a plurality of links.

7. A device as claimed in claim 1, wherein said manually operative means for moving said bolt includes a plurality of distance amplifying links secured between said bolt and said door.

8. A device as claimed in claim 2, wherein said manually operative means for moving said bolt includes a plurality of distance amplifying links secured between said bolt and said door.

9. A device as claimed in claim 3, wherein said manually operative means for moving said bolt includes a plurality of distance amplifying links secured between said bolt and said door.

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