April 24, 1962 H. L. KAPAUN ET AL 3,030,674

SEALING APPARATUS

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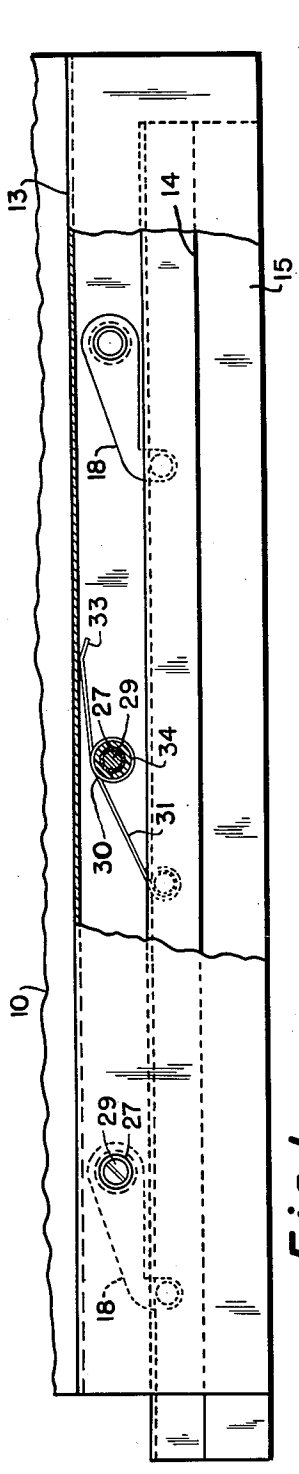


Fig. 1

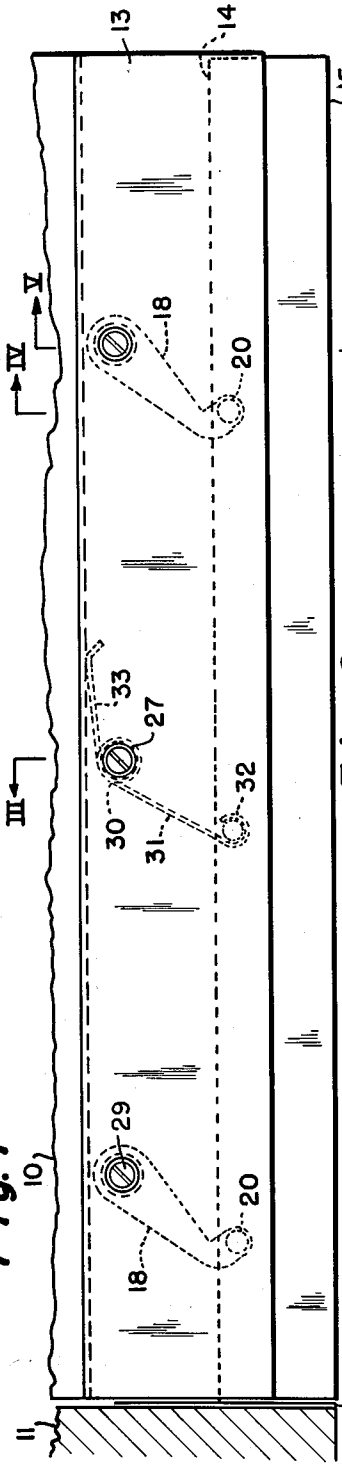


Fig. 2

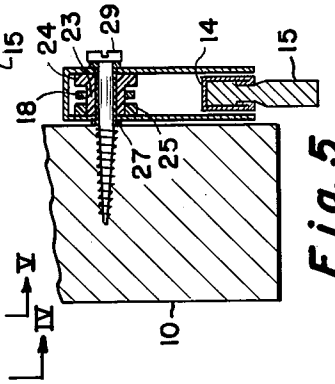


Fig. 5

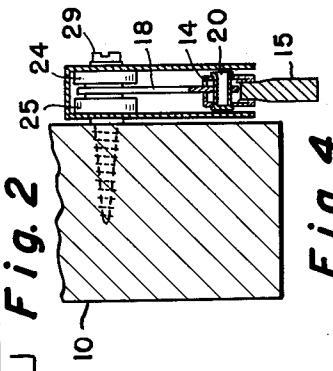


Fig. 4

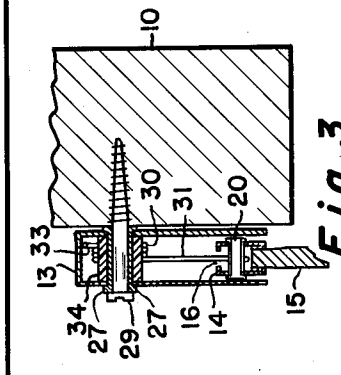


Fig. 3

INVENTORS.
Herbert L. Kapaun
Chester W. Ellingson, Jr.
BY Webb, Mackey & Burden
THEIR ATTORNEYS

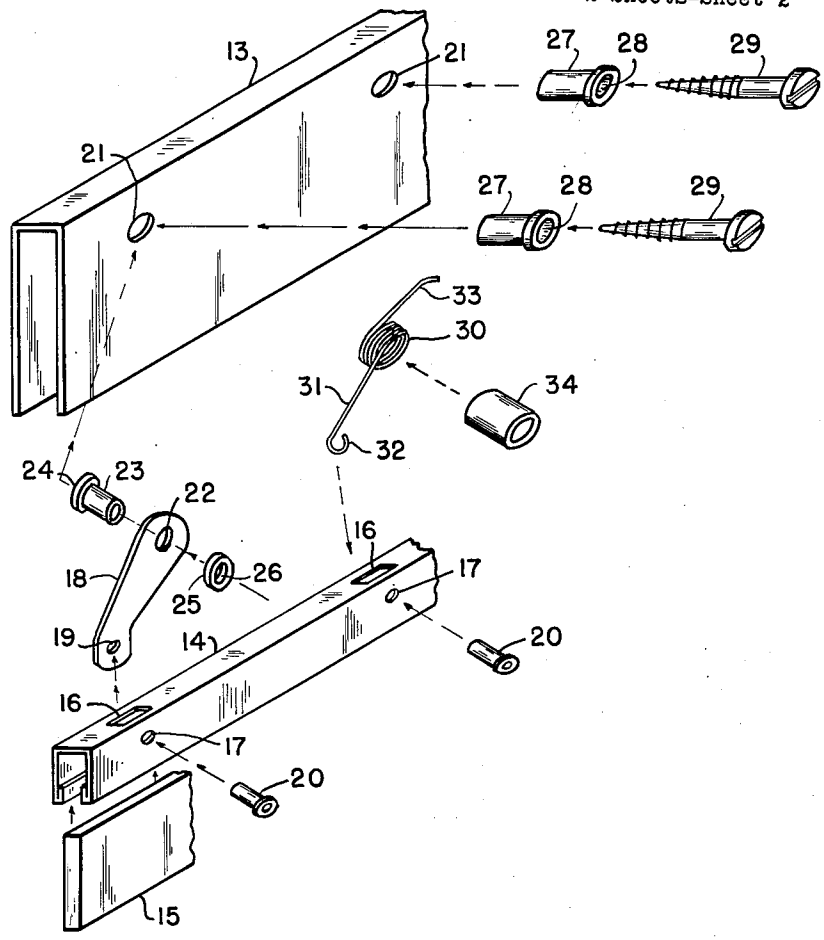
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Fig. 6



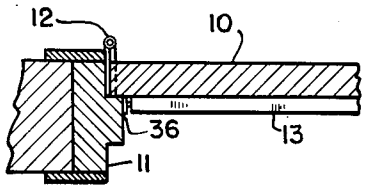


Fig. 7

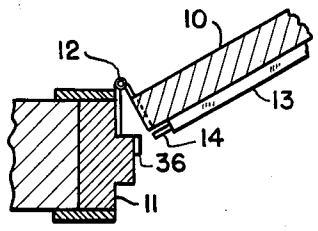


Fig. 8

INVENTORS.
Herbert L. Kapaun
Chester W. Ellingson, Jr.
BY Webb, Mackey & Burden
THEIR ATTORNEYS

United States Patent Office 3,030,674 Patented Apr. 24, 1962

3,030,674

SEALING APPARATUS

Herbert L. Kapaun, St. Louis Park, and Chester W. Ellingson, Jr., Minneapolis, Minn., assignors to Reese Metal Weather Strip Co., Minneapolis, Minn., a corporation of Minnesota

Filed Nov. 9, 1960, Ser. No. 68,294
3 Claims. (Cl. 20—68)

Our invention is directed to a sealing device for use on a closure, particularly a door or the like which is swingably mounted on vertical pins along one of its vertical edges. Our invention is mounted along the bottom edge of the door and has a sealing strip which is swung downward into engagement with the doorsill when the door is closed. Our device is simple in construction, having very few moving parts and, therefore, is extremely simple and inexpensive to manufacture. Our device is constructed such that it is freely moving in performing its sealing function at the bottom of the door and can be easily adapted to various size doors. Our device has an attractive appearance and is manufactured from materials having long life and low maintenance.

In the drawings, we have shown a present preferred embodiment of our invention in which:

FIGURE 1 is a side elevation view of our invention with the sealing strip in raised position;

FIGURE 2 is a side elevation view of our invention with the sealing strip in lowered position;

FIGURE 3 is a cross section taken on line III—III of FIGURE 2 with part of the seal being broken away;

FIGURE 4 is a cross section taken on line IV—IV of FIGURE 2;

FIGURE 5 is a cross section taken on line V—V of FIGURE 2;

FIGURE 6 is an exploded isometric of our invention;

FIGURE 7 is a horizontal cross section of our invention attached to a closed door; and

FIGURE 8 is a horizontal cross section of our invention attached to an open door.

Briefly, our invention includes a U-shaped housing which is positioned on the door with its open side downward, and a felted sealing strip or bar swingably mounted within the housing by a pair of pivotally mounted links. The felted bar moves sidewise and vertically within the housing and is biased to an upward position by a centrally located spring. The felted bar is moved sidewise and downward into engagement with the sill of the door when the door is closed by engagement of one end of the felted bar against the frame of the door when the door is closed.

Our invention is particularly adapted for use on a door **10** mounted in the conventional way in a frame **11** by hinges **12**. Our sealing device includes a U-shaped channel **13** which is positioned on the door with its open side downward, a second U-shaped channel **14**, having smaller dimensions than the first channel, is positioned within the first channel **13**. A felt bar **15** is clamped within the channel **14**. The felt bar **15** is preferably fabricated from felt but can also be fabricated from sponge rubber or other similar resilient material. The channel **14** has underturned edges on its inner face to hold the felt bar **15** securely within the channel.

The channel **14** has three slots **16** in its upper closed wall. These slots are spaced an equal distance from each other. Each of the side walls of channel **14** has three circular holes **17** located therein and one hole in each wall is in alignment with a hole in the opposite wall. Each pair of aligned holes **17** is located immediately below the slots **16** as shown in FIGURE 6.

A pair of L-shaped links **18**, each having a long upper leg and a short lower leg, swingably suspends the channel **14** inside of channel **13**. The short lower leg of each link **18** has a hole **19** therein and the width of the short lower leg is substantially less than the length of the slots **16**. The slot **16** must be of sufficient length to permit pivotal movement of the link **18** within the slot in a manner to be described hereinafter. The lower leg of each link **18** is positioned inside the channel **14** by insertion of the leg through the slot **16**. The holes **17** in the channel and the hole **19** in the leg are positioned in alignment. A rivet or eyelet **20** is inserted through the holes **17** and **19**. One end of the rivet **20** is headed and the other end is burred outward to retain the rivet within the holes and the link **18** within the slot **16**.

Each side wall of channel **13** has three equally spaced holes **21**. One hole in each wall is in alignment with a hole in the opposite wall. The long leg of each link **18** has a large hole **22** which receives a spacer-bearing or bushing including a hollow cylinder **23** having an integral, radially extending flange **24**. The cylinder **23** is inserted through the opening **22** and a retaining spacer-bearing ring **25** having a central opening **26** is slid over the outer surface of cylinder **23**. The ring **25** is snugly received on the cylinder **23** and retained in position by friction. The long arm of each link **18** having the spacer-bearing **23** and retaining ring **25** thereon is positioned inside channel **14** with the hollow portion of cylinder **23** in alignment with holes **21**. A hollow rivet or eyelet **27** is then pushed through cylinder **23** and holes **21**. One end of the hollow rivet **27** is headed and the other end is burred to retain the rivet within the holes. The rivet **27** is of sufficient size to be slidably received within the holes and cylinder. An opening **28** through the middle of the hollow rivet **27** is of sufficient size to receive a mounting screw **29** which is screwed into door **10** to maintain the sealing device in proper position upon the door **10**.

The links **18** at each end of the sealing device are constructed and mounted identically; therefore, only one is described herein.

A torsion leaf spring **30** has a tangentially and downwardly extending leg **31** with a hook **32** on its lower end which is positioned in the center slot **16** of the channel **14**. The hook **32** is aligned with the holes **17**. A rivet or eyelet **20** is positioned through the holes **17** and the hook **32** of the spring **30**. One end of the rivet is headed and the other end is burred to retain the rivet within the holes and maintain the spring hook **32** on the rivet. The spring is free to pivot about the rivet **20**. The spring **30** has numerous coils which are facing downward relative to the channel **30** as shown in FIGURE 2 and a second tangentially and upwardly extending end **33** which engages the underside of the closed side of channel **13**, as shown in FIGURE 1. The spring **30** has sufficient elasticity to bias the channel **14** to an upward sidewise position as shown in FIGURE 1. The spring is in tension even when the sealing strip is in the position shown in FIGURE 1. A hollow cylindrical spacer-bearing **34** is positioned within the coil **30** and the spring and spacer are positioned within the channel **13** with the hollow portion of cylinder **34** in alignment with the aligned holes **21** in the central portion of channel **13**. A hollow rivet or eyelet **27** is positioned within the holes **21** and the hollow of cylinder **34**. The rivet is headed on one end and burred on the other end to retain it within the holes and the cylinder **34**. A mounting screw **29** passes through the hollow portion **28** of the rivet **27** to properly mount the sealing device on the door as hereinbefore described.

A small metal strip **36** is mounted on the frame **11** of the door **10** and the left-hand end of channel **14**, as viewed in FIGURES 1 and 2, abuts against this metal

strip during closing of the door. Thereby, strip 36 prevents damage to the frame 11.

The channels 13 and 14 are preferably fabricated from aluminum, and the bushings are preferably fabricated from nylon, but any known rigid material can be used.

Channel 14 is produced from coiled aluminum strip which is shaped on a roll former into a channel that is wider at the open end than at the closed end. This channel is then cut to the desired lengths for the finished product. Slots 16 and holes 17 are punched into the channel and felt bar 15 is inserted into the channel. The felted aluminum channel is again passed through a roll former which partially closes the open side of the channel by compressing the felt bar. The links 18 are then inserted into the end slots 16 and rivets 20 placed in holes 17 and 19. The rivets are burred over to retain them in the holes. The hook 32 of spring 30 is inserted in center slot 16 and rivet 20 is placed in the aligned holes 17 and hook 32. This rivet is also burred over to retain it in the holes.

The bushings 23 and spacer 34 are positioned in their proper holes in the links and spring.

The channel 13 is roll formed from coiled, prepainted aluminum strip and cut to proper length for the finished product. Holes 21 are then punched in the channel. The links and spring attached to the assembled felted channel 14 are then inserted into channel 13. As the spring 30 is inserted into channel 13, it exerts a force against the inside of the top wall of the channel, thereby moving the felted channel up into channel 13. Hollow rivets 27 are then inserted through holes 21, bushings 23 and spacer 34. The ends of rivets 27 are flared out on an eyelet setting machine.

The device is then packaged for sale.

While we have described a present preferred embodiment of our invention, it is to be understood that it may be embodied within the scope of the following claims.

We claim:

1. A sealing device for a closure which is swingably mounted in a stationary frame; said device including a first U-shaped channel positioned on the closure substantially perpendicular to a first portion of the frame; the open side of the channel facing a second portion of the frame extending perpendicular to said first portion of the frame; a second U-shaped channel movably positioned within the first channel, the open side of the second channel facing in the same direction as the first channel; a resilient pad positioned within and affixed to the second channel; a portion of the pad extending outwardly from the second channel and engageable with said second portion of the frame to provide a seal between said second portion and a portion of the closure immediately adjacent the second portion; a pair of links positioned within said first channel, each of said links being L-shaped with a short leg and a long leg; a pair of longitudinally extending slots in the closed side of the second U-shaped channel; a short leg of each link entering the second channel through one of the slots and being pivotally affixed to the inside of the second channel; the long leg of each link being pivotally affixed inside the first channel, said links being affixed to pivot longitudinally of said first channel and to move the second channel to an extended position and a withdrawn position; said resilient pad being in sealing engagement with the stationary frame when the first channel is in said extended position; a hole in the end of each long leg, a bushing positioned in each last-mentioned hole, the bushing including a hollow cylinder having an integral, radially extending flange at one end and a removable, radially extending flange at the other end; said removable flange having a central opening which slidably engages the outer surface of the hollow cylinder; a pair of spaced holes in each downwardly directed leg of the first channel, one hole in said long leg being in transverse alignment with a pair of holes in said first channel; said bushings being positioned with the hollow of said cylinder in alignment with each pair of transversely aligned holes in the first channel; the bushings being bearings for said long legs and spacers to maintain the downwardly directed legs of the first channel in parallel relationship to each other; a hollow rivet extending through and retained in each hollow in the bushing and the aligned holes in the first channel; means positioned in the hollow of each rivet and affixed to said closure to maintain the sealing device stationary relative to the closure; a third longitudinally extending slot in the closed side of said second channel, said third slot being located midway between said pair of slots; a coil spring located within the first channel and approximately midway between said hollow rivets, one end of the spring extending tangentially of the spring and engaging the inside of the closed side of the first channel; a second end of the spring extending tangentially of the spring in a direction opposite to said one end and into the third slot of the second channel, said second end of the spring being pivotally connected inside said second channel; a third hole in each of the downwardly directed legs of the first channel; the third holes being in alignment with each other and positioned midway between the other holes in the first legs, a securing means positioned and retained in said third holes and the center portion of the coil spring, said spring normally biasing the second channel to said withdrawn position; one end of the second channel being engageable with said frame when the closure is swung relative to the frame such that the second channel moves to said extended position against the normal bias of the spring and by pivoting the links about their pivotal connections.

2. A device according to claim 1 including a hollow cylindrical spacer positioned inside the coil portion of the spring, the hollow of the spacer being in alignment with said third holes; and the securing means being positioned within the hollow and the third holes.

3. A device according to claim 1 wherein said bushings are fabricated from nylon.

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