Oct. 25, 1927.

1,646,559

E. RAY ET AL

WEATHER STRIP

Filed June 14, 1926

2 Sheets-Sheet 1

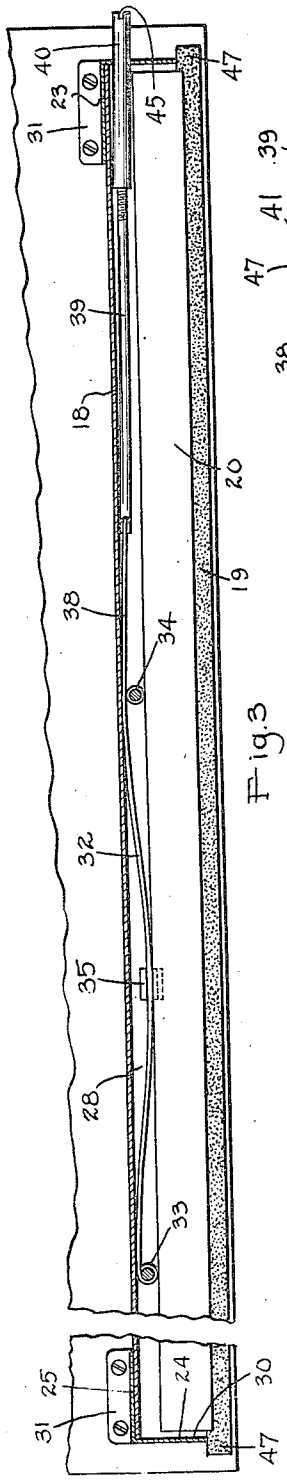


Fig. 3

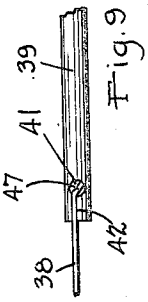


Fig. 9

Fig. 1

Fig. 8

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2 Sheets-Sheet 2

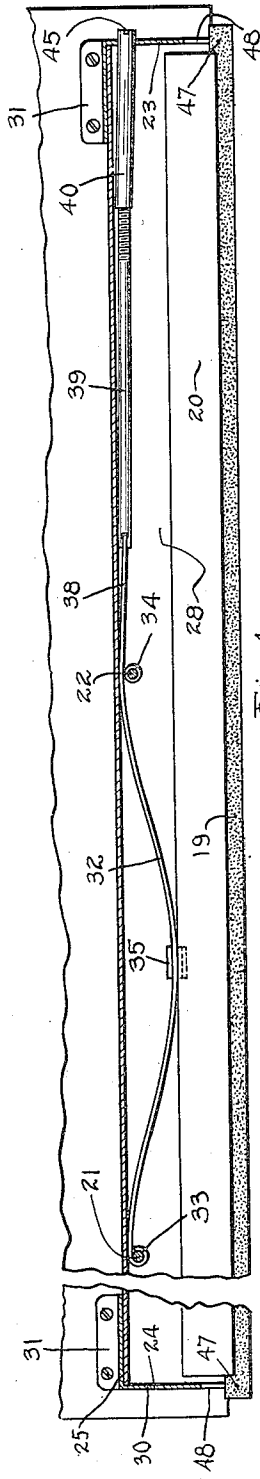


Fig. 4

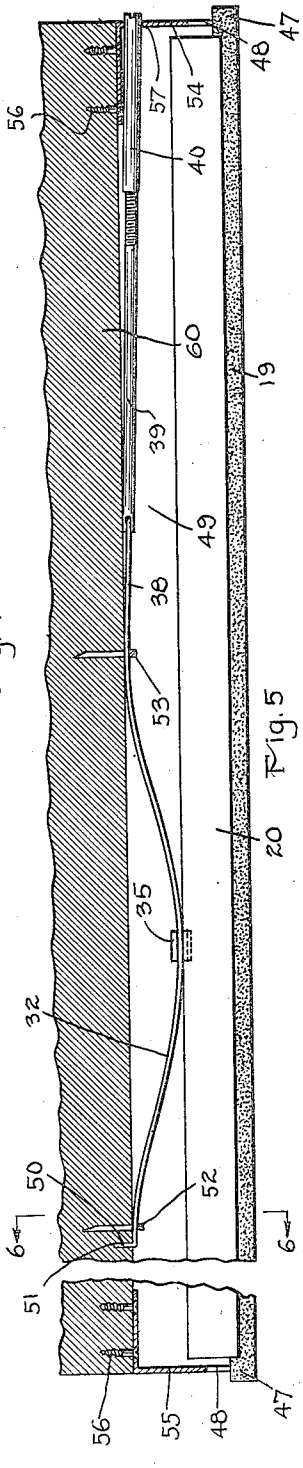


Fig. 5

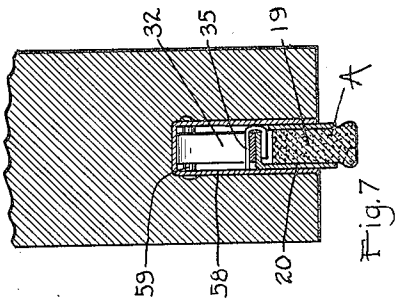


Fig. 7

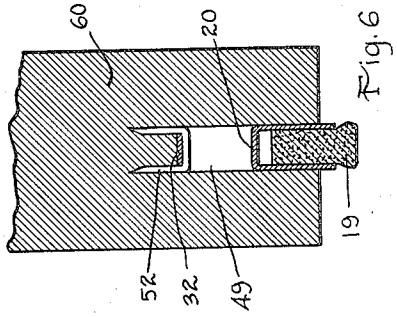


Fig. 6

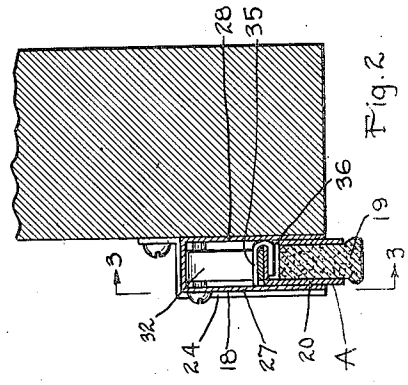


Fig. 2

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Patented Oct. 25, 1927.

1,646,559

UNITED STATES PATENT OFFICE.

EMIL RAY AND HARRY S. RAY, OF MINNEAPOLIS, MINNESOTA.

WEATHER STRIP.

Application filed June 14, 1926. Serial No. 115,873.

Our invention relates to weather strips and has for its object to produce a weather strip for use in conjunction with a closure having a groove therein, which weather strip consists of a sealing strip adapted to be retracted within said groove or ejected therefrom.

Another object of the invention resides in providing an arched spring fixed at one end withing said groove and guided for movement along the other end thereof to which said sealing strip is attached, said spring member being adapted upon movement at its movable end to retract or reject said sealing strip.

Another object of the invention resides in positioning the anchoring means for attaching the fixed end of said spring member remotely from the end of the closure groove and of similarly situating the guide for the other end of said spring member, so that said spring member may be readily adapted to different widths of closures without reconstruction.

Another object of the invention resides in arranging said spring member for longitudinal movement along the guided portion thereof, and in holding said anchored portion of said spring member parallel to said sealing strip producing reverse curves therein to effect positive ejection and retraction of said sealing strip.

A still further object of the invention resides in employing for the purpose of mounting said spring member, staples adapted to straddle the same and to hold the ends of said spring member in parallel relation to said sealing strip.

A feature of the invention resides in employing a ribbon like spring member and in attaching an ejector rod thereto, having a transversely drilled hole at one end, and a slot communicating therewith for the reception of said ribbon like spring member, the extreme end thereof being bent to become lodged in said hole.

Another feature of the invention resides in threading the end of said ejector rod and mounting thereon a plunger adapted to be screwed upon the end of said rod for adjusting the action of said weather strip, and to provide a guide for guiding the movement of said plunger.

A still further object of the invention resides in constructing said sealing strip with a U-shaped holder having a cavity therein, and of utilizing a U-shaped clip adapted to be lodged within said cavity and to straddle said spring, said clip being of a length substantially equal to the width of said groove.

With the foregoing and other objects in view, which will appear in the following description, the invention resides in the novel combination and arrangement of parts and in the details of construction hereinafter described and claimed.

In the drawings:

Fig. 1 is a perspective view of the bottom of a door and a portion of the casing associated therewith illustrating the application of our improved weather strip thereto.

Fig. 2 is a cross sectional view of the weather strip and a portion of the door taken on line 2—2 of Fig. 1, and drawn to an enlarged scale.

Fig. 3 is a longitudinal sectional view of the weather strip taken on line 3—3 of Fig. 2, and illustrating the sealing strip in retracted position, and being drawn to a somewhat smaller scale.

Fig. 4 is a view similar to Fig. 3 illustrating the sealing strip in extended position.

Fig. 5 is a view similar to Fig. 4, showing another form of the invention.

Fig. 6 is a sectional view similar to Fig. 2 taken on line 6—6 of Fig. 5.

Fig. 7 is a sectional view similar to Fig. 6 illustrating a modification of the structure shown in said figure.

Fig. 8 is a perspective view drawn to an enlarged scale of one of the end caps used with the form of the invention shown in Fig. 1.

Fig. 9 is an enlarged detailed view illustrating the manner of connecting the bolt spring to the ejector rod.

For the purpose of illustrating the application of our invention, we have shown a portion of a door jamb 10 provided with the usual casings 11 and the stop 12 extending around the interior of the same for effecting a tight closure along the edges of the door. To the jamb 10 is hingedly connected by means of hinges 13 an ordinary door 14 constructed with stiles 15 and rails 16 supporting the usual panel 17. This construction being well known in the art, forms no

feature of the invention, but has been merely shown as stated to illustrate the application of our invention thereto.

In the form of the invention shown in Fig. 1, we provide a structure which may be easily and readily attached to the lower marginal portion of the door without removal of the door from its hinges, and without rabbeting or grooving the lower edge of the door for the reception of the same. The weather strip here shown consists primarily of a U-shaped housing 18 which is open along the lower portion thereof and is formed with side walls 27 and 28 connected together with a top 29. In the lower portion of this housing is movably positioned a sealing strip indicated in its entirety at A, which consists of a felt strip 19 securely mounted in a U-shaped holder 20 of proper dimensions to readily slide within the housing 18. Housing 18 is held in position upon the lower edge of the door 14 by means of two screws 21 and 22 which pass through the upper portions of the walls 27 and 28 of said housing, and are equally spaced to either side of the center thereof, as best shown in Fig. 1. Said housing is further held in place by means of two end caps 23 and 24, of which the cap 23 is shown in detail in Fig. 8. These caps are formed with walls 25 and 26 which overlap the wall 27 and the top 29 of the housing 18, and with a wall 30 which forms an end plate for the housing 18. These portions of said cap are bent up from the body of the material from which the same is formed, and in addition thereto a flange 31 is provided by means of which the said cap may be screwed to the bottom of the door.

The length of the weather strip may be adjusted to conform to the width of the door by properly positioning the caps 23 and 24 relative to the housing 18. In this manner variations in the width of the door may be easily taken care of without requiring the cutting of the housing on the job.

Within the housing 18, as best shown in Fig. 3, is mounted an arched spring 32 constructed of flat ribbon stock, which is formed with an eye 33 at one end passing around the screw 21 previously referred to. The other end of spring 32, which is indicated at 38 is movable relative to the housing 18 and passes between the screw 34 and the top 29 of the housing 18 where the same is guided for longitudinal movement my means of a sleeve 34 rotatably mounted upon screw 22 and positioned within said housing between the walls 27 and 28 thereof. This spring carries the sealing strip A, which is supported thereon, by means of a U-shaped clip 35 which passes through an aperture 36 in the holder 20 and around the spring 32, and is situated midway between the screws 21 and 22. This clip is held from disengagement with the aperture 36 and the spring 32 due to the fact that the length of the same is substantially equal to the space between the walls 27 and 28 of housing 18.

The spring 32 which is constructed of straight stock holds the sealing strip A in retracted position as shown in Fig. 3, when the movable end 38 thereof is unrestrained, said spring when so situated being slightly arched, as illustrated in Fig. 3. Upon forcing the movable end 38 of spring 32 toward the screw 21, said spring is caused to bow downwardly ejecting the sealing strip A from within the housing 18 to its extended position, as shown in Fig. 4, causing the same to engage the door sill or floor and effect a tight closure between said door and sill. This is accomplished by means of an ejector rod 39 which is attached to the movable end 38 of spring 32, and which has mounted upon its other end a threaded plunger 40, best shown in Fig. 3. The end of the rod 39 is transversely drilled at 41 and a slot 42 cut in the end of said rod, which extends into the drilled portion 41 thereof. Said slot is of a width sufficient to receive the the end of spring 32, which, as previously stated, is preferably formed of a flat ribbon stock. The extreme marginal portion 43 of the movable end 38 of spring 32 is bent over as shown in Fig. 9, and is adapted to be lodged within the hole 41 drilled in the end of the same. Due to the relative width of the spring 32, which is but slightly less than the space between the walls 27 and 28 of housing 18, said spring is held attached to the end of the rod 39, so that the same may not be disengaged therefrom without taking the weather strip apart. Rod 40, which, as stated, is threaded to screw upon the end of 39, passes through an opening 44 formed in the wall 30 of cap 23, which serves as a guideway for allowing said plunger to reciprocate longitudinally of the housing 18.

By applying pressure to the end of plunger 40, the same is caused to force the ejector rod 39 inwardly and to further bow spring 32 so as to eject the sealing strip A from within the housing 18. Plunger 40 is provided with a screw driver slot 45 in the end thereof so that said plunger may be adjusted upon the end of ejector rod 39 to regulate the distance the sealing strip A may be ejected from its housing.

Upon the stop 12 of the door jamb 10 is secured an ordinary flat headed screw 46, which serves as a stop for engagement with the plunger 40. When the door is closed, plunger 40 is forced against screw 46 which causes the ejector rod 39 to be moved inwardly, and spring 32 to be bowed, as previously described, to eject the sealing strip A. By proper adjustment of plunger 40 and said screw 46, which if desired, may be

screwed in until flush with the surface of stop 12, the sealing strip may be ejected the required amount so that the same just comes in contact with the floor or sill when the door is completely closed. Upon opening the door, the plunger 40 is immediately released, which causes sealing strip A to be quickly retracted into the housing 18 by virtue of the resiliency of the spring 32. When in its retracted position, said sealing strip rests against the eye 33 and sleeve 34 on the screws 21 and 22, being thereby held immovable and in proper position within the housing.

For the purpose of effecting a tight closure at the lower corners of the door, felt strip 19 is caused to project outwardly beyond the ends of the holder 20, as indicated at 47 in Figs. 1 and 3, which projected portions are adapted to extend through notched recesses 48 in the walls 30 of the caps 23 and 24 when said sealing strip is in its retracted position. These protruding portions 47 of the felt strip 19 may be trimmed off to just fit snugly against the stops 12 of the door jamb 10, so that when the weather strip is in operation the same serves to effectively seal the joint between the floor and door, and preclude the passage of air therebetween. This has the decided advantage of permitting the weather strip to be adjusted to fit snugly between the stops which would otherwise be impossible where a weather strip of predetermined length was to be applied to the door structure.

If desired, our invention may be equally as well installed within a groove or recess cut in the bottom of the door instead of being attached to the exterior thereof. In Figs. 5 and 6 we have shown a method of mounting the invention when so applied to a door 60 similar to that shown in Fig. 1. For this purpose a groove 48 is cut in the bottom rail of said door proper which extends up into the same a distance equal to the height of the housing 18, which groove is of a width equal to the distance between the walls 27 and 28 of housing 18. When the invention is so mounted in the door, the housing 18 may be dispensed with, the walls of groove 49 taking the place thereof. When so mounted the sealing strip A is identical with that used in the other form of the invention and the ejecting mechanism is practically the same excepting in the manner of supporting and mounting the spring 32. In this case spring 32, instead of being formed with an eye at its fixed end, is provided with a bent portion 50 which extends into a cavity 51 formed in the rail of the door 60 at the proper location with the groove 48. A staple 52 straddles the spring 32 adjacent the portion 50 thereof, and is pounded into the door proper to hold said spring rigidly in place within said groove. A similar staple 53 takes the place of the screw 22 and is pounded into the door proper straddling said spring and forming a guideway for directing the movement of the movable end 38 of said spring. In place of the caps 23 and 24 for closing the openings of the groove 49 we employ two angle plates 54 and 55 which fit snugly within said grooves and which are secured to the door proper by means of screws 56. The plate 54 is provided with an opening 57 through which the plunger 40 extends, providing a guide-way for such plunger, the same as the opening 44 in cap 23. Excepting for these changes, the weather strip, when so constructed, functions in identically the same manner as heretofore described. It will be noted that the screw 46 forming the abutment for the plunger 40 must necessarily be attached to the jamb proper instead of the stop thereof, in order to co-act with said plunger, as illustrated. This form of the invention is exceedingly simple and completely seals the entire structure so that no disfiguration of the door occurs. At the same time the mechanism required is exceedingly simple and inexpensive, making the installation economical and practical.

Where it is desired to be able to remove the weather strip from the door, and where it is also desired to conceal the same, the structure shown in Fig. 2 may be recessed within the bottom of the door, as shown in Fig. 7. When so used, rivets 59 are employed in place of the screws 21 and 22, and angle plates 54 and 55 such as shown in Fig. 5 substituted in place of the caps 23 and 24. Otherwise the construction is the same as that previously described, and functions in the same manner.

The invention is highly meritorious in that it provides a simple and effective device for automatically effecting an air-tight closure between the bottom of a door and the sill or floor with which the door is associated. Upon commencing to open the door, the sealing strip is immediately retracted so that thereafter the door opens freely and without obstruction from said sealing strip, thereby preventing wear upon the floor or sealing strip. The sealing strip is so attached to the ejecting member, that the same may readily conform to the surface of the floor or sill irregardless of whether or not the same is parallel with or angularly disposed relative to the bottom of the door. The device may be accurately adjusted so that the proper action of the weather strip may be secured at all times and looseness occurring from wear or settling or sagging of the door may be easily compensated for. The device is exceedingly simple and is easily and quickly installed in existing door structures with but little or no alteration therein. When once installed, the device will continue to function in the desired man-

ner, due to the fact that a minimum number of parts are employed, which are so correlated as to positively effect the required purpose.

Changes in the specific form of our invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of our invention.

Having described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member within said groove, means for securing one end of said spring member in parallel relation to said sealing strip, means for holding and guiding the other end of said spring member for movement parallel to said sealing strip, means for securing said spring member at its bowed portion to said sealing strip and an ejector rod secured to the movable end of said spring member.

2. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a spring member within said groove, means for anchoring one end of said spring member to said closure, means for slidably supporting the other end of said spring member, said spring member being bent intermediate its fixed and movable ends in a pair of reverse curves, means for attaching said spring member to said sealing strip, and actuating means for engagement with the movable end of said spring member.

3. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member positioned within said groove, means for anchoring one end of said spring member to said closure at a point remote from the end of said groove, means for guiding the portion of said spring member near the opposite end thereof for longitudinal movement, said guiding means being situated symmetrically with respect to said anchoring means, means for supporting said sealing strip from said spring, and actuating means for co-operating with the movable end of said spring member.

4. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member positioned within said groove, means for anchoring one end of said spring member to said closure at a point remote from the end of said groove, means for guiding the portion of said spring member near the opposite end thereof for longitudinal movement, said guiding means being situated symmetrically with respect to said anchoring means, means for supporting said sealing strip from said spring, an ejector rod secured at one end to the movable end of said spring member projecting beyond the end of the groove in said closure, and a guide at the end of said groove for guiding the movement of said ejector rod.

5. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member positioned within said groove, said spring member having a bent portion at one end, said bent portion being lodged in said closure, a staple straddling said spring member and secured to said closure adjacent the bent end thereof, a second staple straddling said spring member near the other end thereof and secured in said closure for guiding the movement of the movable end thereof, means for supporting said sealing strip from said spring member, and actuating means associated with the movable end of said spring member.

6. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member positioned within said slot, means for anchoring one end of said spring member to said closure, means for guiding the other end of said spring member for longitudinal movement, means for supporting said sealing strip from said spring member, an ejector rod attached to said spring member at its movable end, said ejector rod being threaded at its free end, and a plunger screwed upon said threaded end of said ejector rod, projecting outwardly beyond the end of said closure, and a guide for guiding the movement of said plunger.

7. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed ribbon spring member positioned within said slot, means for anchoring one end of said spring member to said closure, means for guiding the other end of said spring member for longitudinal movement, means for supporting said sealing strip from said spring member, an ejector rod having a transverse hole drilled at one end and a slot communicating therewith for the reception of said ribbon spring member, said spring member having the extreme end thereof bent to form an angular portion lodged within said hole, and a guide for said ejector rod.

8. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member positioned within said groove, means for anchoring one end of said spring member to

said closure, means for guiding the other end of said sealing strip and a clip for supporting said sealing strip from said spring member, said clip being slidable along said spring member.

9. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, said sealing strip consisting of a U-shaped holder having a felt strip lodged therein, said holder being formed with a cavity near the center thereof, a bowed spring member positioned within said groove being attached at one end to said closure and being arranged for longitudinal movement at its other end, a U-shaped clip of a length substantially equal to the width of said slot having one leg thereof extending into said cavity and the other end thereof straddling said spring member for holding said sealing strip attached to said spring member, and actuating means for co-operating with the movable end of said spring member.

10. A weather strip for use within a groove in a closure comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, said sealing strip consisting of a U-shaped holder having a felt strip lodged therein, said felt strip having portions thereof extending beyond said holder, and end plates adapted to be secured to said closure at the ends of said grooves for enclosing said sealing strip, said end plates being formed with notches therein for the reception of the protruding ends of said felt strip.

11. A weather strip for use within a groove in a closure, comprising a sealing strip adapted to be retracted within said closure or ejected therefrom, a bowed spring member within said groove, means for anchoring one end of said spring member to said closure, means for moving the other end of said spring member toward said anchored end, means for holding the ends of said spring member in alignment throughout the movement thereof, and means for supporting said sealing strip from said spring.

In testimony whereof we have affixed our signatures to this specification.

EMIL RAY.
HARRY S. RAY.