

Aug. 25, 1942.

R. W. TRIPP

2,294,101

DOOR SEALING STRIP

Filed Oct. 19, 1940

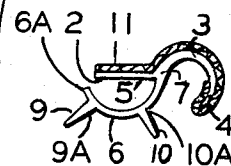
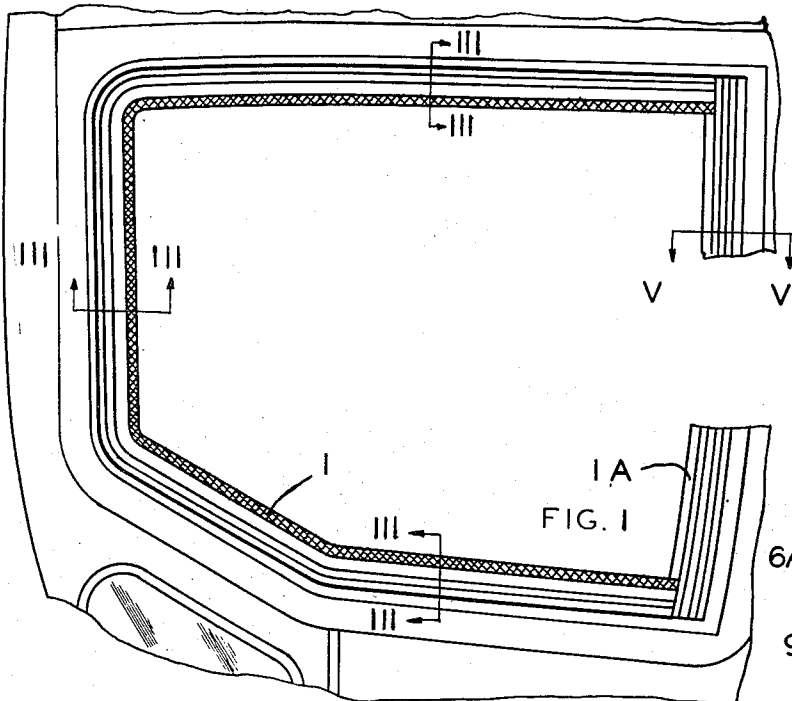


FIG. 2

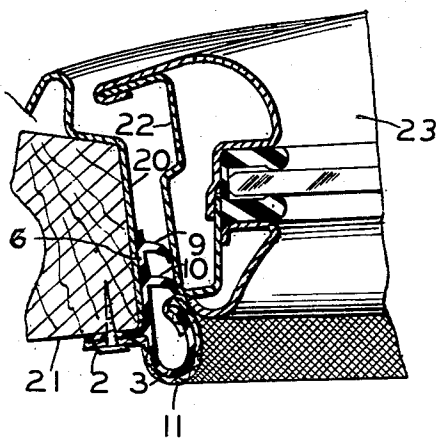
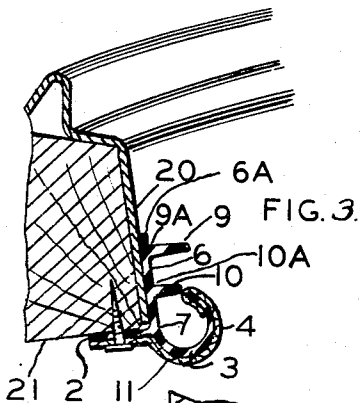


FIG. 4.

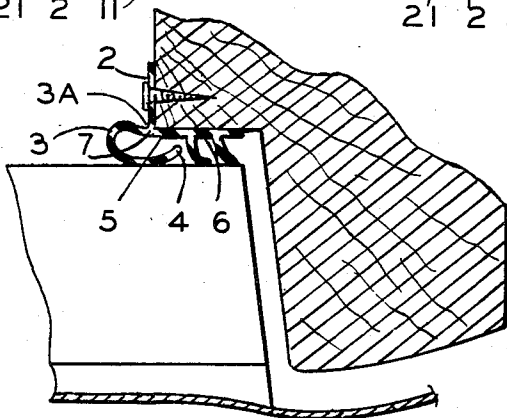


FIG. 5.

ROBERT W. TRIPP

INVENTOR.

BY *Robert E. Woodhams*

ATTORNEY.

UNITED STATES PATENT OFFICE

2,294,101

DOOR SEALING STRIP

Robert W. Tripp, Hudson, Mich.

Application October 19, 1940, Serial No. 361,958

7 Claims. (Cl. 20—69)

This invention relates to a door seal and weatherstrip as used on the doors of vehicle bodies.

The primary object of the present invention is to provide a door seal which is readily attachable to the door opening of a vehicle body and which provides an efficient and durable shield against the entry of wind, water and dirt.

Another purpose of the present invention is to provide a door seal which does not require exactly uniform distance between the door surfaces and door opening surfaces, but which will adjust itself to compensate for any of the ordinary small variations in said distance which inevitably arise in the usual manufacture thereof.

Another purpose of the present invention is to provide a door seal which will eliminate the condensation of moisture between the door surfaces and the door opening surfaces and the consequent rusting thereof.

A further object of this invention is to provide a door seal for vehicle bodies which has all of the above named desirable characteristics and yet which may be inexpensively manufactured and easily and rapidly applied to any vehicle body door.

There is following a disclosure of a specific embodiment of my invention, the application upon which is a continuation in part of my application for door sealing strip filed February 9, 1940, under Serial No. 318,011 of the series of 1935.

The disclosed door sealing strip has a base which is fastened in any conventional and convenient manner to the inner part of the door opening surface of the vehicle body, and said base bears extensions which are so arranged as to engage the door surfaces in close, sealing relationship when the door is placed in a closed position. This weatherstripping in the form herein disclosed is simple to manufacture, and because it is composed of only one piece and said piece is flexible, it is simple to apply to the vehicle door opening in position to be engaged by the door.

It will be apparent that my invention may be applied in practice in various specific forms and that, accordingly, any of such forms will be included within the hereinafter appended claims unless said claims are otherwise specifically limited; and, therefore, the herein disclosed form is intended as an example only of a certain specific embodiment of my invention, and is not intended to illustrate the only way in which that invention may be practiced. Various modified forms of this embodiment will be apparent to

any one skilled in the art upon examination of the within disclosure.

Further benefits and advantages in addition to those above named will be apparent from the following detailed description which is to be taken in connection with the accompanying drawing.

In the drawing:

Figure 1 represents the door opening in an ordinary automobile door.

Figure 2 represents an end view of an uninstalled piece of weatherstrip.

Figure 3 represents a cross-section taken on any of the lines III—III of Figure 1 and showing the manner of application of the said weatherstrip to the door opening.

Figure 4 is a similar section with a portion of the door, likewise shown in section, in closed position and showing the manner in which the weatherstrip is distorted thereby.

Figure 5 is a cross-section taken on the line V—V of Figure 1 and showing the manner of applying the weatherstrip to the door sill and also showing the door in closed position.

It has been found in the manufacture of automobile bodies that the presently used methods of weatherstripping said bodies around the door openings are only partially satisfactory at best. In the methods in present use there exists the dilemma of either requiring such exactness in aligning the doors to a close fit as to be impractical in commercial mass production, or the tolerating of excessive wear upon the weatherstripping at some points and permitting gaping between the door and weatherstripping at other points. There exists also the difficulty in the present practice of placing a more or less rounded rubber strip near the outer part of the door which difficulty manifests itself by the freezing of the rubber to the door in cold weather, and of the softening and sticking to the door in hot weather, by either of which when the door is opened the rubber is torn apart. By placing all parts of my seal on the inner side of the vehicle body and door, I have succeeded in minimizing this wide variation in temperatures and have accordingly minimized the consequent above mentioned results thereof, and have in addition succeeded in securing an effective double seal between the door and vehicle body. This seal comprises a rubber strip molded as shown in the drawing and hereinafter described in detail which is placed on the inner side of the space between the door and door opening surface. This strip may be applied rapidly and effectively, compensates itself naturally for any ordinary door misalignment

and provides a durable and weather tight seal under all conditions.

Referring to the drawing, Figure 1 shows the door opening in an ordinary automobile body, with the sealing strip 1 in place. The material of said strip should be resilient and elastic and capable of being molded or extruded. I have found molded or extruded rubber to be satisfactory.

Figure 2 shows a cross-section of the form of the strip which is the hereinafter described embodiment. Inasmuch as the strip is of constant cross-section throughout its length, it will be convenient to examine and describe its structure and method of use by reference to its cross-section. It will be noticed that this constancy of cross-sections makes for economy in manufacture and ease of application. Yet, the strip will be seen to provide within itself sufficient adaptability to compensate for any ordinary or likely door misalignment.

Referring to Figure 2, the said seal strip has a member 2 of convenient thickness and length for tacking or otherwise fastening the strip to the inside of the automobile or vehicle body at a point adjacent the door opening. This member 2 will hereinafter be referred to as the "fastening part." Blending smoothly and roundly into the fastening part 2, is an arcuate portion 3, which may for convenience be referred to as "inner sealing member" which gradually diminishes in thickness from adjacent point 7 which is nearly twice the thickness of part 2 to the tip 4 which is approximately the thickness of part 2. Said arcuate portion 3 is constructed and arranged to extend from the fastening part 2 as described smoothly and roundly in a direction inward of the vehicle body to which said strip is to be applied as hereinafter set forth and then curves circularly to extend outwardly of said body to a point substantially beyond or outward of the plane surface 5 projected. Tip 4 thereof then curves backward somewhat toward the hereinafter mentioned member 6 but in the form shown does not reach the same. This curve should be smooth but not necessarily of constant radius. By this construction, the tip 4 of said arcuate member 3, in its normal position extends outwardly of the plane occupied by the inner surface of the door when closed as shown in Figure 4, so that when said door closes, the said tip 4 is crumpled inward and deformed from its normal position as shown in Figure 5.

At approximately the intersection of members 2 and 3, namely point 7, the portion 6 which hereinafter may be called the outer sealing member, leads off in the direction of the open side of the arc of member 3, and at an angle at point 7 with member 2 which is slightly less than the angle between the door opening surface 20, and the inner surface 21 of the vehicle body. From point 7, member 6 extends in an arc of constantly diminishing radius for an arcuate distance of approximately one-half or one-third of the width of the door opening surface to which the sealing member is to be applied. Member 6 may be of the same thickness throughout or, at point 7, member 6 may be of approximately the thickness of member 2 and from there it may progressively diminish to point 6A where its thickness is approximately one-half the thickness of member 2. By thus starting member 6 at point 7 at an angle with member 2 only slightly less than 90° and curving it from there constantly toward member 2; said member 6 is, when placed upon a door

opening surface whose angle with the inner surface of the vehicle body is approximately 90°, distorted outwardly a substantial distance out of its normal position and will lie with a considerable pressure against the door opening surface to insure a tight fit thereagainst and compensate within itself for any irregularities which may be in the door opening surface.

Members 9 and 10, which may be referred to as the fins, stand up from member 6 from selected points thereon. In the embodiment herein described, there are two such members and they lead off from point 10—A, which is near the middle of member 6, and point 9—A which is about one-third of the distance from tip 6—A to point 10—A. The exact location however of points 9—A and 10—A may be altered freely without going beyond the scope of this invention. Members 9 and 10 are, at points 9—A and 10—A respectively, of approximately the thickness of member 6 at points 9—A and 10—A respectively and they taper from such thicknesses progressively to tips of approximately one-third of said respective thicknesses. Members 9 and 10 should stand out from member 6 distances of approximately twice that of the normal clearance between the vehicle door surface 22 and the door opening surface 20 of such vehicle, but need not be equal to each other. In this way the vehicle body door can be considerably out of the proper alignment with the door opening surface and still be securely sealed by said members 9 and 10.

Fabric 11 may be placed around members 2 and 3 for the sake of appearance and is applied in any convenient manner, as shown in Figures 2, 3 and 4. However, it is probably desirable to omit the fabric from the portion at the bottom of the door opening, as shown in Figure 5, and at 1—A in Figure 1.

In use, the fastening part 2 is tacked or otherwise secured to the inner part 21 of the automobile body adjacent the door opening so that the outer sealing member 6 tightly engages the door opening surface 20 of said body. Thus, both the inner sealing member 3 and fin members 9 and 10 extend into the door opening space, in a position to engage the door when the same is placed in its closed position. This situation is shown in Figure 3. The distortion of outer sealing member 6 from its normal position (Fig. 2) causes it to press tightly against surface 20. When the door closes, the situation becomes as shown in Figure 5. Door 23 has closed and has respectively engaged fin members 9 and 10 and tip 4 of the inner sealing member 3. By this engagement, said sealing portions are deflected out of their normal position and accordingly, by the resiliency of the material used, said sealing portions exert a pressure upon the door portion to provide a weather tight seal, which in this embodiment provides sealing points in three places. It may be provided that the fin members 9 and 10 lie in a plane whose angle is slightly acute to the line of travel of the door when closing, and thus increase the distortion of the said members 9 and 10 out of their normal position to exert still more pressure against the door surface.

It will be noticed that the herein disclosed embodiment of the door seal presents a combination between a butt seal (against the inner seal 3), and a shear seal (against fins 9 and 10). By this combination, considerable variation is permitted between door and door open-

ing and still assures a tight fit between the door and the seal.

It will be noted also that in this form, the rounded portion of member 3 presents on the inside of the vehicle body the neat and attractive appearance which is now secured by the use of the conventional wind cord. Hence, by the use of this sealing member, the vehicle body loses nothing in the way of appearance and gains an additional sealing member between the door and the door surface. Thus the need for a seal near the outer surface of the vehicle body is eliminated and the process of applying the wind cord and the weatherstripping to the vehicle body door opening is reduced to one operation instead of the present two operations, which desirable advantage is in addition to the securing of a seal having the other desirable characteristics mentioned above.

It will be noted also that the curve of member 6 is not precise, but the same may be varied according to the resiliency of the rubber used and the amount of pressure desired by member 6 against the door opening surface. Likewise, the fin members may be varied in size and position and angle of placing, according to the size and type of door used and the amount of expense which it is feasible to put into weatherstripping for such door. Such variations, however, should not deprive the fin members 9 and 10, or their counterparts, of substantial pressure against the door when the same is in closed position and the outward extent of the fin members 9 and 10 or their counterparts should, where the door is subject to some misalignment with the door opening, be kept at substantially more than the normal clearance between the door and the door opening in order that there be an ample amount in the extent of the outer sealing members to take up ordinary door misalignment.

Although specific embodiments of the present invention are shown in the accompanying drawing and described in the foregoing specification, it will be apparent that various other modifications and changes in addition to those suggested above, may be made in the various parts and features of the structure, and, accordingly, it will be understood that formal changes may be made in the specific embodiment of the invention herein disclosed without departing from the spirit or substance of the broad invention whose scope is commensurate with the appended claims.

Having thus fully described my invention, what I claim as new is:

1. A weatherstrip for a door of a vehicle body comprising a continuous strip of a resilient and elastic material, having a cross-section which is uniform at all points along its length and including in said cross-section an extended fastening portion to be affixed to a part of said vehicle body adjacent a door opening; an inner sealing portion molded therewith at one end thereof and extending in a direction away from the free end of said fastening portion circularly to a point spaced in one direction from a plane located within said fastening part and parallel to a surface thereof and thence extending further circularly in the opposite direction relative to said plane and continuing circularly toward said fastening part but terminating at a point spaced from same, an outer sealing member starting from the point of meeting between said fastening part and said inner sealing member and extending in the second above named direction

relative to said plane at substantially a right angle with said fastening part and thence progressing in an arc toward the free end of said fastening part an arcuate distance approximately equal to one-half of the width of the door opening surface to which said weather strip is to be applied, a plurality of fins upon said body part in position at substantially a right angle to said outer sealing member at the base of each of said fins and extending a distance away from said outer sealing member approximately twice that of the normal clearance between the door and the door opening surface with which said weather stripping is to be used.

2. An article of manufacture for sealing the door of a vehicle body, comprising a strip of molded rubber of uniform cross-section having a fastening portion adapted to lie flatly against the inner part of the vehicle body adjacent the door opening; inner and outer sealing portions together describing an S-curve attached near the mid-point thereof to one end of said fastening part; said inner sealing portion extending from said fastening portion oppositely to the free end thereof and progressing arcuately through more than 180°; said outer sealing portion being a smoothly curved member commencing near the juncture of the said fastening portion and the said inner sealing portion and in its normal position lying within a right angle having one leg thereof lying within said fastening part and the apex thereof lying at the above mentioned point of juncture; further members on said body part comprising fins attached thereto.

3. An article of manufacture for sealing a metallic door within a door-opening therefore, comprising: an inner sealing member and an outer sealing member together describing substantially an S-curve; a fastening member affixed at one end thereof to said S-curve near the midpoint of said S-curve and lying in a plane which plane extended passes in relatively close proximity to the extremity of the portion of said S-curve representing the outer sealing member.

4. An article of manufacture for sealing a door, comprising a strip of resilient material presenting in cross-section: an inner sealing member and an outer sealing member together describing an S-curve wherein the portion of said S-curve representing the outer sealing member is of uniform thickness and a portion of said S-curve representing the inner sealing member is of a thickness constantly diminishing from a point near the midpoint of said S-curve to the extremity of the portion thereof representing the inner sealing member; a fastening member affixed at one end thereof to said point on said S-curve and said fastening member lying in a plane which plane intersects the free end extended of said outer sealing member.

5. An article of manufacture for sealing a door comprising a strip of resilient material presenting in cross-section: an inner sealing member and an outer sealing member describing together an S-curve wherein the portion of said S-curve representing the outer sealing member curves on a radius relatively larger than the portion of said S-curve representing the inner sealing member; a fastening member affixed at one end thereof to a point near the midpoint of said S-curve and extending to a point in relatively close proximity to the extremity of said outer sealing member.

6. An article of manufacture for sealing a door

comprising a strip of resilient material presenting in cross-section: an inner sealing member and an outer sealing member describing together an S-curve wherein the portion of said S-curve representing the outer sealing member curves through less than 180° of arc and the portion of said S-curve representing the inner sealing member curves through more than 180° of arc; and a fastening member affixed at one end thereof to a point near the midpoint of said S-curve and extending to a point in close prox-

imity to the extremity of the outer sealing member.

7. An article of manufacture for sealing a door comprising a strip of resilient material presenting in cross-section: an inner sealing member and an outer sealing member describing together an S-curve; a fastening member affixed at one end thereof to a point near the midpoint of said S-curve and extending substantially perpendicularly therefrom.

ROBERT W. TRIPP.