Dec. 2, 1930. A. OLSON 1,783,305

ROLLER WEATHERSTRIP FOR DOORS

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Fig. 1

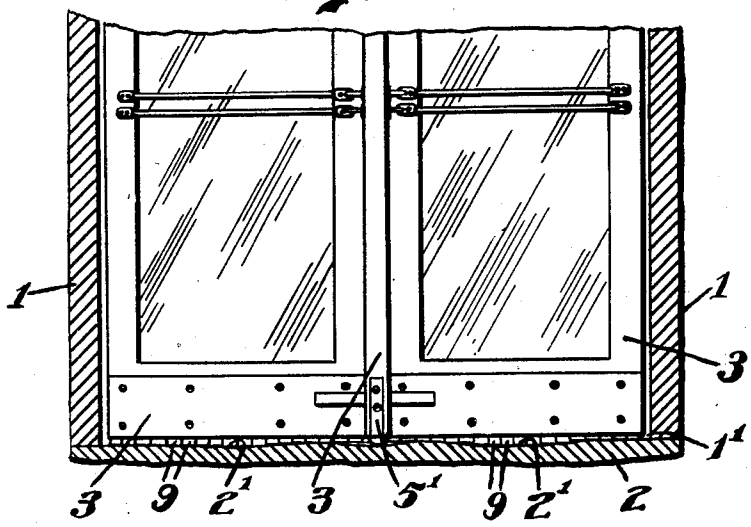
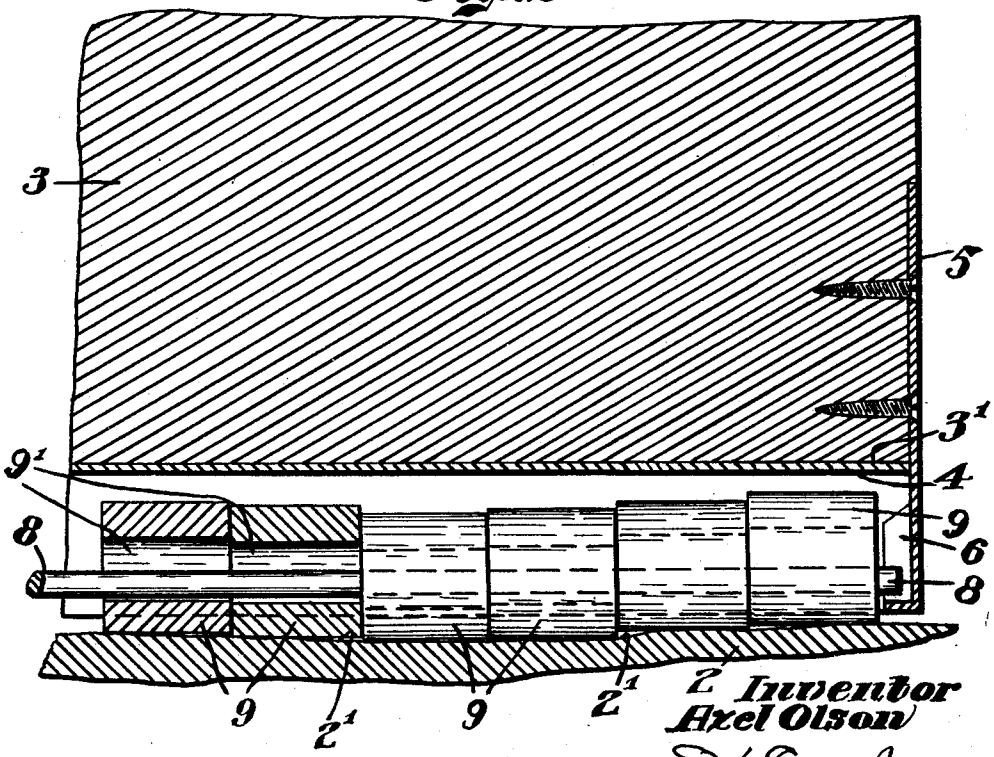


Fig. 2



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Fig. 3

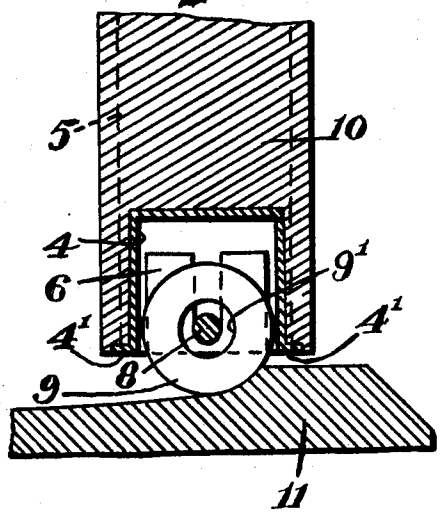


Fig. 4

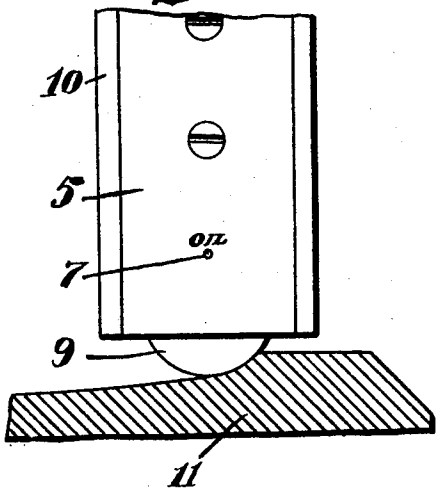


Fig. 5

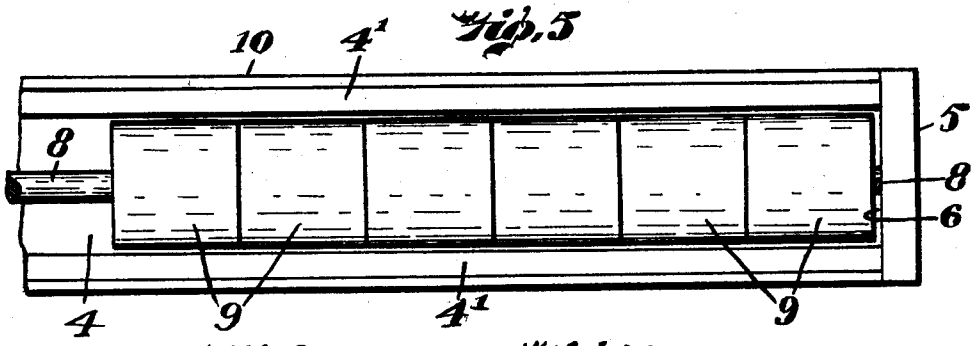


Fig. 6

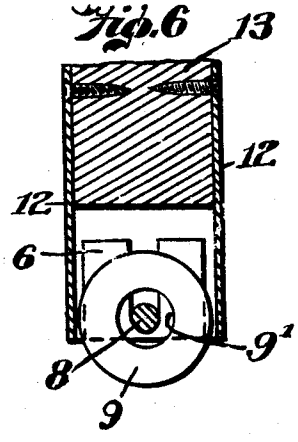
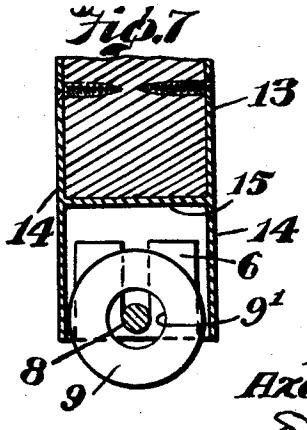


Fig. 7



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UNITED STATES PATENT OFFICE

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ROLLER WEATHER STRIP FOR DOORS

Application filed March 18, 1929. Serial No. 347,978.

In the draught proofing of modern door structures and particularly in revolving and swinging doors in much used entrances, there has developed the very serious problem due to the wear of threshold or floor. This is particularly observable in public buildings where very obvious depressions are worn. These worn places are by the very presence of the door strongly localized just under the normal position of the door when closed, and are particularly troublesome in the case of revolving doors where the doors come to rest at different positions at different times.

The problem is generally an old one, but highly aggravated by modern conditions. Various attempts have been made in the past to solve the general problem, and in fact, the art shows a considerable development in the roller type of weather strip which is a logical basis of treatment for such problems.

My present invention contemplates a weather strip of the old roller type and in fact combines several features individually old in the art, but does so in such a way as to produce a simple automatic roller weather strip capable of easy installation in either swinging or revolving doors and capable of meeting the various types and conditions of floor or sill wear even in their extreme instances.

As illustrative of my invention I have shown in the accompanying drawing a roller strip of great simplicity and practical utility and have illustrated this in both revolving door and swinging door installations. Throughout the specification and drawings like reference characters are employed to indicate corresponding parts, and in the drawings:

Fig. 1 is an elevation of a lower part of a swinging door with the casing broken away and the floor sections.

Fig. 2 is a partly sectioned fragment of the lower part of a door equipped in accordance with my invention.

Fig. 3 is a vertical section through such an installation in a swinging door with door sill.

Fig. 4 is an end view of such a portion of a door and sill in section.

Fig. 5 a bottom view of a portion of such a door.

Fig. 6 a section of door and adjacent floor in a revolving door installation, and

Fig. 7 is a further modification of the same.

Referring to Fig. 1 which illustrates the lower part of a revolving door having its casing 1 broken away to expose the door, I have indicated at 2 a portion of floor surface sectioned to illustrate depressions 2^1 such as are frequently worn within the enclosure 1 and in the general path of the swinging doors. The doors I have indicated generally as at 3, these revolving in the usual manner on a central axis.

The problem of the depressions 2^1 is illustrated more clearly in the section in Fig. 2 and in this figure I have shown partly in elevation and partly in section a portion of my roller weather strip. This is installed in a recess 3^1 usually cut as a channel in the bottom edge of the door, the channel being preferably lined by a galvanized iron housing 4 which is preferably turned outwardly toward the edge of the door as at 4^1 and secured conveniently thereto. The ends of the channels are closed by plates 5. On the inner face of the plate 5 and projecting slightly within the channel is a bearing 6 and an oil hole 7 may be provided through the plate 5 so that this bearing can be lubricated.

Loosely mounted in this bearing 6 are the ends of a rod 8 extending through the channel and on the rod 8 are mounted a plurality of rollers 9. These rollers 9 are preferably of hard rubber or like material having a bore 9^1 considerably larger than the diameter of the rod 8 so that each roller is free to move on the rod and the rod in turn free to move in the bearing 6. The rod and rollers so mounted constitute a gravity strip each unit 9 being free to rotate at its own speed so that there is no drag due to the distance from the point of pivot or swing of the door. Furthermore, each roller unit 9 is free to find its bearing on the floor or threshold so that individually on the rod 8 and as a whole with the rod 8 the rollers can accommodate them-

selves each to the surface of its own orbit or path.

In Fig. 3 I have illustrated the section of a door 10 of the swinging type having a threshold 11. In this I have indicated the galvanized housing 4 which appears in section. The bearing 6 is also shown in section, and in Fig. 4 which is an edge elevation of such a swinging door the plate 5 is shown in elevation.

In Fig. 5 I have illustrated the bottom edge of such a door and from this it can be seen how easily my roller weather strip may be installed and repairs or replacements made if required. My rollers come preferably in inch length sections so that any stock door can be fitted, the rod 8 being simply cut off the right length and the rollers strung on to fill it.

In Fig. 6 I have shown a further modification of installation. In this a kick plate 12 is used on a door 13 and in this instance no channel is required as the door 13 and the plate 12 overlap to form the roller channel.

In Fig. 7 I have shown a still further modification in which I have provided a housing which consists of two side members 14 and a cross member 15. The side members 14 may be made of any length so as to constitute kick plates which can be overlapped on the door 13 cut back as shown in Fig. 6, the lower part constituting the roller channel as indicated.

These and various other modifications illustrate the principles of my invention. While the devices shown are illustrative, they do represent a very simple and very satisfactory solution of this old outstanding problem. My roller weather strip is not only inexpensive and simple, but is very quickly and easily installed and is entirely automatic and self-compensating as it acts by gravity and provides for a free and independent rotating movement for the full width of the door.

I am advised that roller weather strips have been proposed and that it has been proposed to make such a roller in sections and to make such sections individually yieldable, but that such structures involved spring pressures and did not permit a free gravity play of the parts. It will be noted that in accordance with my invention not only does the whole roller assembly ride freely by gravity, but that each roller unit is free by gravity to follow the irregularities of its own path by free movement relative to the rest. The importance of these combined motions is at once apparent because while the whole roller series is free to rise and fall as in meeting a common obstacle, each unit follows the lesser irregularities peculiar to its own path and does so at its own speed of rotation without drag or wear. These principles together with the structural improvement constitute the more important aspects of my invention.

In conclusion I might say that while the operation of my device will be apparent from the foregoing description taken with the drawings, there are certain features of its operation which are somewhat subtle and might be herein remarked to advantage. As will be apparent from the study of the worn depressions in any floor or threshold, it will be noted that these depressions are usually elongated in the line of travel of entrance and exit. On the other hand, the path of travel of any given point on a swinging door and markedly so on a revolving door is in an arc or in a circle. Where these circles cut the area of depression the roller has to make contact with what might be called a warped surface. By this I mean that the path is not one of direct ascent and descent or uphill and down, but is an inclined path.

My invention as will be seen meets this by permitting the roller to have freedom not only to rise and fall with reference to the rod, but to permit it to accommodate itself slightly to meet the requirements of combined inclinations of its path. Furthermore as my rollers are gravity pressed, there is no particular compression on any part of the individual rollers and hence no lateral expansion which would cause binding and destroy the freedom of each roller to rotate independently of the rest.

What I therefore claim and desire to secure by Letters Patent is:—

In combination, a door having a bottom edge channel, bearings at the ends of said channel, a rod extending from end to end of said channel and mounted at its ends in said bearings, and a series of rollers mounted on said rod in end to end relation and having a collective length substantially equal to the length of said channel, said rod being mounted in said bearings for free vertical movement to permit the series of rollers to move vertically independently of any vertical movement of the rollers relative to the rod, and each roller having a rod receiving bore of materially greater diameter than the rod to permit individual vertical movement of the rollers relative to the rod.

In testimony whereof I affix my signature.

AXEL OLSON.