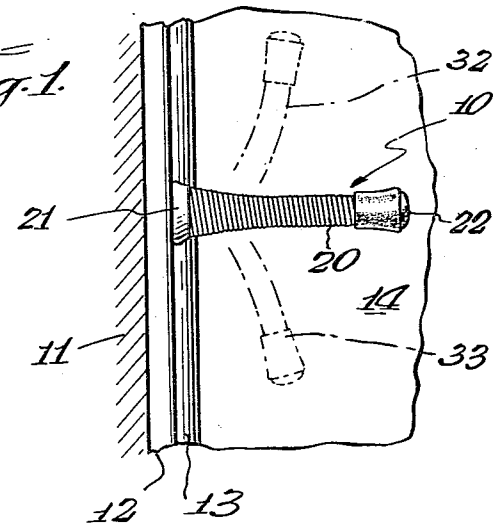
Sept. 10, 1957 L. REDER 2,805,441

FLEXIBLE DOOR STOP

Filed Oct. 26, 1954

Fig. 1.



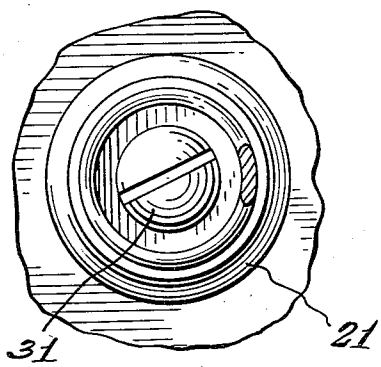


Fig. 4.

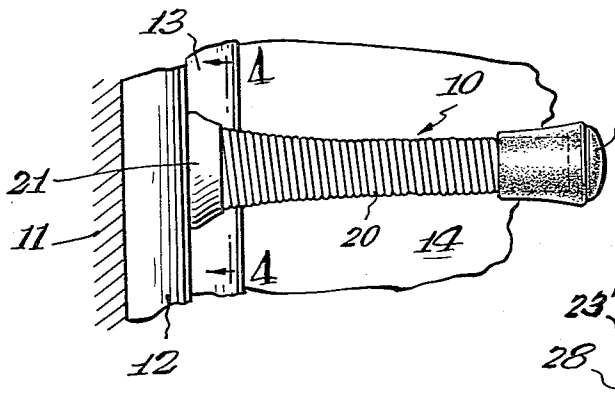


Fig. 2.

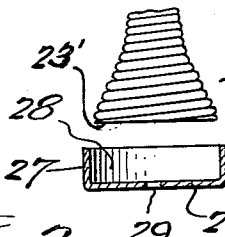


Fig. 5.

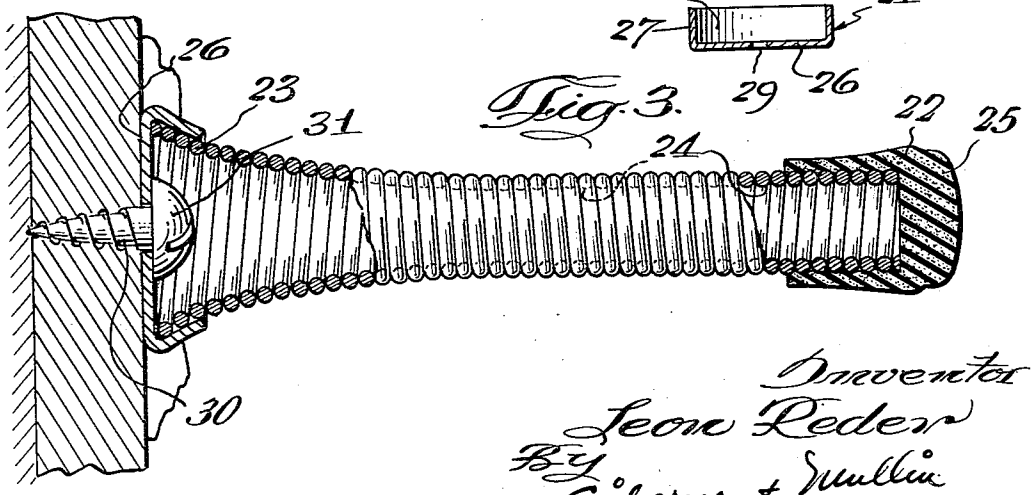


Fig. 3.

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FLEXIBLE DOOR STOP

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Application October 26, 1954, Serial No. 464,359

4 Claims. (Cl. 16—85)

This invention relates generally to door stops and more particularly, is concerned with a door stop adapted for securement to a wall or other supporting surface cushioning or limiting the movement of a door.

This invention constitutes an improvement over the construction of the door stop described in my co-pending application, Serial No. 438,711 filed June 23, 1954 and now abandoned for Flexible Door Stop. As described in said co-pending application, the door stop was substantially rigid or non-yielding when an axial force was applied to an end thereof, but was flexible when any other force was applied thereto. Same comprised a spring of elongate formation secured at one end thereof to a moulded base member, the base member being attachable to the baseboard of a wall by means of a screw. Access to the head of the screw for securing the base member to the baseboard was had through the central passageway in the spring and a removable cushioning cap or tip was provided for the opposite end of the spring. Other features and advantages of said door stop were described in detail, but insofar as the invention herein described is concerned, the improvement resides in the novel and improved form of base member for the spring.

In the said co-pending application, the base member could be formed of some readily workable metal, such as lead or white metal, of any of the die casting alloys or of suitable plastics. Same was moulded to shape, an end of the spring member being inserted into the mould and the material of the base either poured or injected into the mold and engulfing several of the end coils. In order to prevent the spring from being pulled out of the base or unscrewed forcibly, at least one lateral offset extension of the secured end of the spring was provided which could take several forms. Without deprecating any of the advantages of the door stop of the co-pending application, certain less desirable features thereof were recognized. The cost of moulding contributed to a higher price of the door stop although the article was more economical than heretofore believed to have been made. Also, during the moulding of the base member, the heat of the molten base material employed of necessity affected the temper of the spring metal in some measure thereby preventing the greatest strength for said spring to be obtained. This had a tendency to weaken the union between the base and spring to some degree. Accordingly, it is a principal object of this invention to provide a flexible door stop of the character described which while accomplishing all of the advantages ascribed to the structure of said co-pending application will have none of the less desirable features discussed hereinabove.

It is another important object of the invention to provide a door stop of the character described in which the spring member is secured to a novel rigid base comprising a metallic washer member of dished-out formation capable of being stamped to shape in a single operation and thereafter assembled to the spring member by peening or swaging portions of the washer member over an

end of the spring, said washer member having an opening therein through which a simple screw may be screwed into the wall for mounting the door stop to the wall and said spring having a central passageway through which access to the screw for mounting the door stop may be had from the opposite end of the spring.

Other objects of the invention are to provide a novel base member for a door stop of the character described which decreases measurably the cost of the door stop, which may be mounted on an end of the spring member without in any way decreasing the strength of the spring, which is substantially simpler to assemble on said spring and which is durable.

Another object of the invention is to provide a base member for a door stop of the character described which does not necessitate the use of lateral offset extensions or any other additional structure on the end of the spring member to which same is to be secured.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel features of construction, arrangement and a combination of parts hereinafter fully described, illustrated in the accompanying drawing, and particularly pointed out in the appended claims, it being understood that various changes in the forms, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of this invention, there is illustrated in the accompanying drawing a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, this invention, its mode of construction, assembly and operation, and many of its advantages should be readily understood and appreciated.

Referring to the drawing in which the same characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawing:

Fig. 1 is a plan view of the door stop embodying the invention secured to a wall, the normal position thereof being shown in solid outline and illustrative positions capable of being taken thereby when lateral forces are applied thereto shown in phantom outline.

Fig. 2 is a similar view of my door stop on an enlarged scale.

Fig. 3 is an elevational view on a greatly enlarged scale and partially broken away to expose the interior of the base member and cap of the door stop.

Fig. 4 is a sectional view taken through the door stop along the line 4—4 of Fig. 2 and in the direction indicated by the arrows on this line.

Fig. 5 is a diagrammatic exploded view showing the manner in which the base member is assembled to the spring.

Referring to the drawing, the door stop embodying the invention is designated generally **10** and is shown secured to a wall **11** located adjacent a door (not shown) and against which the door ordinarily would swing unless prevented from doing so. Where wall **11** is made of plaster or the like, same may be provided with a baseboard **12** and a moulding strip **13** at the meeting of floor **14** and said wall. This illustrative arrangement may be changed since door stop **10** may also be secured to the wall proper, to the baseboard or any abutment rising from the floor in the path of the swinging door.

Doorstop **10** is comprised of a resilient spring member **20**, a base member **21** and a cushion cap or tip **22**. The parts are assembled with an end of the spring **20** engaged by the base member **21** and the cushion tip **22** removably secured over the free end of the spring so as to permit access to the interior of the spring. The base member **21**

is secured to baseboard 12 with the spring projecting horizontally therefrom spacing the tip 22 from said wall for engagement with the swinging door.

Spring member 20 is formed with its adjacent coils close together and in substantial engagement throughout the length of the spring so that when the door stop 10 receives an impact parallel to the axis thereof, there can be no yielding of the spring. There is thus presented a rigid stop for the door moving thereagainst. The end 23 of said spring has the last several coils thereof outwardly flared with the extremity being squared, for reasons subsequently discussed. Spring 20 provides a central passageway 24 therethrough because of its formation from a single length of coiled wire. Cap or tip 22 comprises a cup-shaped member formed of rubber or similar flexible material adapted to be frictionally engaged over the free end of said spring. The end of the cap or tip may be thickened as at 25 for sustaining or absorbing shock.

The herein described improvement concerns chiefly the construction of base member 21. Same comprises a dished metallic washer member and may be formed in a variety of configurations. By way of example, as shown ni Fig. 5 prior to assembly on the spring, the washer is of cup-like formation having a planar bottom wall 26 and an annular flanged wall 27 substantially perpendicular thereto. Walls 26 and 27 define an outwardly opening chamber 28. The chamber and opening thereinto are of a size sufficient to accommodate and permit passage thereinto of the flared end 23 of spring 20. Wall 26 has a centrally located perforation 29.

To secure the spring to said base member, recommended practice is to place the washer 21 on a work surface such as a table with the chamber 28 opening upwardly. The flared end 23 is inserted into the chamber 28 with the squared extremity of the spring engaged against the inside surface of bottom wall 26. Flanged wall 27 is then bent inwardly or wedged around the flared end 23 encircling and engaging the last several coils. As shown in Fig. 3, wall 27 is bent to follow the contour of the outwardly flared end 23 and because it is inwardly directed will partially close the opening to chamber 28 and prevent removal of the spring from the washer. The woodscrew 30 may then be passed through opening 29 and the door stop mounted on the wall by driving home screw 30. It will be seen that removal of the cap 22 from the opposite end of the spring will permit entry of a screw driver into passageway 24 for engaging the head 31 of said screw.

With washer 21 tightly engaged upon flared end 23 and secured above moulding 13 as described, great lateral forces may be applied to the door stop without severing the union between washer and spring. The spring will take the positions shown in phantom outline at 32 and 33 (Fig. 1) upon application of such lateral forces and because the spring has in no way been weakened during assembly to the washer, there is no likelihood of severance. It has been found that the construction described has long life and does not weaken even after long and hard use.

No particular manner of bending or peening over of the side wall 27 has been described because a great variety of techniques could be employed. For instance, it would be practical to place the washer 21 in a jig and after the flared end of the spring is inserted into chamber 28, a tube having a suitably internally tapered end inserted downwardly over the spring to engage the wall 27. Force is applied to the opposite end of the tube to constrict wall 27 to encircle and engage the flared end 23. The operation may be accomplished manually or with the use of a mechanical press. It is desired to emphasize that the particular method employed for attaching the washer on the flared end of the spring is unimportant from the standpoint of this invention and that other methods or equipment may occur to the skilled artisan.

As previously stated the bottom end of the spring member 20 is squared as indicated at 23'. This can be done simply by disposing the member perpendicular to a flat grinding surface and pressing the same against the surface. This grinds off portions of the end 23 so that the bearing end of the member 20 is perpendicular to its axis. Thus when disposed in the base member 21 during assembly, as long as the member 20 is pressed into the chamber 28 with the squared end 23' engaging the wall 26, the axis of the door stop will be perpendicular to the wall to which same is secured.

The resulting article 10 consists of an elongate hollow spring member having one end secured within the sheet metal base member. The base member may be characterized as being of generally frusto-conical configuration, with the end of greater diameter closed, and the end of lesser diameter open, and with the spring member having an end engaged in the base member, the engaged end having a diameter substantially greater than that of the open end of the base member.

It is believed that the invention has been described in sufficient detail to enable same to be practiced as prescribed by the patent statutes. It is desired to be limited in the scope of the invention only as defined by the claims hereto appended.

What it is desired to be secured by Letters Patent of the United States is:

1. A door stop comprising, a sheet metal base member of cup-like formation having a bottom wall and an annular side wall defining an opening, an elongate hollow spring member axially rigid but laterally resilient having an end secured within said formation against said bottom wall and extending out of the said opening, and means for securing said formation to a suitable surface, said side wall being frusto-conical in formation and having an outer edge of a diameter less than the diameter of the secured end of said spring member.

2. A door stop comprising, a sheet metal base member of cup-like formation having a bottom wall and an annular side wall defining an opening, an elongate hollow spring member axially rigid but laterally resilient having an end secured within said formation against said bottom wall and extending out of the said opening, and means for securing said formation to a suitable surface, said side wall being frusto-conical in formation and having an outer edge of a diameter less than the diameter of the secured end of said spring member, said secured end of the spring member substantially conforming to the inner surface of said side wall.

3. A door stop comprising a metal base member of cup-like formation including a bottom wall and a flanged side wall defining an opening into the interior of the formation, an elongate hollow spring member axially rigid but laterally resilient having an end secured on the interior of said formation against said bottom wall and extending out of said opening, and means for securing said base member to a suitable surface, said side wall being angularly disposed relative to the plane of the bottom wall to engage around said one end of the spring member and effect securement of the said one end of the spring member on the interior of the base member, said side wall being annular in configuration, said one end of the spring member being outwardly flared to provide a greater diameter adjacent its innermost coil and the diameter of said opening adjacent the outer edge of said side wall being less than the diameter of the flared end of the spring member, said bottom wall being planar and having a passageway therethrough for reception of a fastener, the door stop adapted to be mounted on a supporting surface with the exterior face of the bottom wall flush with said supporting surface.

4. A door stop comprising, a base member having a chamber open at one end thereof, an elongate hollow spring having one end received in said chamber and being axially rigid but laterally resilient, a passageway from the opposite end of the chamber to the exterior of the base

for receiving therethrough a fastening member, access to said fastening member being had through the spring, a cushioning cap secured over the free end of the spring, said base comprising a metallic washer having integral upstanding wall portions engaging around said one end of the spring to retain same in the chamber, said one end of the spring being outwardly flared and said wall portions being inwardly turned to follow the contour of said flared end, said washer having a planar bottom wall and said wall portions being integral with said bottom wall and defining said chamber, said passageway extending through

the bottom wall to enable the door stop to be mounted on a supporting surface with the exterior face of the bottom wall flush against said supporting surface with the fastener engaged through said passageway in said surface.

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