Nov. 23, 1965 R. L. SNELL 3,219,374

DOOR STOP AND HOLDER MECHANISM

Filed July 15, 1963

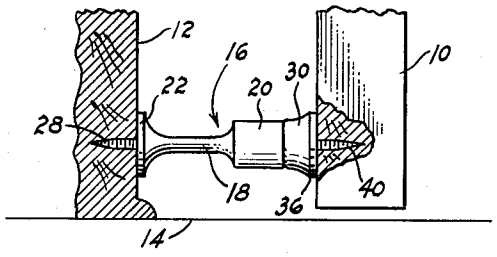


Fig. 1

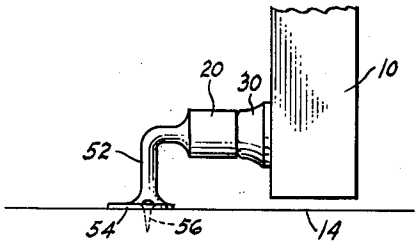


Fig. 2

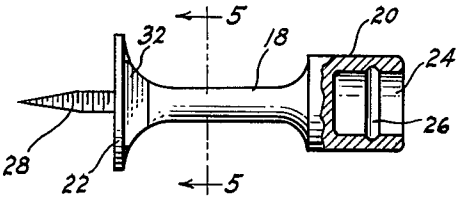


Fig. 3

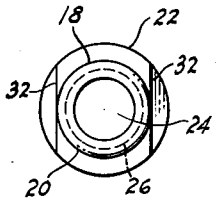


Fig. 4

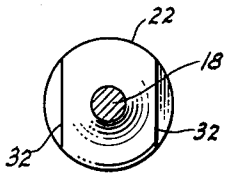


Fig. 5

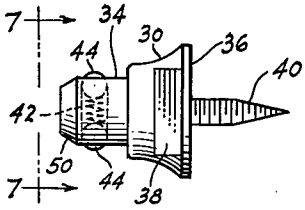


Fig. 6

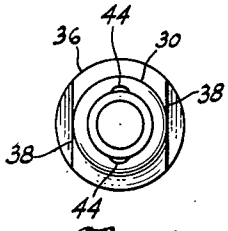


Fig. 7

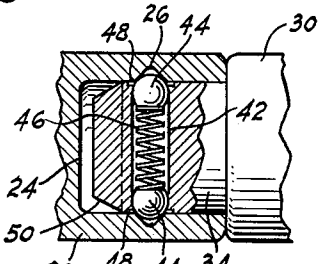


Fig. 8

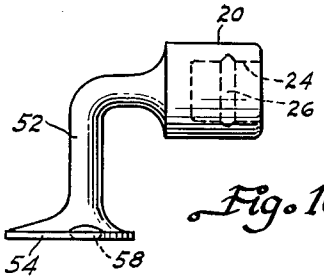


Fig. 10

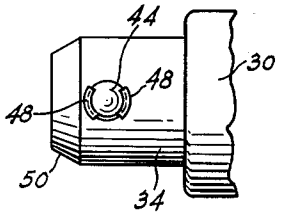


Fig. 9

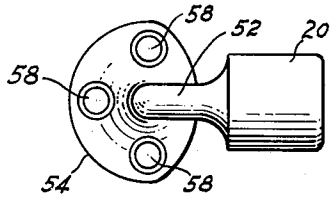


Fig. 11

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DOOR STOP AND HOLDER MECHANISM

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2 Claims. (Cl. 292—15)

This invention relates to a door stop and holder mechanism which also accurately may be termed a door check unit and preferably comprises coengageable head and socket means or members respectively connectable to one surface of a door and another surface relative to which the door is to be positioned by said mechanism.

Heretofore, various types of door stop and holder mechanisms or door checks have been devised in various degrees of complexity, expense and capabilities. Certain deficiencies exist in a number of these previously devised mechanisms and units, but, for various reasons, relatively few different types of such mechanisms presently are available in the current hardware field.

It is the principal object of the present invention to provide a door stop and holder mechanism or unit which is relatively simple in construction and therefore inexpensive to fabricate, the same preferably being formed from metal, whereby the same is durable and capable of long life.

Another object of the invention is to form the various components of the aforementioned mechanism or unit by casting from metal, only a very limited number of machine operations being required to completely fabricate and finish the components of the mechanism.

A further object of the invention is to employ very simple and inexpensively constructed latch means having components formed on the head and in the socket of the socket member, such latch members having releasably coengageable elements which effectively hold a door latched in desired position, while with very little manual effort, the door may be unlatched from its latched position.

Still another object of the invention ancillary to the immediately foregoing object comprises the utilization of standard, readily available latching elements respectively comprising spherical balls, such as are utilized in ball bearings, and small compression springs, these being supported in a simply formed transverse bore or hole extending through the head member of the mechanism, whereby through the employment of a simple staking or deforming operation of the opposite end walls of the bore in the head, complete movement of the balls from either end of the bore is prevented while permitting a desired amount of projection of said balls from opposite ends of the bore so as to comprise effective detent means engageable with an internal groove in the socket member.

Details of these objects and of the invention, as well as other objects thereof, are set forth in the following specification and illustrated in the accompanying drawing comprising a part thereof.

In the drawing:

FIG. 1 is a vertical elevation illustrating, fragmentarily, a portion of a door and a section of a wall, wash board or other similar surface, with respect to which the head and socket members of the door stop and holder mechanism embodying the principles of the present invention are connected for support, said members being illustrated in engagement with each other.

FIG. 2 is a modified form of the door stop and holder mechanism illustrated in FIG. 1 and showing the socket member arranged for connection to a horizontal surface, such as a floor.

FIG. 3 is a side elevation, partly broken away to expose details, of the socket member and its base of the type illustrated in FIG. 1, but shown on a larger scale than in said figure.

FIG. 4 is an end elevation of the socket end of the socket member shown in FIG. 3.

FIG. 5 is a transverse sectional view of said socket member shown in FIGS. 3 and 4, as seen on the line 5—5 of FIG. 3.

FIG. 6 is a side elevation of the head member and its supporting base, which is cooperable with the socket member shown in FIGS. 3–5.

FIG. 7 is an end view of the head member, as seen from the line 7—7 of FIG. 6.

FIG. 8 is a fragmentary, vertical sectional view showing portions of the head and socket members positioned with the latching means thereof in coengaging relationship.

FIG. 9 is a fragmentary, top plan view of the head end of the head member illustrated in FIGS. 6–8 and showing exemplary retaining means for the detent elements of the latching mechanism in the head.

FIGS. 10 and 11 respectively are a side elevation and top plan view of the embodiment of socket member illustrated in FIG. 2, but shown on a larger scale than employed in said figure.

Referring to the drawing, and especially FIG. 1, a lower fragmentary portion of an exemplary door **10** and a vertical exemplary sectional view of a supporting surface **12** is shown, the latter comprising either a wall surface, wash board at the bottom of a wall adjacent a floor surface **14**, or an appropriate part of a cabinet, or the like, with which a door stop and holder mechanism or unit **16** has been connected so as releasably to secure the door **10** in fixed position with respect to the surface **12** relative to which the door is to be positioned. The mechanism or unit **16** illustrated in FIG. 1 comprises what will be termed a straight socket member **18** having a socket end **20** and a base **22**.

As best seen from FIG. 3, the socket member **18** is provided with a preferably cylindrical socket **24** in the socket end **20**, the socket **24** having an open outer end and, between the ends of the socket walls, there is provided an annular groove or circumferential recess **26**. The base **22** of the socket member **18** is provided with a threaded screw **28**, which preferably is firmly secured to base **22**.

In the preferred construction of the invention, the socket member **18** and the head member **30** with which it cooperates are both formed from suitable metal, preferably by casting, so as to minimize the expense of fabrication of these members. As many of the surfaces of the members as possible are formed either in finished or semi-finished condition as a result of forming the same by casting. Appropriate metals comprise aluminum, brass or bronze, iron or steel, and zinc, which is commonly termed white metal. The latter is especially adapted for die casting, as well as providing acceptable strength. The other metals also will afford acceptable strength, and especially after appropriate finishing operations, such as tumbling with suitable compounds, and the like, will yield either acceptable finished surfaces with no further treatment or when appropriately plated or painted, lacquered, or the like.

Although the formation of the socket and head members **18** and **30** by casting is the preferred procedure, the invention is not to be restricted thereto, since it is highly conceivable that said members can be machined, for example, by appropriate lathe operations, from bar stock, if desired. It also is conceivable that said socket and head members may be appropriately formed by molding from suitable synthetic resins or plastic materials having appropriate strength and durability, especially if the same have properties equal to or better than phenol-formaldehyde condensation products, certain types of which are sold under the trade name Bakelite.

In forming the socket member **18**, and particularly to

provide the threaded screw **28** thereon, suitable commercial screws having appropriate formations on the end opposite the pointed end thereof may be utilized, and the molding material from which the socket member **18** is to be cast is flowed around said end of the screw **28** so as to integrally bond therewith and thereby provide a relatively inexpensive means for affording the socket member with a screw-threaded connecting member on the base **22** thereof. Further, the base **22** also preferably is formed with a pair of opposed, substantially parallel flat surfaces **32** for engagement by a wrench, pair of pliers, or other suitable tool by which the connection of the socket member **18** to a supporting surface is facilitated.

Referring particularly to FIGS. 6–8, it will be seen that the head member **30** is provided at one end with a preferably cylindrical head **34** and at the other end with a base **36**, which preferably has substantially parallel flat surfaces **38** on opposite sides thereof for engagement by a wrench, or the like, to facilitate attachment of the head member **30** to a supporting surface by threading the threaded, pointed screw **40** into such surface, such as a door **10**, as illustrated in FIG. 1. Intermediately of the ends thereof, a transverse bore **42** is formed in the head **34** for the reception of detent members in the opposite ends thereof, said detent members preferably comprising metallic balls **44**, such, for example, as the type employed in ball bearing assemblies. Disposed within the bore between the detents **44**, is a resilient compressible member, such as a compression spring **46**, of sufficient strength to press the detents **44** in opposite directions into engagement with opposed portions of the groove **26** formed in the walls of the socket **24**.

The particular type of detents **44** and the support thereof within the head **34** comprises one of the important features of the present invention, especially in view of the effectiveness, reliability, and inexpensiveness of construction, particularly in view of the fact that complete assembly and fabrication of said detent means with respect to the head **34** so as to comprise latch means thereon, is accomplished through the very simple and inexpensive expedient of deforming preferably opposed portions **48** in the opposite ends of the walls defining the bore **42**, the portions **48** slightly overlying opposite surfaces of the detents **44** and thereby restrict the outward movement of the detents relative to the opposite ends of he bore **42**. Such deforming of the walls to form the portions **48** is sometimes referred to as staking, and a simple tool may be utilized to achieve this through the expedient of the use of a hammer, appropriate press, or the like. The distance between the opposed portions **48** is slightly less than the diameter of the detents **44**, but the deformation of the walls of the bore **42** to form the portions **48** does not extend axially a very appreciable distance, whereby an appreciable portion of each of the detents **44** projects beyond the opposite wall surfaces of the head **34**, as can be readily seen from FIG. 6–8, whereby there is a sufficient amount of the detents **44** so projecting that they readily may be received within opposed portions of the groove **26** in socket head **20** so that, in conjunction with the strength of spring **46**, effective latching is accomplished between the detents **44** and groove **26**.

As can be appreciated particularly from FIG. 8, the arrangement of the detents **44** and the spring **46** therebetween within the bore **42** is such that said detents are capable of a limited floating action within the confines imposed by the opposed portions **48** in opposite ends of the bore **42**, but such arrangement facilitates the desired engagement with opposed portions of the groove **26** in the socket member **20** so as to minimize wear between the latching means and also minimize the amount of force necessary to effect engagement, as well as disengagement, of the coacting members of the latching mechanism. Further to facilitate the coengagement of the socket and head members, as well as that of the respective latching means carried by each, it will be seen from FIGS. 6, 8 and 9

particularly that the end of head **34** opposite the base **36** is beveled to provide a frusto-conical end **50**, which, particularly if there is limited misalignment of the socket and head members through warpage, or otherwise, of the members or surfaces supporting the same, will serve as cam means to guide the head **34** and socket **24** into axial alignment and telescopic relationship with each other, especially to insure the coengagement of the detents **44** with the annular groove **26**.

In addition to the straight type socket member **18** described hereinabove, the present invention also contemplates an angular or floor type socket member **52**, which has a socket end **20** identical with the socket **20** on the straight type socket member **18**. The opposite end of the member **52**, however, has a base **54** especially adapted to receive at least a pair of screws **56** in appropriate screw holes **58** in said base. Under such circumstances, no integral screw is formed on the base **54** and, in addition, as especially can be appreciated from FIG. 11, the shape of the base **54** in plan view is such as to afford ample stability when engaged with a floor surface **14**, as shown in FIG. 2, to resist bending moments which will be imposed upon the socket member **52** as the result of a door **10**, for example, being moved into engagement with the socket member with considerable force. Otherwise, the latching engagement between the socket **20** of the angular socket member **52** and the head member **30** is the same as described above with regard to the strtight type socket member **18**.

From the foregoing, it will be seen that the present invention provides a relatively simple, but highly effective and durable, door stop and holder mechanism or unit which is capable of inexpensive manufacture and merchandising. The method of connecting the members comprising said mechanism or unit to their respective supporting means is extremely simple in that it is only necessary, for example, to connect the socket member to its supporting surface, whether vertical or horizontal, such as a floor surface, and then temporarily connect the head member to the socket of the socket member. When this is done, the door is lightly moved into engagement with the pointed end of the screw **40** on the head member so as to mark on the door where the screw **40** is to be located. Then, upon removing the head member **30** from the socket member **18** or **52**, said head member is threaded into firm engagement with the intended surface of the door **10**. Both the head member and socket member, including both types thereof, are provided with flat surfaces for engagement by appropriate wrenches or other tools to facilitate the connection of the members of the unit with their respective supporting surfaces.

Should the walls of socket **24** tend to become worn through repeated engagement of the detents **44** therewith, it is only necessary to slightly rotate head member **30** a few degrees to position new portions of the socket walls and groove therein for engagement by the detents **44**. Thus, the total life of the entire assembly of members **18** and **30** is very extensive, especially through such repositioning of head member **30**.

While the invention has been described and illustrated in its several preferred embodiments, it should be understood that the invention is not to be limited to the precise details herein illustrated and described, since the same may be carried out in other ways falling within the scope of the invention as claimed.

I claim:

1. Door stop and holder mechanism comprising in combination, a socket member having a substantially cylindrical socket extending axially inward from one end thereof and provided with an annular groove in the walls of said socket spaced from the ends thereof, and a substantially cylindrical head member closely complementary to and having one end receivable co-axially within said socket for a substantial axial amount, said members respectively having supporting means thereon connectable to

a door and a surface relative to which the door is to be positioned by said mechanism, releasably engageable latch means on said head member comprising a bore extending transversely through said cylindrical head member spaced from the ends thereof, similar substantially diametrically opposed detent members comprising balls respectively projecting from the opposite ends of said bore and portions of each detent member extending beyond opposed portions of the outer cylindrical surface of said head, a compression spring carried within said bore and engaging said detent members to urge the same apart and into substantially equal engagement with said annular groove when said head member is projected into the socket of said socket member to effect such engagement, and means adjacent the opposite ends of said bore projecting from the periphery of said bore and engaging said detent members and operable to restrict the movement of said detent members outwardly from said head to a predetermined maximum amount, the diameter of said head member being only slightly less than that of the socket in said socket member, whereby substantial guiding of said head member into said socket is provided to prevent relative misalignment and insure reception of both of said detent members simultaneously within said annular groove.

2. The door stop and holder mechanism set forth in claim 1 further characterized by said one end of said head being frusto-conical to facilitate the reception of said head within the open end of said socket.

References Cited by the Examiner

UNITED STATES PATENTS

1,089,891	3/1914	Woolley	292—75
2,809,061	10/1957	Beyer	292—75

M. HENSON WOOD, JR., *Primary Examiner.*