April 21, 1953 S. S. ROBY 2,635,904

ROPE ATTACHING MEANS

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Fig. 1

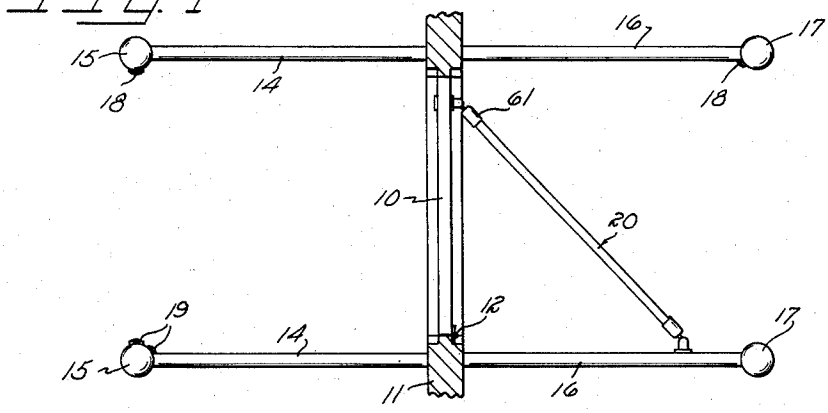


Fig. 2

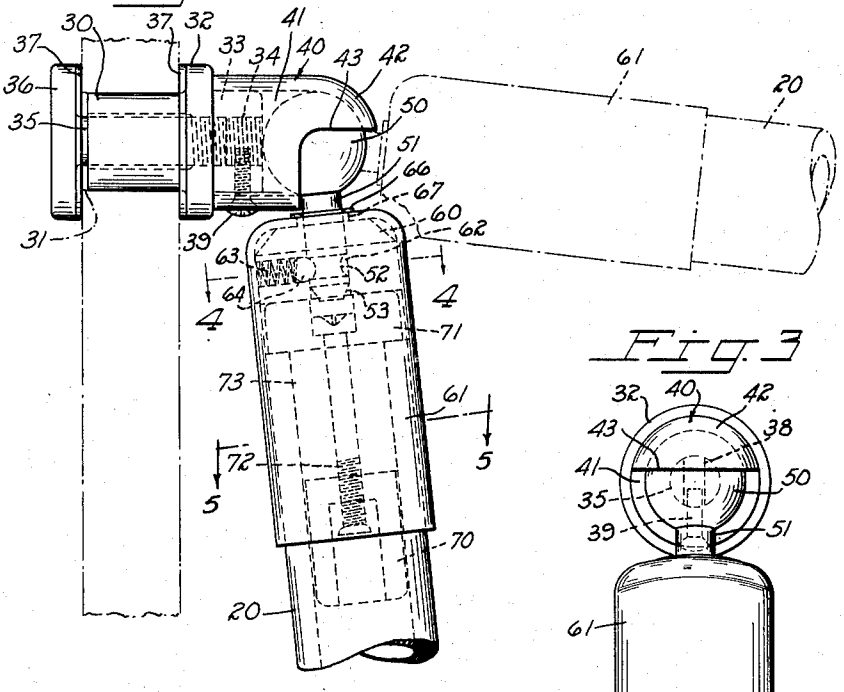


Fig. 3

Fig. 4

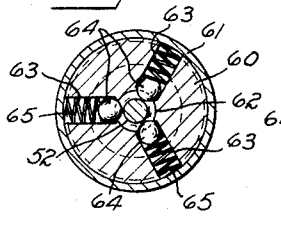
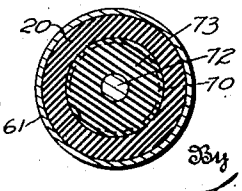


Fig. 5



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ROPE ATTACHING MEANS

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The present invention relates to rope attaching means and, more particularly, to means for forming a connection for rope ends having particular advantage in the installation of guide or barrier ropes, safety ropes, service ropes, or similar ropes of general utility for decorative purpose. The invention has particular advantage in the mounting or attachment of safety ropes to automatically operated doors such as the so-called "magic eye" doors. In the installation of such doors, it is the practice to suspend a rope from the door on the exit side of the door to restrain persons from walking into the path of the door.

It is an aim of the present invention to provide a rope connection of the character referred to which will form an effective attachment or anchorage for the rope, which will have a pleasing streamlined appearance, which is of simple construction and fabrication so that it may be manufactured and installed at low cost, and which will be sufficiently rugged to provide effective service over long periods of time. Included in this aim is the object of providing a rope attaching means which will operate in an improved manner, which will be easy to assemble and disassemble both for purposes of the original installation or for replacement, and which will have greater usefulness and versatility.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings—

Figure 1 is a top view partially in cross section of a "magic eye" door installation and including a safety rope mounted by means of the attaching means of the present invention;

Fig. 2 is an enlarged, side view of the attaching means;

Fig. 3 is a fragmentary front view;

Fig. 4 is a cross sectional view taken along line 4—4 of Fig. 2; and

Fig. 5 is a cross sectional view taken along the line 5—5 of Fig. 2.

Referring to the drawings, a typical "magic eye" door installation is shown in Fig. 1. As shown in Fig. 1, a door 10 is hinged at 12 on the door jamb 11 so that the door in opening will pivot clockwise as viewed in Fig. 1. A pathway toward and away from the door is defined

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by front railings 14 extending between front posts 15 and the door jamb and by railings 16 extending rearwardly to rear posts 17. A light source 18 is fixed to one of the front posts 15 and also to one of the rear posts 17. The light from these light sources acts upon a photoelectric cell indicated at 19 in the opposite post 15.

Means (not shown in the drawing) is provided for actuating the door in both an opening and closing direction. This mechanism is so arranged that, when the path between the front light source and the photoelectric cell is interrupted, the door will be opened and will remain open until the person entering through the door has moved beyond the rear light source, whereupon the door will again close. In most installations, the operation of the door is generally fairly rapid and, accordingly, there is a possibility of injury should someone walk from the rear into the path of opening of the door. To prevent this happening, it is the general practice to suspend a restraining or warning rope from the door as indicated by the rope 20 fastened at one end to the door 10 and at the other end to a rear railing 16. Although the member 20 is referred to herein as a "rope," it actually may be a piece of rubber tubing as shown more particularly in Fig. 2 of the drawings. When rubber tubing is utilized, it usually is provided with a surface finish to simulate a cloth covered rope.

The foregoing is given merely by way of background to illustrate the use of the present invention. The invention is more particularly directed to the means for attaching the rope 20 to the door 10 and railing 16, the details of which are shown more particularly in Figs. 2, 3 and 4 of the drawings.

Referring to Fig. 2, means is provided for forming a rigid anchor on the door which consists of a hollow post 30 adapted to be received in and extend through bore 31 in the door 10, this post being provided with a flange 32 adapted to abut against the face of the door. An extension 33 is provided on the post 30 and is formed with an internally threaded opening 34 for receiving a threaded stud 35 adapted to extend through the hollow post 30 from the opposite side of the door and having a head 36 abutting against the opposite face of the door. Resilient washers 37 may be provided to facilitate a tight connection with the door.

The end of the threaded post 35 is bifurcated as indicated at 38 in Fig. 3 to receive the end of a set screw 39 which, when inserted, effectively

prevents turning of the post 35 and loosening of the device on the door.

Received over the extension 33 is a member 40 having a cylindrical portion 41 which fits over the extension 33 and being held in place by the set screw 39. The forward end of the member 40 is formed with a cap like parti-spherical surface 42 and a lower cut out segment 43. In the specific embodiment shown in the drawings, the areas of the cap portion 42 and cut-away segment 43 are each approximately equal to that of one-quarter of a sphere.

The member 40 provides a seat for a ball 50 which is formed with an extended neck portion 51 received outwardly through the cut-away section 43. The extension 51 is adapted to be attached to the rope 20 as will be explained more particularly hereafter. As will be apparent from Figs. 2 and 3 of the drawings, this construction permits free swiveling movement of the ball 50 except as limited by engagement of the neck portion 51 with the periphery of the cut-away segment 43.

The neck portion 51 is provided at its outer end with an annular groove 52 and a beveled edge 53. As a result of this construction, the neck 51 is adapted to be readily attached or detached from an engaging member 60 shown more particularly in Fig. 4 of the drawings, which is mounted within a cap 61 adapted to fit over the end of the rope 20. The member 60, as best shown in Fig. 4, is an annular ring-like device provided with a central opening 62 and radial bores 63 in which are disposed balls 64 which are pressed inwardly toward the opening 61 by springs 65. The member 60 is retained at the forward end of the cap 61 by an extended tubular portion 66 which is received through the opening 67 of the cap 61 and swaged thereto.

As will be apparent, when the neck 51 is pushed into the member 60, the balls 62 are first cammed outwardly to prevent the entrance of the neck 51 and then return inwardly to seat in the annular groove 52. This will ordinarily hold the attachment in the position shown in Fig. 2, but may be released by sufficient tension to cause the balls 62 to be again unseated from the groove 52.

To provide for the attachment of the rope 20 to the cap 61, there is provided an insert for the end of the rope 20 which comprises a pressure member 70, an end piece 71, a screw 72 extending therebetween, and a rubber bushing 73 situated between the end piece 71 and the pressure member 70. When the screw 71 is turned to withdraw same from the pressure member 70, the pressure on the rubber bushing 73 is released and the device may be easily inserted into or removed from the rope 20. When the assembly has been inserted into the end of the rope 20, however, the screw 72 may be turned to draw in on the pressure member 70 causing axial compression of the rubber bushing 73 which is accompanied by a radial expansion sufficient to expand the rope 20 thus effectively locking the cap 61 on the end of the rope 20. The screw 72 can readily be turned by inserting a turning tool, such as a screw driver, through the opening provided by the tubular portion 66 in the cap 61.

As a result of the construction of the embodiment of the present invention, there is provided an attaching means which is of pleasing and distinctive appearance suitable for installations of the type referred to and which will function in an improved manner. Among the advantages, for example, is that when the door moves from a closed to an open position, the attaching means, though metallic, will be substantially noiseless in operation and will not come into marring contact with the door or wall. That is because the rope will rapidly move from the position shown in dot and dash lines in Fig. 2 to the position shown in solid lines in Fig. 2, and further movement will be prevented by engagement of the neck 51 against the edge of the cut-out section 43 of the member 40. The points of contact are so close to the center of the ball 50 that the noise is almost inaudible and all other metallic portions of the attaching means are spaced from the door and wall which not only avoids the noise of contact as previously mentioned, but also prevents marring of the door or wall. As a result, it is not necessary to provide any snubbers or similar devices for preventing contact of the attaching means with the door as frequently has been the case in the past.

By reason of the present invention, the attachment and detachment of ropes such as rope 20 has been greatly facilitated and yet this improved operation is sufficiently concealed so that unauthorized persons would be unlikely to discover how to remove the rope. Removal and replacement of the rope has been rendered extremely simple and easy to carry out.

The device is of simple construction and may be fabricated and assembled at low cost. Yet the device is extremely effective in operation and enhances the value of door installations of this type.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. A barrier rope-like member for use with automatically operated doors and the like comprising a flexible tube, a cap for one end of the tube having a center axial opening, means for attaching the tube to the cap comprising radially expansible means actuated through said opening, a ball-like member having an extended neck portion for insertion through the axial cap opening, means within the cap for releasably engaging said neck portion, and a seat for said ball-like member adapted to be attached to a door comprising a tubular member having a hood-like extension providing a concave bearing surface enclosing the upper portion of the end of the tubular member.

2. A barrier rope-like member as defined in claim 1 in which the said radially expansible means comprises a rubber bushing situated between members adjustably connected through a centrally located screw extending therebetween.

3. Attaching means for tubular barrier ropes and the like comprising a cap for receiving one end of the rope and provided with an axial opening, means for securing the rope to the cap comprising a pair of members disposed within said one end of the rope and adjustably intercon-

nected by a centrally located screw extending therebetween, a rubber bushing situated between said members and arranged to be expanded radially outwardly as said members are moved toward one another, said screw being substantially in registry with said opening for actuation therethrough, a ball-like member having an extended neck portion for insertion into said opening, spring pressed movable means carried by the cap and extending radially into said opening, said neck portion having an annular groove for receiving said movable means, and a seat for said ball-like member adapted to be attached to a door or the like and comprising a tube having a hood-like extension providing a concave bearing surface enclosing substantially one-half of the end of the tube.

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