Feb. 12, 1935. P. R. FORMAN 1,990,898

DOOR SHAFT CONSTRUCTION

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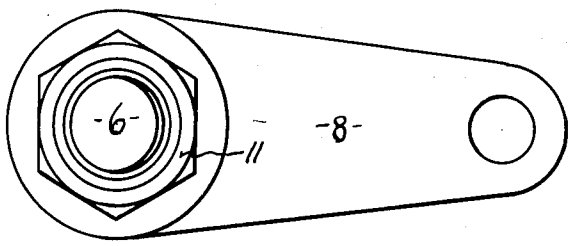


Fig. 1.

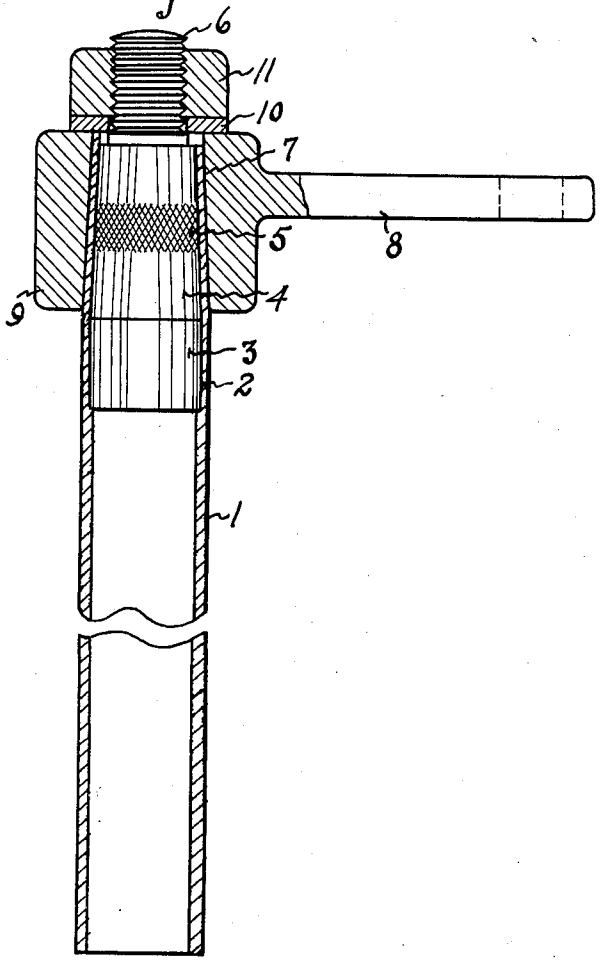


Fig. 2.

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DOOR SHAFT CONSTRUCTION

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2 Claims. (Cl. 287—53)

This invention relates to improvements in door shaft constructions, with particular reference to door supporting shafts as used on vehicles, such for example as buses, street cars, subway cars, and the like.

An important object of this invention is to provide in a very simple structure a light-weight door shaft which is at the same time exceedingly strong.

A further object of this invention is to provide a supporting member for a door shaft which is rigidly bonded to the door shaft against rotational movement with respect thereto when power is applied to operate the door. These and many other objects, as will appear from the following disclosure, are secured by means of this invention.

This invention resides substantially in the combination, construction, arrangement, and relative location of parts, all as will appear from the following disclosure.

Referring to the drawing—

Figure 1 is a top plan view of the structure of this invention; and

Fig. 2 is a vertical central cross-sectional view therethrough.

In transportation vehicles, such as buses, street cars, railway cars, subway cars and the like, it is common practice to provide swinging doors at the entrance and exitways. These swinging doors are quite commonly of the folding leaf type which are supported along one vertical edge of one of the leaves upon a rotatable door shaft which is journaled in the vehicle structure at one side of the door opening. The doors for vehicles of this type are commonly power operated through a motive device, either of the electric or pneumatic type. It is highly desirable that the structure of the door shaft be light in weight without diminishing its strength. It is, of course, obvious that simplicity of structure lends itself to inexpensive and rapid manufacture. The prime object of this invention is to provide a light-weight door shaft which is exceedingly strong and yet is simple in structure and inexpensive to manufacture.

Referring to the drawing, the door shaft itself is shown at 1 in the form of a metal tube having a wall thickness sufficient to withstand the stresses and strains to which it will be subjected. This tube is counterbored from one end, as shown at 2. Seated within the counterbore is a plug or bearing member having a cylindrical portion 3 which preferably has a tight or sliding fit with the counterbore. The portion 4 of this bearing member is tapered away from the cylindrical portion and terminates in a portion of reduced diameter, as indicated at 6, having threads on the surface thereof. The conical portion 4 is provided with a knurled or roughened band 5 of the necessary longitudinal extent. The plug is forced into the end of the shaft so as to seat against the shoulder formed by the recess. The end of the shaft opposite the tapered portion 4 of the plug is then compressed in any suitable manner so as to snugly fit the tapered portion 4 of the plug and to firmly engage its knurled or roughened part 5. The end 7 of the shaft may be forced down in place in accordance with any well known practice, such as by metal spinning, in which case it is revolved on its longitudinal axis at high speed and a tool applied to its outer surface with sufficient pressure to cause the metal to flow down into tight engagement with the conical surface of the plug. At 8 is the lever through which power is applied to shaft 1. This lever is part of a hub or collar 9 having a tapered bore therethrough. The hub fits down over the tapered end 7 of the shaft and is held firmly by the nut 11 and washer 10. It will be noted the plug and the end of the shaft are tapered in opposition to the bore in hub 9. Thus nut 11 jams the parts securely together ensuing an absolutely rigid structure.

The upper end of the shaft is supported in any suitable bearing member. Of course any other method of attaching the operating lever may be employed. The end 6 of the plug may take other forms, such as a square extension to fit in a square socket in the lever arm. The door itself is supported on the shaft 1 in accordance with the usual practice. It is, of course, apparent that the lower end of the shaft may be provided with any suitable form of bearing member which may be a structure like that disclosed in this case.

From the above description it will be apparent that this invention may assume other physical forms without departure from the scope thereof. I do not, therefore, desire to be strictly limited to the disclosure but rather to the scope of the appended claims.

What I seek to secure by United States Letters Patent is:

1. An assembly as described comprising a cylindrical tube tapered at one end to the end, a tapered plug, of circular cross-section throughout its length, within the tapered end of the tube, a threaded extension on the plug, a lever having a hub with a tapered circular bore therethrough seated on the tapered end of the tube and a nut on said extension for locking the parts together.

2. An assembly as described comprising a shaft having a counterbored end to provide a thin wall, a tapered plug of circular cross section throughout its length in said counterbore, the thin walls of the shaft being tapered to snugly fit the plug, a lever having a hub with a circular, tapered bore fitted on the end of the shaft and means for locking all of said parts together.

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