Feb. 25, 1930. E. A. HALL 1,748,126

PILOT STEM

Filed Jan. 9, 1928

Fig. 1

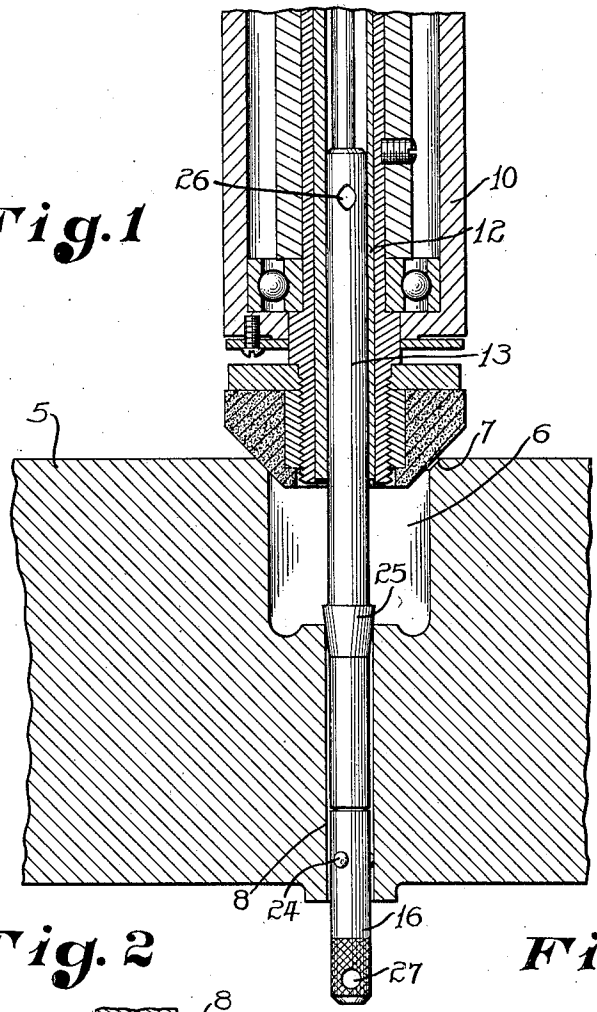


Fig. 4

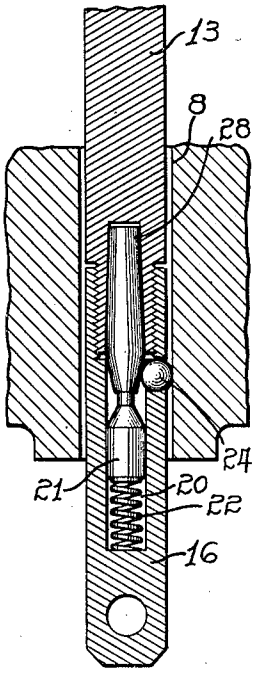


Fig. 2

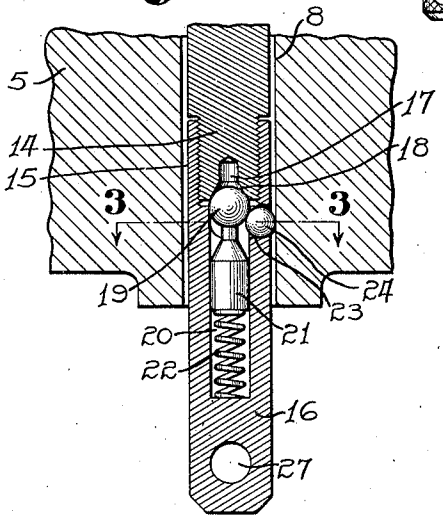
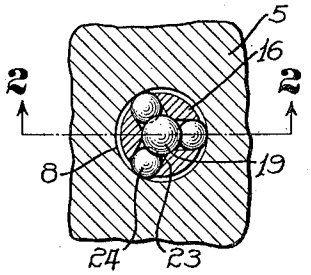


Fig. 3



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UNITED STATES PATENT OFFICE

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PILOT STEM

Application filed January 9, 1928. Serial No. 245,369.

This invention relates to a pilot stem, of improved construction, adapted to be used in connection with valve seat grinders and other tools which operate in a similar manner.

The object of the invention is to provide, for the purpose stated, a pilot stem or spindle which is so constructed that it may be easily and firmly secured in a valve stem guideway, and in connection therewith, to provide improved means for adjusting and centering the lower end portion of the stem within the guideway.

In using pilot stems, as heretofore commonly constructed, for the purpose of centering valve seat grinders and the like, it has been necessary to secure the pilot stem in proper position by applying a centering nut, expanding screw or equivalent means to the lower end of the stem after it has been inserted in the valve rod guideway. With the present invention, the entire pilot stem and adjusting means may be inserted through the upper end of the guideway, and after it has been inserted, the lower end may be easily adjusted so that it will be centered with respect to the guideway and held securely in that position.

The specific construction of the invention and the advantages resulting therefrom will be more particularly described in connection with the accompanying drawing in which—

Figure 1 is a vertical section taken centrally through the lower part of the valve seat grinding tool and the adjacent portion of the motor, with the pilot stem secured in operative position.

Fig. 2 is an enlarged central vertical section through the lower part of the pilot stem, the section being taken substantially on the line 2—2 of Figure 3.

Fig. 3 is a horizontal section taken substantially on the line 3—3 of Fig. 2.

Fig. 4 is a vertical section through the lower end of the upper section of the pilot stem, showing a modified construction.

The internal combustion motor, a fragment of which is shown at 5, is formed with a cavity 6 which may represent either the inlet or exhaust, and which is formed with a valve seat 7. Beneath the cavity 6 is a guideway 8 for the valve stem.

The valve seat grinding tool 10 may be of any suitable construction, preferably being provided with an eccentric bearing 12 adapted to be rotated about the pilot stem 13, which constitutes the subject matter of the invention.

In accordance with the invention, the stem 13 is made in two sections, the upper section being formed at its lower end with a reduced portion 14 which is threaded to receive the correspondingly threaded sleeve 15 formed at the upper end of the lower section 16. The end of the reduced portion 14 is formed with a central bore 17 which is reamed out to provide a conical seat 18 adapted to receive a steel ball 19. The upper portion of the section 16 is provided with a central bore 20 in which a plunger 21 is guided. An expansile coil spring 22, seated in the end of the bore 20, holds the plunger 21 normally in engagement with the ball 19. The section 16 is formed near the base of the sleeve 15 with a plurality of equally spaced openings 23 extending from the bore 20 through the lateral surface of the stem. The interior surfaces of these openings form seats to receive steel balls 24 which are adapted to project outwardly through the openings, but the outer edges of the openings are sufficiently restricted to prevent the balls 24 from passing through the same. The reduced upper end of the plunger holds the balls 24 in their seats when the two sections of the pilot stem are being assembled.

The stem 13 is also formed with a gradually tapered conical enlargement 25, the base of which is somewhat larger than the internal diameter of the guideway. The normal distance from the tapered enlargement 25 to the balls 24 is somewhat less than the length of the guideway 8.

In order to insert the pilot stem in the valve rod guideway 8, the section 16 is unscrewed sufficiently to permit the balls 24 to be moved inwardly toward the central cavity 20, thus permitting the pilot stem to be inserted from the upper end of the guideway without disassembling the same. When

the pilot stem is thus inserted, it is forced downwardly until the tapered enlargement 25 is firmly seated in the upper end of the guideway. The lower section 16 is then screwed up, forcing the balls 24 against the ball 19, which forces them outwardly, causing them to project from the openings 23 and to bear forcibly against the wall of the guideway 8. In order to facilitate the insertion and adjustment of the pilot stem, the latter is formed near its upper and lower ends with transverse holes 26 and 27 respectively, for receiving cross rods.

After inserting the pilot stem in the guideway, it is not necessary to attach any nut, screw or the like to its lower end. All that it is necessary to do is to tighten the lower section by hand or by means of a cross rod inserted through the hole 27. The balls 18 and 24 automatically effect the centering of the lower end of the stem as it is tightened. They may be forced to exert the greatest amount of pressure against the wall of the guideway, while offering comparatively little frictional resistance against the rotational movement which is necessary to tighten the same. The proportions of the tapered enlargement 25 and of the balls 19 and 24 are such that the pilot stem may be firmly secured in the guideway irrespective of how much the latter has been worn.

The modified construction shown in Fig. 4 is the same as the construction shown in the other figures with the exception that, instead of the central ball 19, a tapered pin 28 is set in a socket formed in the lower end of the upper section of the stem 13, and the lower end of this pin is in the shape of a cone which constitutes an abutment for the balls 24.

When the grinding of the valve seat has been completed the lower section 16 may be loosened sufficiently to permit the stem to be easily withdrawn from the guideway and to be inserted in like manner in the next valve stem guideway for grinding the next valve seat.

While I have shown and described specifically two forms in which the invention may be embodied, the principles of their operation are substantially the same. It is obvious that the invention may be considerably modified in other respects without departing materially from the scope thereof as claimed.

What I claim is:

1. A pilot stem for the purpose described, adapted to have its lower end portion inserted in a valve stem guideway, said lower end portion having a screw adjustment toward the upper end, and individually rotatable elements exerting increasing pressure against the wall of said guideway as said lower end portion is thus adjusted.

2. A pilot stem for the purpose described, with its lower end portion having a screw adjustment with respect to its upper end portion, said lower end portion being insertible downwardly through a valve stem guideway, individual rotatable elements carried by said stem, and means operable by the screw adjustment, after the stem is inserted, to press said elements forcibly against the wall of said guideway.

3. A pilot stem adapted to be inserted in a valve stem guideway, said stem having upper and lower sections with a screw threaded connection therebetween, said stem having a central cavity where the two sections meet, with openings from the central cavity to the lateral surface of the stem, individual elements within said openings, and means for pressing said elements forcibly outwardly from said openings against the wall of said guideway.

4. A pilot stem adapted to be inserted in a valve stem guideway, said stem having upper and lower sections with a screw threaded connection therebetween, said stem having a central cavity where the two sections meet, with openings from the central cavity to the lateral surface of the stem, individual balls within the respective openings, said openings being large enough to permit the balls to project therefrom but not to pass entirely therethrough, and means operable by a screw adjustment of the two sections toward each other, after the stem is inserted, to press said balls forcibly against the wall of said guideway.

5. A pilot stem for the purpose described, comprising an upper section with a reduced threaded lower end, a lower section having at its upper end an internally threaded sleeve to receive the threaded end of the upper section, both sections being of less diameter than the valve stem guideway in which the pilot stem is to be used, said lower section having a central bore below said sleeve with openings from the bore through the lateral surface of the section, and means cooperating with said bore and openings to exert pressure against the wall of the guideway.

6. A pilot stem for the purpose described, comprising an upper section with a reduced threaded lower end presenting a centrally disposed abutment, a lower section having at its upper end an internally threaded sleeve to receive the threaded end of the upper section, and freely rotatable means cooperating with said abutment and the lower section to exert pressure against the wall of the valve stem guideway when the two sections are adjusted toward each other.

7. A pilot stem adapted to be inserted in a valve stem guideway, said stem comprising an upper section with a reduced threaded lower end, a lower section having at its upper end an internally threaded sleeve to receive the threaded end of the upper section, said lower section having a central bore below said seat, with openings from said bore

through the lateral surface of the section, a spring pressed plunger in said bore, balls held in said openings, and a centrally disposed abutment at the lower end of the upper section and normally engaged by the plunger, said abutment being engageable with said balls to press them forcibly against the wall of said guideway, when the two sections are adjusted toward each other.

8. A pilot stem comprising two sections disposed in end to end relation with a screw threaded connection between them, said stem having a central cavity where the two ends are connected, and openings from said cavity through the lateral surface of one of said sections, a seat formed in the end of the other of said sections, and means coacting with said seat and said balls to positively force the latter to project outwardly from said openings, when the two sections of the stem are adjusted toward each other.

In testimony whereof, I have hereunto signed my name to this specification.

ERNEST A. HALL.