Aug. 10, 1948. H. H. REETZ 2,446,787

PILOT GUIDE DEVICE

Filed Dec. 3, 1945

Fig. 1.

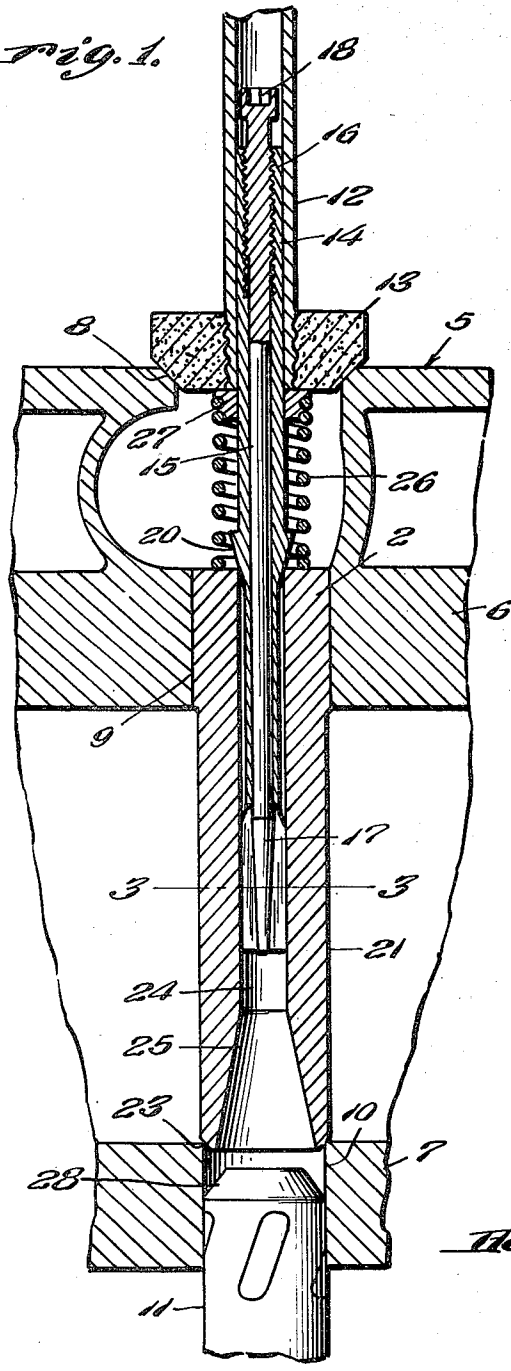


Fig. 2.

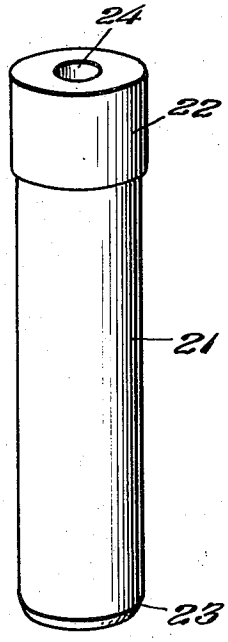
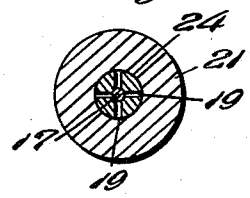


Fig. 3.



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PILOT GUIDE DEVICE

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2 Claims. (Cl. 51—241)

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This invention relates to a device for guiding the expansible pilot of a valve seat grinder or reamer when used in an engine block having spaced upper and lower portions formed with vertically aligned cylindrical valve stem and tappet guide openings.

The primary object of the present invention is to provide a guide device of the above kind by means of which the valve seat may be ground or reamed in perfect alignment with the valve guide and tappet without the exercise of special skill or care.

A further object of the invention is to provide a device of the above kind which is extremely simple in construction, easy to use, and highly efficient in use.

The exact nature of the present invention will become apparent from the following description when considered in connection with the accompanying drawing, in which:

Figure 1 is a sectional view showing a device constructed in accordance with the present invention and illustrating the same in use in connection with a valve seat grinder.

Figure 2 is a perspective view of the elongated tubular member or bushing forming part of the present guide device.

Figure 3 is a horizontal section taken on line 3—3 of Figure 1.

Referring in detail to the drawing, 5 indicates the cylinder block of an internal combustion engine having spaced upper and lower portions 6 and 7, the upper portion 6 being formed with a valve seat 8 and a valve stem guide opening 9 below and in alignment with the seat 8, and the lower portion 7 being formed with a guide opening 10 for a tappet 11 in vertical alignment with the opening 9 and seat 8.

In resurfacing the valve seat 8, it is the customary practice to use a reamer or a grinder. The reamer and grinder are of generally similar construction except that the former uses a reaming head and the latter uses a grinding stone. In Figure 1, the present guide device is shown in use in connection with a valve seat grinder which includes a tubular shaft 12 having a grinding stone 13 secured on the lower end thereof. The grinder further includes an expansible pilot embodying an elongated sleeve 14 whose upper end portion is rotatably received within the shaft 12, and which has an axial bore in which is disposed an expander rod 15 having a threaded upper end portion 16 and a tapered lower end portion 17. The sleeve 14 is internally threaded at its upper end to receive the threaded portion 16

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of the rod 15, so that by turning the latter, said rod is adjusted axially of the sleeve 14. The upper end of the rod 15 may be provided with an extension formed with a polygonal socket 18 to facilitate rotation of the rod 15 by the use of a suitable tool. The lower end portion of sleeve 14 is provided with slits 19 arranged around the circumference and extending upwardly from the lower end. The slitted lower end portion of sleeve 14 is tapered inside to fit the tapered lower end 17 of the rod 15, so that when the rod 15 is adjusted downwardly the split lower end portion of sleeve 14 will be expanded. Conversely, when rod 15 is adjusted upwardly, the split end portion of sleeve 14 will contract under its own tension. Intermediate its ends, the sleeve 14 has an enlarged tapered portion 20.

The guide device embodying the present invention includes an elongated tubular member or bushing 21. Having an enlarged cylindrical upper end portion 22 adapted to snugly fit in the valve stem opening 9, and a tapered lower end 23 adapted to simultaneously center in the tappet guide opening 10 while resting on the lower block portion 7 about said opening 10. The tubular member 21 has an axial cylindrical bore 24 for snug sliding reception of the split end portion of the pilot when contracted, and it is noted that the lower end portion of the bore 24 is downwardly flared as at 25. A helical compression spring 26 may be disposed on the upper end of the member or bushing 21, said spring having a bushing 27 fitted and secured in the upper end thereof and adapted to have a snug sliding fit on the sleeve 14 above the enlarged portion 20. The spring 26 is of a length so that it will be placed under compression when the member 21 is operatively disposed as shown in Figure 1 and the grinding stone of the grinder or the reaming head of the reamer is forced downwardly against the valve seat 8, the bushing 27 being in contact with the bottom of said grinding stone or reaming head. This compression of spring 26 will firmly hold the member or bushing 21 in place with its lower end 23 in firm contact with the block portion 7 and centered in the tappet guide opening 10. Thus, when the grinding stone or reaming head is rotated, the valve seat will be reamed or ground in perfect alignment with the valve guide and tappet.

In practice, the tubular member or bushing 21 is inserted downwardly through the opening surrounded by the valve seat 8 and lowered until the end portion 22 is disposed in the valve guide

opening 9 and the tapered end 23 is centered in the tappet guide opening 10 at the top of the latter. The pilot is then inserted so that it has its lower end portion disposed within the bore 24 of the member or bushing 21 and the enlarged tapered portion 20 of sleeve 14 is centered in the bore 24 at the top of the member or bushing 21 as shown in Figure 1. The rod 15 is then rotated to feed the same downwardly and thereby expand the split lower end portion of sleeve 14 into tight gripping engagement with the wall of the bore 24. If the spring 26 is used, it is then placed upon the top of the member or bushing 21 about the portion of the sleeve 14 directly above said member or bushing 21, whereupon the grinding stone or reaming head is brought down into engagement with the valve seat 8 by allowing the upper end portion of the sleeve 14 to enter the tubular shaft 12. When this is done, the spring 26 is placed under compression as and for the purpose previously described. The grinding stone or reaming head is then rotated by turning the shaft 12 so as to effect the desired valve seat resurfacing operation. If desired, the spring 26 may be dispensed with because there is often sufficient space between the block portions 6 and 7 to permit gripping of the member or bushing 21 for the purpose of firmly holding it in place with its lower end centered in the tappet guide opening 10. Should the tappet 11 be in a raised position projecting above the block portion 7, its tapered upper end 28 will enter the flared lower end portion 25 of bore 24 so as to have the same supporting and centering effect on the lower end of the member or bushing 21 as is had by engagement of the tapered end 23 in the opening 10.

From the foregoing description, it is believed that the construction, operation and advantages of the present invention will be readily understood and appreciated by those skilled in the art. Minor changes may be made in details of construction, illustrated and described, such as fall within the spirit of the invention as claimed.

What I claim is:

1. A device for resurfacing a valve seat of an engine block having spaced upper and lower portions respectively formed with cylindrical valve stem and tappet guide openings which are vertically aligned, comprising a pilot guide consisting of an elongated tubular member having

an enlarged cylindrical upper end portion adapted to snugly fit in the valve stem guide opening and an externally tapered lower end adapted to simultaneously center in the tappet guide opening, said tubular member further having an axial cylindrical bore, a resurfacing head having a tubular shaft, and an expansible pilot including an elongated sleeve having the lower end portion of said shaft rotatably fitted on its upper end portion, said sleeve having an intermediate external tapered portion centered in the upper end of said bore and an expansible lower end portion snugly fitted in said bore.

2. A device for resurfacing a valve seat of an engine block having spaced upper and lower portions respectively formed with cylindrical valve stem guide and tappet guide openings which are vertically aligned, and wherein a tappet is movable in and above said tappet guide opening and has a tapered upper end, comprising a pilot guide consisting of an elongated tubular member having an enlarged cylindrical upper end portion adapted to snugly fit in the valve stem guide opening and an internally tapered lower end adapted to simultaneously center on the upper end of the tappet when the latter is in an elevated position, said tubular member further having an axial cylindrical bore, a resurfacing head having a tubular shaft, and an expansible pilot including an elongated sleeve having the lower end portion of said shaft rotatably fitted on its upper end portion, said sleeve having an intermediate external tapered portion centered in the upper end of said bore and an expansible lower end portion snugly fitted in said bore.

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