Oct. 15, 1940. G. E. HUGGINS 2,217,952

VALVE GRINDING GAUGE

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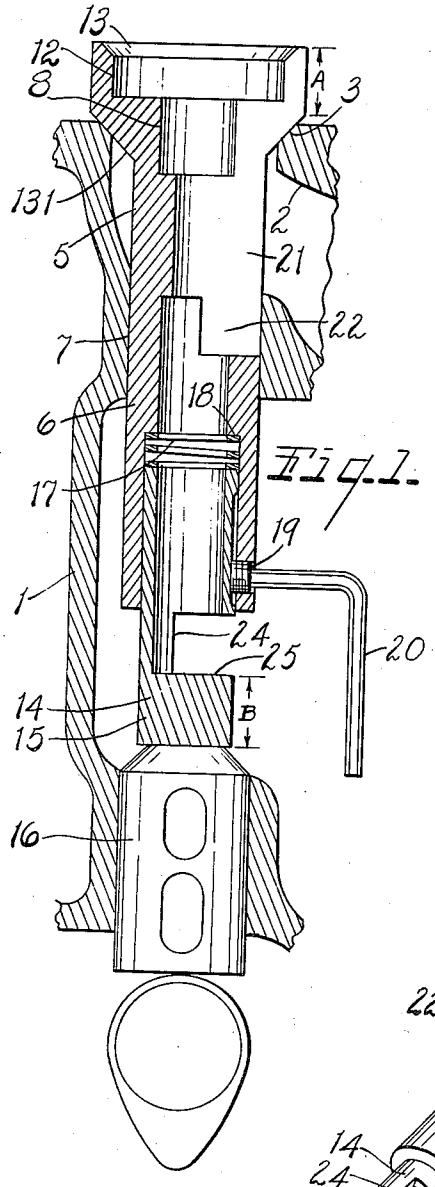


Fig. 1.

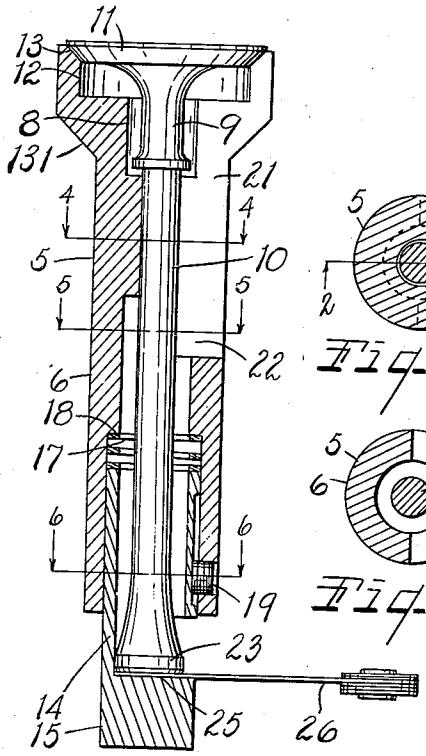


Fig. 2.

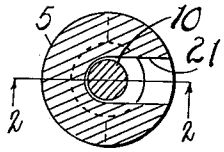


Fig. 4.

Fig. 5.

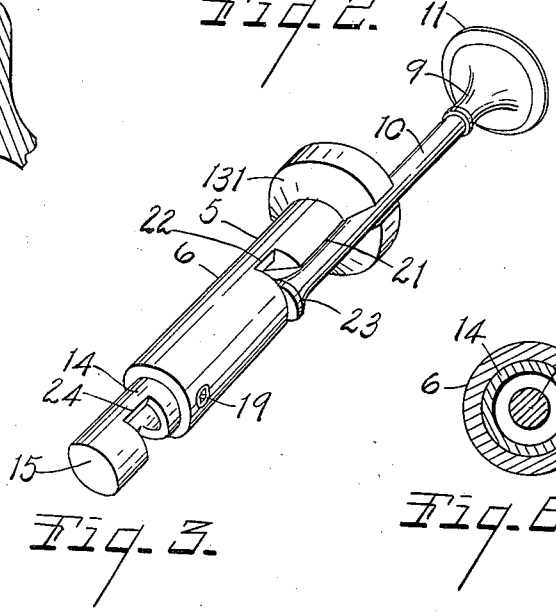


Fig. 3.

Fig. 6.

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VALVE GRINDING GAUGE

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7 Claims. (Cl. 33—181)

This invention relates to improvements in valve grinding gauges.

The main objects of this invention are:

First, to provide a novel gauge for facilitating the proper grinding and fitting of tappet valve elements.

Second, to provide a gauge of the type described which is of exceedingly simple construction and by which the accurate grinding of the valve seat and valve are facilitated.

Third, to provide a gauge which is in the form of a single unit adapted to be positioned in the valve opening of an engine block and to be properly adjusted therein, the said gauge thereafter serving as a handy and convenient device by use of which the grinding of the valve is greatly facilitated.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view in vertical section of part of an engine block adjacent a valve opening therein and illustrating the construction and relation thereto of the device of my invention.

Fig. 2 is a view generally similar to Fig. 1, being in section on line 2—2 of Fig. 4 and illustrating the manner in which the gauge is employed with a valve in determining the proper amount to be ground therefrom so that the valve will close properly on a ground valve seat.

Fig. 3 is a perspective view illustrating the manner in which a valve is inserted in the device of the invention for gauging.

Figs. 4, 5, and 6 are views in section on lines 4—4, 5—5, and 6—6, respectively, of Fig. 2.

This invention relates to a valve gauging device for facilitating the proper fitting of the valve with relation to the reground engine valve seats therefor. More particularly, it concerns such a device which is in the form of a single unit which may be inserted in its entirety in the valve opening of an engine block and given a single and final setting therein, after which the device is removed and availed of in the grinding or fitting of a valve, without further reference to the engine block or without the use of further coacting devices to enable the valve to be properly ground for accurate seating on the valve seat. Furthermore, no mental calculations are required in ascertaining the amount of metal to be removed. I am aware that devices have heretofore been proposed for this general purpose, but to my knowledge all thereof involve the successive use of a plurality of different gauging instrumentalities or require the making of a number of different settings; in short, all are characterized by a complexity either in structure or manner of use, which it is the particular purpose of the present invention to avoid.

Referring to the drawing, the reference numeral 1 indicates the cylinder block of an internal combustion engine which has a valve passage 2 provided with a valve seat 3 with which the gauging device of my invention coacts in ascertaining the amount of grinding of the valve stem requisite to provide proper closing. It is assumed that this seat has been properly ground.

The device of this invention is generally designated by the reference numeral 5 and consists of an elongated hollow tubular metal body member 6 of a diameter enabling the same to be slidably received in the valve guide opening 7 in the block. The bore of this member 6 is counterbored at 8 to receive the enlarged neck 9 of a valve between the stem 10 and valve element proper 11 of the valve, as clearly illustrated in Fig. 2, and is further counterbored at 12 and provided with a beveled seat 13 the angle of which corresponds to the angle of the engine block valve seat 3. This seat 13 receives the valve element 11 in testing, as shown in Fig. 2, and the gauge has an external beveled or inclined peripheral shoulder 131 which is adapted to engage the seat 3 when the gauge is inserted in the block, as in Fig. 1. The distance between the seat 13 and a vertically alined portion of the shoulder is indicated by the reference character A in Fig. 1.

At its lower end, the member 6 telescopingly receives a further tubular gauge element 14 which is hollow in part and at its lower end has a tappet engaging block 15 for engagement with the slidable tappet or cam follower 16 of the engine. The vertical thickness of this block is denoted B in Fig. 1 and is exactly equal to the dimension A. The element 14 is urged outwardly relative to the body member 6 by a coiled compression spring 17 interposed between the end of the element and an internal shoulder 18 formed in the bore of the body member 6. A set screw 19 extends through the member 6 and coacts with the element 14 for clamping the same in adjusted position. This set screw may be actuated by the wrench 20.

In order to facilitate insertion of the valve in the gauge for testing, I provide the latter with a radial slot 21 extending vertically from an intermediate point on the member 6 to the upper extremity of the same. This slot communicates the

bore of the body member with the exterior thereof and is of a sufficient width to receive the stem 10 of the valve in the manner illustrated in Fig. 4. The slot 11 may be provided with an enlarged portion 22 to accommodate the enlarged tappet engaging portion 23 of the valve.

The telescoping member 14 has an opening 24 formed in the side thereof and exposing the top surface 25 of the tappet engaging block 15, this opening enabling the insertion of a suitable feeler gauge 26, as illustrated in Fig. 2, and likewise serving as a sight opening.

In utilizing the gauging device of my invention, assuming that the valve seat has been properly ground, the gauge 5 is inserted in the valve opening so that the beveled shoulder 131 thereof firmly engages the valve seat 3. At this time, the set screw 19 is backed off so that the element 14 may telescope freely in the member 6 against the action of the spring 17. The block 15 engages the cam actuated tappet 16. With the telescoping element 14 properly positioned, the set screw 19 is actuated to clamp the element and member 6 in this adjusted position and the gauge is then removed from the engine block. Since the vertical thickness of the block 15 is exactly equal to the distance between the point of engagement of the shoulder 131 with the valve seat 3 and a corresponding point on the seat 13, it is clear that the distance between the surface 25 of the tappet engaging block 15 and the seat 13 of the gauge is exactly equal to the distance between the uppermost surface of tappet 16 and the valve seat 3.

In case the valve 4 is a new one which it is desired to properly fit for insertion, it is only necessary to grind sufficient material from the enlarged tappet engaging end portion 23 thereof to enable the latter to engage surface 25 (or a suitable clearance feeler gauge 26) when the beveled valve member 11 engages and seals the seat 13 of the gauge. This operation of grinding down the stem can be performed with the gauge of my invention conveniently at hand so that a number of trips to and from the engine block to determine by trial and error if the stem is of proper length are unnecessary. The feeler gauge 26 representing a thickness of, say, .002 inch when inserted between the end of the valve stem and the surface 25 as illustrated in Fig. 2 insures that when ground and reinstalled the valve will close on seat 3, by reason of the slight clearance provided. If the valve is an old one and in a pitted or corroded condition, it should be ground on the seat engaging surface, after which it may be gauged by removal of the metal from the end portion 23 as in the case of a new valve.

The device in accordance with the above description greatly simplifies the operation of fitting valves for proper and efficient seating. The device itself is simple, consisting of a single self-contained unit and not being dependent upon other coacting devices, nor requiring mental computation in its use, hence not involving the complexity of a manipulation which such devices commonly do.

I have illustrated and described my improvements in an embodiment which is very practical. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

Having thus described my invention, what I claim is new and desire to secure by Letters Patent is:

1. A valve gauging device comprising tubular telescoping tappet engaging and valve seat engaging members, spring means interposed between said members to urge the same longitudinally apart, said valve seat engaging member having a lateral slot communicating with the bore thereof for the reception of a valve to be gauged and having a valve seat engaging surface and a further test surface spaced longitudinally therefrom and adapted to be engaged by the valve to be gauged, said tappet engaging member having a tappet engaging surface and a test surface spaced longitudinally a distance equal to the spacing of corresponding longitudinally alined portions of said seat engaging surface and tappet surface on the seat engaging member, the relative adjusted positions of said telescoping members being determined by insertion thereof in a valve opening for engagement with the valve seat and tappet of an engine respectively, thereby telescopingly shifting the same in opposition to said spring means, and means for securing the members in longitudinally adjusted position.

2. A valve gauging device comprising tubular telescoping tappet engaging and valve seat engaging members, said valve seat engaging member having a bore for the reception of a valve to be gauged and having a valve seat engaging surface and a further test surface spaced longitudinally therefrom and adapted to be engaged by the valve, said tappet engaging member having a tappet engaging surface and a test surface spaced therefrom a distance equal to the spacing of corresponding longitudinally alined portions of said seat engaging and first named test surfaces on the seat engaging member, the relative adjusted postions of said telescoping members being determined by insertion thereof in a valve opening for engagement with the valve seat and tappet of an engine respectively, means for resiliently urging said members in opposite directions, and means for securing the members in longitudinally adjusted position.

3. A valve gauging device comprising tubular telescoping tappet engaging and valve seat engaging members, spring means interposed between said members to urge the same longitudinally apart, said members having provision for the reception of a valve to be gauged, said seat engaging member having a valve seat engaging surface and a further test surface spaced longitudinally therefrom and adapted to be engaged by the valve to be gauged, said tappet engaging member having a tappet engaging surface and a test surface spaced longitudinally a distance equal to the spacing of corresponding longitudinally alined portions of said seat engaging and tappet surfaces on the seat engaging member, the relative adjusted positions of said telescoping members being determined by insertion thereof in a valve opening for engagement with the valve seat and tappet of an engine respectively, thereby telescopingly shifting the same in opposition to said spring means, and means for securing the members in longitudinally adjusted position.

4. A gauging or testing device of the type described comprising a pair of hollow axially telescoping members, one thereof having a beveled surface engageable with the valve seat of an engine and a further similarly beveled gauging seat spaced axially from the seat engaging surface and adapted to be engaged by a valve to be test-

ed, the other thereof having a surface engageable with the tappet of the engine and a further test surface spaced axially from said tappet engaging surface a distance equal to the spacing of the seat engaging and gauging surfaces of said first named member, means for urging said members for relative axial movement in one direction to oppose engagement of said seating surface with a valve seat when said tappet engaging surface is in engagement with a tappet of the engine, and means for clamping said members in axially adjusted position.

5. A gauging or testing device of the type described comprising a pair of axially telescoping members having provision to receive a valve to be tested, one thereof having a surface engageable with the valve seat of an engine and a further gauging seat spaced axially from the seat engaging surface and adapted to be engaged by a valve to be tested, the other thereof having a surface engageable with the tappet of the engine and a further test surface spaced axially from said tappet engaging surface a distance bearing a predetermined relation to the spacing of the seat engaging and gauging surfaces of said first named member, means for urging said members for relative axial movement in one direction to oppose engagement of said seating surface with a valve seat when said tappet engaging surface is in engagement with a tappet of the engine, and means for clamping said members in axially adjusted position.

6. A gauging or testing device of the type described comprising a pair of axially telescoping members having provision to receive a valve to be tested, one thereof having a surface engageable with the valve seat of an engine and a further gauging seat spaced axially from the seat engaging surface and adapted to be engaged by a valve to be tested, the other thereof having a surface engageable with the tappet of the engine and a further test surface spaced axially from said tappet engaging surface a distance bearing a predetermined relation to the spacing of the seat engaging and gauging surfaces of said first named member, the distance between said gauging seat and test surface representing the distance between said valve seat and tappet when said device is axially adjusted so that the first named surface engages the engine valve seat and said tappet engaging surface engages a tappet of the engine, resilient means to urge the members apart, and means for clamping said members in axially adjusted position.

7. A gauging or testing device of the class described comprising a tubular body member adapted to be inserted in a cylinder block with a valve guide removed therefrom and having a head portion adapted to rest on the valve seat, said member having a seat in its outer end corresponding to the valve seat and adapted to receive a valve adapted to coact with the valve seat with the stem of the valve disposed within the body member, a tappet engaging member telescopingly adjustable relative to said body member and provided with a gauging seat in opposed relation to the end of a valve stem arranged in the device, resilient means to urge the members apart, and means for securing said tappet engaging member in its adjusted position in said body member.

GERALD E. HUGGINS.