Nov. 14, 1939. B. H. DAVIS 2,179,714

VALVE GRINDING TOOL

Filed Oct. 29, 1936

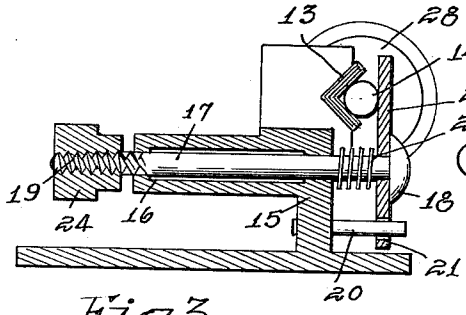


Fig. 3.

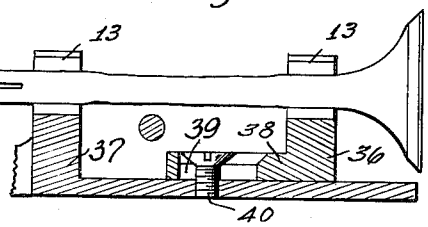


Fig. 5.

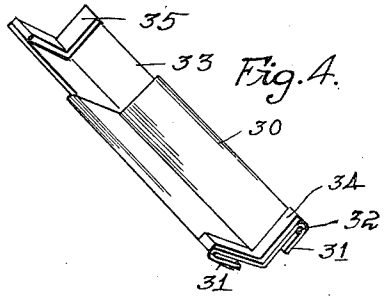


Fig. 4.

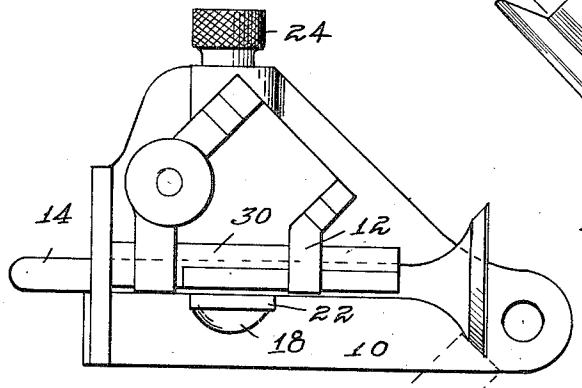


Fig. 2.

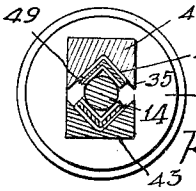


Fig. 7.

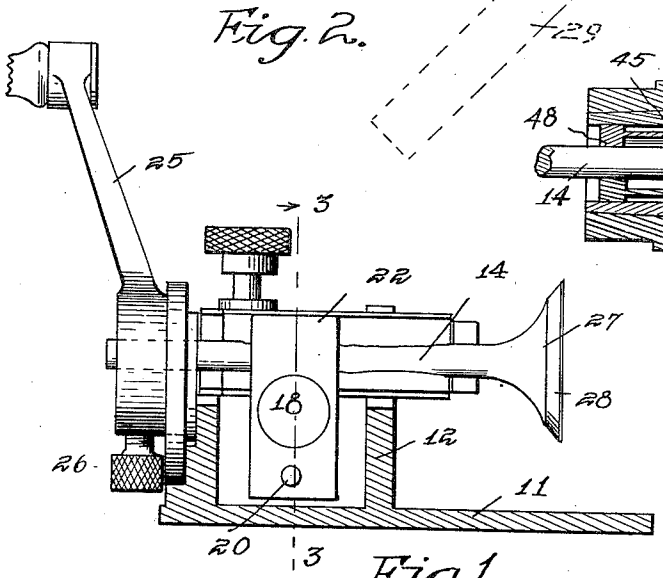


Fig. 1.

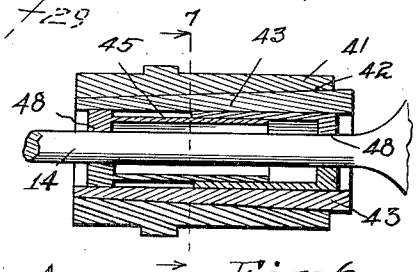


Fig. 6.

Inventor

Bert H. Davis

by Owing & Hague Attys

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VALVE GRINDING TOOL

Bret H. Davis, Ollie, Iowa

Application October 29, 1936, Serial No. 108,188

3 Claims. (Cl. 51—236)

This invention relates to improvement in devices for grinding and refinishing worn mushroom valves of the type employed in internal combustion engines, and particularly to grinding devices adapted to finish and regrind automobile valves, having a pair of bearing members provided with V-shaped notches for rotatably receiving the valve stem, and clamping means for securing the valve stem within the bearings, together with a crank device or other suitable mechanism for rotating the valve within said bearings and in operative relation with a suitable grinder employing either a fixed grinding element or a rotating grinder. Valve grinding devices of the type above described operate very efficiently and accurately if the valve stems have not become worn, but difficulty has been experienced in accurately grinding valves having worn stem portions, inasmuch as the uneven surfaces of the worn portion of the valve stem causes the valve seat to operate in an eccentric manner rather than in a concentric manner.

It is, therefore, the object of my invention to provide a simple, durable and inexpensive device which may be easily and quickly attached to the ordinary valve grinding tool and when so attached, will enable the operator to grind the valves accurately.

More specifically, it is the object of my invention to provide a telescopically arranged device having a bearing at each end for engaging the unworn portions of the valve stem near each of its ends, said device to be clamped in the V-shaped notches of the grinding machine, without altering the construction of the stem.

A further object of my invention is to provide in a valve grinding tool employing a pair of valve stem supporting bearings and means for clamping a valve stem therein, means for adjustably supporting one of the bearings to move toward and from the other so that the movable bearings may be adjusted so that the bearing members may always engage unworn portions of the valve stem.

A further object of my invention is to provide improved chucking means wherein the adjustable bearing elements may be easily and quickly clamped into a rotating head wherein the head rotates about the longitudinal axis of the valve stem when clamped therein.

My invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of a grinder head such as is used in some types of grinding machines now in commercial use, showing the manner in which my improved device is attached thereto and the manner in which a valve having a worn valve stem is mounted therein.

Figure 2 is a plan view of Figure 1.

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a perspective view of my improved attachment designed to be used in valve grinding machines.

Figure 5 is a sectional view of the head element of a valve grinding machine showing the manner in which an adjustable bearing element may be applied thereto to carry out my invention.

Figure 6 is a longitudinal sectional view of a rotating grinding head removed from its support showing the manner in which my invention may be applied to rotating heads.

Figure 7 is a detail sectional view taken on the line 7—7 of Figure 6.

In the accompanying drawing I have illustrated in Figures 1, 2 and 3 a grinder head 10 such as is used on certain types of grinding machines now in commercial use, said head comprising a base plate 11 having upright supports 12, each of said supports having in its front edge a V-shaped notch 13 to form bearings for receiving a valve stem 14. The member 11 is also provided with an upright support 15 having a horizontally extending portion 16 provided with an opening for slidably receiving a shaft 17 having a head 18 at one end and a screw threaded portion 19 at its opposite end. The member 15 has a forwardly extending pin 20 designed to enter an opening 21 in a vertical clamping plate 22, said plate also being mounted on the shaft 17, having its upper end designed to engage the valve stem 14 and to retain the same in the notches 13. A spring 23 is provided for holding the plate 22 at its outer limit of movement, the screw-threaded portion 19 being provided with a nut 24 for clamping the plate 22 against the stem 14.

A crank 25 is rotatably mounted adjacent to one end of one of the members 12 and adapted to receive the free end of the valve stem 14, a set screw 26 being provided in the crank 25 for clamping the valve stem thereto, thus providing means whereby the valve stem may be rotated and with it the valve 27, with the seat 28 of said valve stem in operative relation with a grinding element 29 illustrated in dotted lines, which may

be either a stationary grinder or a rotatably mounted stone.

The mechanism above described pertains to one type of valve grinding mechanism such as is in common use, and forms no part of my present invention other than a support for my improved bearing plates illustrated in Figure 4.

As stated in my objects, one of the difficulties in devices of this type is that the members 12 and the V-shaped bearing notches 13 are supported in fixed relation and usually so close together that either one or both of the bearing elements will engage the central portion of the valve stem which has become more or less worn, so that the valve seat 28 cannot be accurately ground. To overcome this difficulty I have provided an attachment which may be easily and quickly placed in the grooves 13, comprising a body portion 30, formed preferably of sheet metal and bent to form a V-shaped portion having its edges bent outwardly and re-doubled near its outer surface to provide flanges 31 having spaces 32 between the flanges for receiving one end of a second V-shaped plate 33 in a telescopic manner, the outer end of the member 30 having a plate or strip 34 to provide a bearing member, while the outer end of the member 33 is provided with a thicker strip 35 to provide a second bearing member, the member 35 being of a thickness equal to the combined thickness of the member 33 and the member 34.

By this arrangement, the member 30 may be placed in the V-shaped notches 13, having the members 30 and 33 adjusted so that the bearing strips 34 and 35 will engage unworn portions of the valve stem near each end so that the said valve stem may be rotated concentrically within said bearings, so that the seat 28 may be accurately ground. Both the stem 14 and the member 30 are clamped in position by means of the plate 22.

In Figure 5 I have illustrated a modified form of my device in which, instead of providing auxiliary bearing plate such as illustrated in Figure 4, I have simply mounted a bearing member 36 to slide towards and from the bearing member 37, so that the V-shaped bearings 13 may always be brought into engagement with unworn portions of the valve stem, the member 36 being provided with an extension 38 having a slot 39 for receiving a set-screw 40 by means of which the bearing member 36 may be adjusted in any desired position, thus providing means whereby the device is adapted to be used in connection with valve stems of various lengths.

In Figures 6 and 7 I have illustrated means whereby my device may be used in a rotatably mounted head 41, said head being provided with a tapered opening 42 for receiving the valve stem 14, said opening being preferably rectangular in cross section, as shown in Figure 7, for receiving wedges 43, having V-shaped notches 44 for receiving telescopic auxiliary bearing members 45 similar to the member 30, the outer faces of the members 43 being beveled to provide wedges whereby valve stems of various diameters may be used in the bearing members 48.

Thus it will be seen I have provided a very simple and inexpensive device in the nature of an auxiliary attachment which may be applied to valve grinders of the type illustrated in Figures 1, 2 and 3, and when so applied, the valve stem may be clamped in the device in such a manner that the valve seat may be accurately and evenly ground, regardless as to whether or not the central portion of the valve stem has been worn, my invention consisting principally in providing bearing members which may be adjusted toward and from each other to accommodate valve stems of various lengths whereby the unworn portion of the stem may be mounted in the bearing, the modifications described and illustrated simply being to illustrate the manner in which the invention may be applied to various structures.

I claim as my invention:

1. A valve grinder, comprising a base having bearing elements provided with V-shaped notches for rotatably receiving a valve stem and adjustable means for retaining the valve stem within said notch, in combination with an auxiliary bearing device adapted to be placed in said notches and provided with V-shaped bearing elements adjustably mounted to move toward and from each other whereby valve stems of various lengths may be placed in said auxiliary bearings to engage unworn portions of said valve stem near its ends, for the purposes stated.

2. An auxiliary bearing element for valve grinders, comprising a body member V-shaped in cross section, a second V-shaped body member telescopically connected to the first body member, the free ends of said body member having bearings for rotatably supporting the unworn portions of a valve stem, for the purpose described.

3. An auxiliary bearing element for valve grinders, comprising a body member V-shaped in cross section, a second V-shaped body member telescopically connected to the first body member, one end of one body member having a bearing for rotatably supporting the unworn portion of a valve stem for the purpose described.

BRET H. DAVIS.