2,894,504

VALVE SEAT STONE DRESSER


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7 Claims. (Cl. 125—11)

This invention relates in general to new and useful improvements in tools for internal combustion engines, and more specifically to an improved valve seat stone dresser.

In the construction of internal combustion engines, there are provided valve seats formed either in the block or in the head against which heads of valves seat. In the average internal combustion engine, the face of the head of the valve and the valve seat are ground at an angle of 45°. However, in some internal combustion engines other angles, such as 30°, are utilized. Irrespective of the particular angle used, both the angle of the face of the head of the valve and the angle of the valve seat are to be identical.

The primary difficulty with present day equipment is that one machine is used for refacing valves and another machine is used for grinding the valve seats. As a result, there are two separate grinding stages, each of which is variable. As a result, the angle of the face of the valve head may vary slightly from the angle of the valve seat. This results in an improper fit between the valve seat and the valve seat inasmuch as there should be a continuous mating surface between the face of the valve seat and the valve seat, this mating surface being annular and having a width in the vicinity of thirty seconds of an inch.

It is therefore the primary object of this invention to provide a valve seat stone dressing tool which is so constructed whereby it may be mounted on the valve refacing machine so that the valve seat stone may be dressed to the same angle as the angle which the face of the valve is ground.

Another object of this invention is to provide an improved attachment for valve refacing machines, the attachment including a clamp for clamping a stone dressing tool on a guard of the grinding wheel assembly of the refacing tool and a pilot mountable within a chuck of the driven chuck of the refacing machine whereby a stone dressing stone mounted on the pilot is aligned with the dressing tool and with the alignment of the valve with respect to the grinding wheel of the grinder part of the refacing tool.

A further object of this invention is to provide an improved attachment for refacing machines, the attachment being in the form of a mounting bracket secured to a guard for a driven wheel of the refacing machine and there being provided suitable means on the mounting bracket for the adjustment mounting of the dressing stone.

These together with other objects and advantages which will become subsequently apparent reside in the details of the construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a top plan view of a conventional type of valve refacing machine and shows mounted on the same the valve seat stone dressing attachment which is the subject of this invention, a valve seat dressing stone being illustrated in position for a dressing operation;

Figure 2 is an enlarged fragmentary view showing the manner in which the dressing stone for the valve seat grinding stone is mounted on a guard for the grinding wheel of the valve refacing machine; and

Figure 3 is an enlarged perspective view of the mounting bracket assembly of Figure 2.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figure 1 a conventional type of valve refacing machine, such machine being the subject of Patent No. 2,120,198, granted on June 7, 1938.

The valve refacing machine 10 includes a suitable base 12 which has mounted thereon for transverse sliding movement a slide plate 14. Carried by the slide plate 14 is an electric motor 16 which is drivenly connected to a spindle assembly 18. The entire unit is adjustable transversely of the base 12 by means of an adjusting screw 20 and a hand wheel 22.

The spindle assembly 18 includes a grinding wheel 24 which has a major portion thereof encased within a suitable guard 26. The grinding wheel 24 and the guard 26 are moved together as a unit longitudinally of the base 12 by means of a feed assembly 28.

Also mounted on the base 12 is a chuck assembly which is referred to in general by the reference numeral 30. The chuck assembly 30 includes a chuck 32 for receiving a stem of a valve. If desired, the chuck assembly 30 may include an electric motor for driving the chuck 32.

In the normal operation of the valve refacing machine 10, a stem of a valve is locked into the chuck 32 and is so mounted whereby it may even be driven in response to driving of the chuck 32 or may be free to rotate. The chuck assembly 30 is provided with a suitable base 34 which is rotatably mounted on the base plate 12. By rotating the base 34 and fixedly securing it to the base plate 12, the desired angle between a head of a valve (not shown) with respect to the guide wheel 24 may be obtained.

After the chuck assembly 30 has been set at the desired angle, a stem of a valve to be refaced is locked into the chuck 32. Then the grinding wheel 24 is advanced transversely of the base plate 12 so that it is in the proper position with respect to the face of the valve to be refaced. Then the grinding wheel 24 is fed back and forth longitudinally of the base plate 12 over the face of the valve to reface it through a grinding operation.

The above described method of refacing a valve determines the angle of such face of the valve. The angle of a valve seat is determined by the angle of a grinding surface 36 of a seat grinding stone 38. The seat grinding stone 38 is removably carried by a grinding sleeve 40 which has releasably attached thereto a mounting head 42. The sleeve 40 is mounted on a suitable spindle or pilot (not shown) normally carried by a valve guide (not shown) of the internal combustion engine for centering the stone 38 with respect to the valve seat to be ground.

In order to dress the grinding face 36 of the stone 38 at the desired angle, a suitable dressing stand, such as the dressing stand of Patent No. 1,999,435, granted on April 30, 1935, is utilized. The angle of the grinding face 36 is determined by inserting the particular dressing tool.

It is readily apparent that the angle of the grinding face 36 may vary from the angle between the head of the valve and the grinding stone 38 so that the face of the valve may be ground at a slightly different angle from the valve seat.

In order to overcome the above mentioned deficiency, it is desired that the dressing face 36 of the stone 38 be dressed in the same manner as the face of the valve is ground for the seat to which the stone 38 is to be
applied. The stone 38 is retained in the same position as the head of the valve refaced by the valve refacing machine 10 by means of a special spindle or pilot 44 which is chucked in the chuck 32. The sleeve 40 is then passed over the spindle 44 and the stone 38 is ready for rotation by the head 42 in the customary manner.

Referring now to Figure 3 in particular, it will be seen that there is illustrated a valve seat stone dressing tool which is referred to in general by the reference numeral 46. The valve seat stone dressing tool 46 includes a mounting bracket 48 having a plurality of circumferentially spaced clamp fingers 50 which are engageable over the grinding stone guard 26. In order that the mounting bracket 48 may be clamped on the guard 26, at least one of the clamp fingers 50 is provided with a set screw 52.

Carried by the mounting bracket 48 is an internally threaded member 54. The internally threaded member 54 has an axis which is disposed parallel to the plane of the grinding wheel 24. Threadedly engaged in the internally threaded member 54 is an elongated screw threaded member 56 which is provided at one end with a latching means 60 to facilitate setting of the screw threaded member 56. A lock nut 62 is mounted on the screw threaded member 56 for locking it in position relative to the internally threaded member 54.

In the operation of the attachment for dressing the stone 38 on the valve refacing machine 10, the stone 38 is mounted in the position illustrated in Figure 1 and the valve seat stone dressing tool 46 is clamped on the guard 26, as is best illustrated in Figures 1 and 2. The diamond 58 is advanced to a point whereby it projects beyond the grinding wheel 24. Then by advancing the grinder wheel 24, the guard 26 and the valve seat stone dressing tool as a unit, the diamond 58 is positioned that it will lightly engage the dressing portion 36 of the stone 38. With the head 42 operating, the valve seat stone dressing tool is moved longitudinally on the base plate 12 by means of the feed mechanism 28. The diamond 58 is moved back and forth over the dressing portion or dressing face 36 of the stone 38 and the diamond 58 is fed slowly into the stone 38 by means of the feed screw 20. This is continued until the dressing portion 36 of the stone 38 has been properly dressed. The angle of the dressing face 36 of the stone 38 is then identified as the face of the valve head. Thus a valve seat ground with the stone 38 will have an angle identical to the angle of the face of the valve for which it is intended.

Although, the invention has been illustrated as being attached to a machine of the type wherein the grinding wheel is moved relative to the valve being refaced, the application of the invention is not so limited. If desired, the diamond holder may be used in conjunction with machines which are so constructed to move the valve relative to the grinding wheel.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes of detail readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a valve refacing machine of the type including a grinder having a grinding wheel and a guard, and a valve stem chuck, a valve seat stone dressing tool including a mounting bracket secured to said guard, a dressing stone carried by said mounting bracket, and a valve seat dressing tool pilot carried by said chuck, said dressing stone facing said pilot for dressing a valve seat stone mounted on said pilot.

2. In combination with a valve refacing machine of the type including a grinder having a grinding wheel and a guard, and a valve stem chuck, a valve seat stone dressing tool including a mounting bracket secured to said guard, a dressing stone carried by said mounting bracket, and a valve seat dressing tool pilot carried by said chuck, said dressing stone facing said pilot for dressing a valve seat stone mounted on said pilot.

3. In combination with a valve refacing machine of the type including a grinder having a grinding wheel and a guard, and a valve stem chuck, a valve seat stone dressing tool including a mounting bracket secured to said guard, a dressing stone carried by said mounting bracket, and a valve seat dressing tool pilot carried by said chuck, said dressing stone facing said pilot for dressing a valve seat stone mounted on said pilot.

4. For use in combination with a valve refacing of the type including a grinding wheel and a guard for the grinding wheel with the guard having an end wall surface disposed parallel to the plane of the grinding wheel, a valve seat stone dressing tool comprising a mounting bracket having a flat face adapted to be disposed in face to face engagement with an associated grinding wheel guard end wall, mounting means on said mounting bracket for attachment to the grinding wheel guard, a dressing stone, and support means on said mounting bracket adaptably supporting said dressing stone, said support means including an elongated holder disposed parallel to said flat face and projecting beyond said mounting bracket.

5. For use in combination with a valve refacing of the type including a grinding wheel and a guard for the grinding wheel with the guard having an end wall surface disposed parallel to the plane of the grinding wheel, a valve seat stone dressing tool comprising a mounting bracket having a flat face adapted to be disposed in face to face engagement with an associated grinding wheel guard end wall, mounting means on said mounting bracket for attachment to the grinding wheel guard, a dressing stone, and support means on said mounting bracket adaptably supporting said dressing stone, said support means including an elongated holder disposed parallel to said flat face and projecting beyond said mounting bracket, said mounting means including a plurality of clamp fingers, at least one of said fingers.

6. For use in combination with a valve refacing of the type including a grinding wheel and a guard for the grinding wheel with the guard having an end wall surface disposed parallel to the plane of the grinding wheel, a valve seat stone dressing tool comprising a mounting bracket having a flat face adapted to be disposed in face to face engagement with an associated grinding wheel guard end wall, mounting means on said mounting bracket for attachment to the grinding wheel guard, a dressing stone, and support means on said mounting bracket adaptably supporting said dressing stone, said support means including an elongated holder disposed parallel to said flat face and projecting beyond said mounting bracket, said mounting means including a plurality of clamp fingers, at least one of said fingers.

7. For use in combination with a valve refacing of the type including a grinding wheel and a guard for the grinding wheel with the guard having an end wall surface disposed parallel to the plane of the grinding wheel, a valve seat stone dressing tool comprising a mounting bracket having a flat face adapted to be disposed in face to face engagement with an associated grinding wheel guard end wall, mounting means on said mounting bracket for attachment to the grinding wheel guard, a dressing stone, and support means on said mounting bracket adaptably supporting said dressing stone, said support means including an elongated holder disposed parallel to said flat face and projecting beyond said mounting bracket, said mounting means including a plurality of clamp fingers, at least one of said fingers.
justably supporting said dressing stone, said support means including an internally threaded member secured to said mounting bracket, a screw threaded member, said dressing stone being mounted on one end of the screw threaded member, said screw threaded member being adjustably mounted in said internally threaded member, said screw threaded member having an axis disposed parallel to said flat face and said dressing stone projecting beyond said mounting bracket, said mounting means including a plurality of clamp fingers, at least one of said fingers having a setscrew.

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