Feb. 12, 1946. P. WEYNAND 2,394,882

VALVE SEAT GRINDING TOOL

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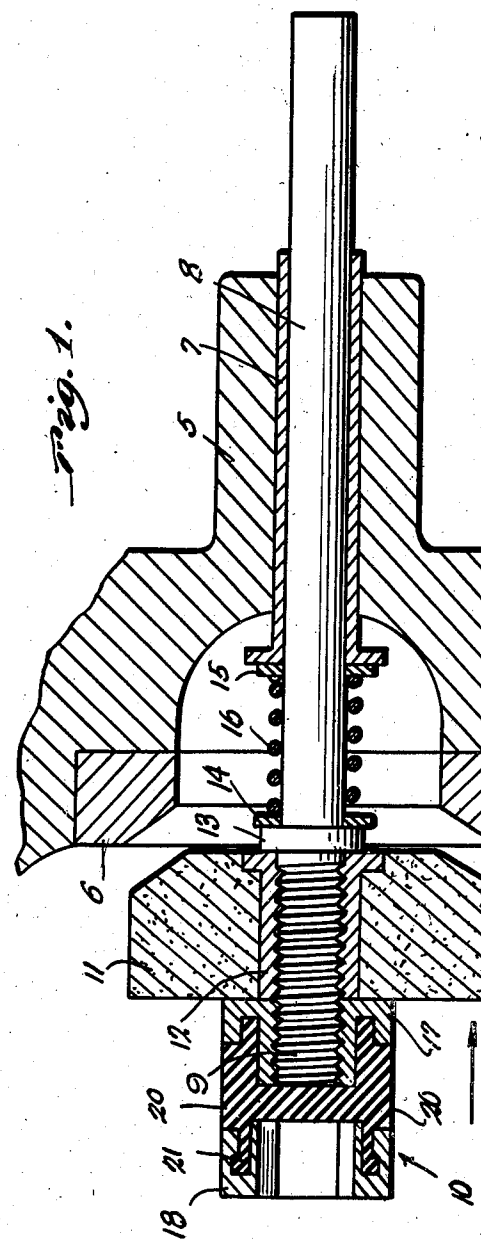

Fig. 1.

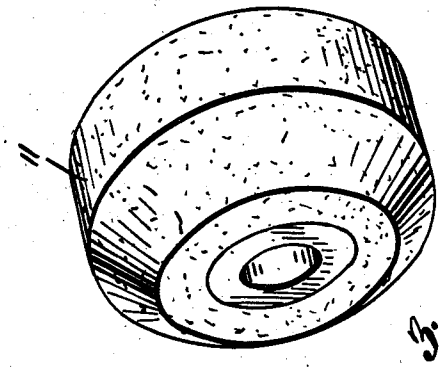

Fig. 3.

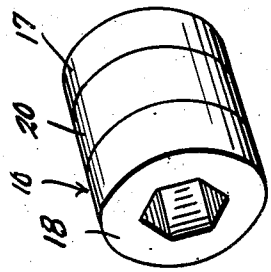

Fig. 2.

Inventor

Paul Weynand

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

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Fig. 4.

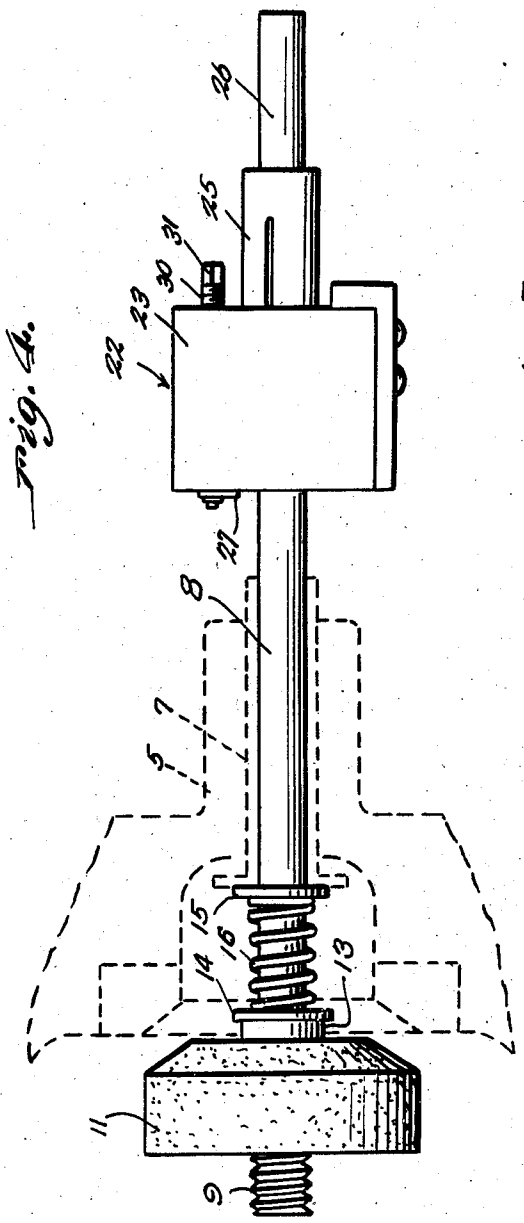
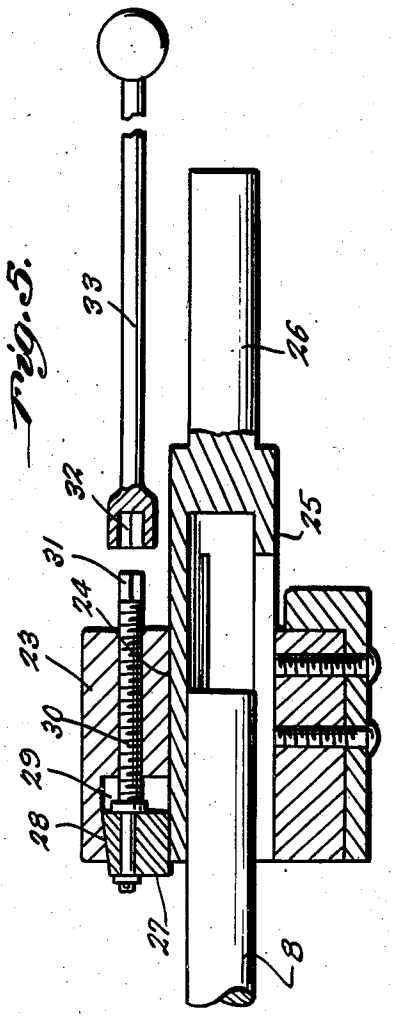


Fig. 5.



Inventor

Paul Weynand

By Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Patented Feb. 12, 1946 2,394,882

UNITED STATES PATENT OFFICE

2,394,882

VALVE SEAT GRINDING TOOL

Paul Weynand, San Antonio, Tex.

Application September 15, 1943, Serial No. 502,513

3 Claims. (Cl. 51—241)

This invention appertains to new and useful improvements in valve seat grinding tools and more particularly to a tool especially adapted for grinding aeroplane engine valve seats.

The method now commonly used in grinding aeroplane engine valve seats is first attaching the cylinder to a base on the grinding machine which necessitates securing the grinding stone pilot securely into the valve guide by means of a locking type pilot. The stone is then fitted to a projecting shaft and the seat is ground by electric motor coupled to a flexible shaft connected to the stone drive. This method cuts the valve seats true only in relation to the valve guide, the pilot being locked securely into the guide, the seating surface of the valve is then cut on another machine and is sometimes cut many times to find the angle to fit the ground valve seat.

The principal object of the present invention is to preserve the merits of the above method, but to shorten the overall operation by the provision of a specially constructed tool.

Other objects and advantages of the invention will become apparent to the reader of the following description.

In the drawings:

Figure 1 represents a fragmentary detailed sectional view showing a valve seat with the improved tool in working relation with respect thereto.

Figure 2 is a perspective view of the power coupling.

Figure 3 is a perspective view of the grinding stone.

Figure 4 is a fragmentary side elevational view showing a special type of coupling for driving the stone shaft from the guide end thereof.

Figure 5 is a fragmentary detailed sectional view through the power coupling shown in Figure 4.

Referring to the drawings wherein like numerals designate like parts, it can be seen that Figure 1 shows a portion of an engine including one valve seat and the tool being driven from the outer end. In this connection, numeral 5 denotes a portion of the engine, while numeral 6 denotes a beveled valve seat. A tubular guide 7 is provided for accommodating the usual valve stem (not shown) and through this is disposed a shaft 8, forming part of the present invention.

This shaft may be driven from either end, depending upon requirements, and one end is threaded as at 9 to accommodate a coupling generally referred to by numeral 10 when the shaft is driven from the left hand in Figure 1.

Numeral 11 denotes a grinding stone having a beveled face, at the bevel of the seat 6. This stone 11 has an internally threaded centrally located bushing 12 and the stone is adapted to be screwed onto the threaded portion 9 and against a shoulder 13 of said shaft 8.

A pair of washers 14, 15 are provided on the shaft 8, one to abut the shoulder 13 and the other to abut the adjacent end of the guide sleeve 7, and a compression spring 16 is interposed between these washers, for the purpose of maintaining the stone 11 urged a slight distance away from the valve seat 6.

The coupling 10 consists of a pair of annular members 17, 18, the member 17 being internally threaded to coact with the threads 9 of the shaft 8, while the ring 18 is provided with a polygonally-shaped openings to receive a motor driven tool (not shown). Interposed between the annular members 17, 18 is an annular cap member 20 of some resilient material such as rubber forming a cushion for the threaded end of the shaft, and this annulus 20 is provided with laterally disposed portions 21 which are received by grooves in the annular members 17, 18. Thus a flexible connection is provided between the members 17, 18.

A power driven tool is engaged with the annular member 18 of the coupling 10, and by exerting pressure against the resistance of the spring 16, the stone 11 can be brought into working engagement with the seat 6.

For driving the shaft 8 from the right end as shown in Figure 4, a special coupling generally referred to by numeral 22 is provided.

The coupling 22 consists of a block 23 having a bore 24 therethrough for receiving a slotted barrel 25 of spring metal from which a power tool engageable shank 26 projects. The barrel 25 is adapted to receive one end of the shaft 8 and is adapted to be compressed to snugly engage the shaft 8 by a wedge member 27 operating against the tapered formation 28 in a pocket 29. Swivelly connected to this wedge member 27 is one end of a screw shaft 30 which is feedable through the block 23 and has a polygonal-shaped end portion 31 adapted to be engaged by the polygonal-shaped socket 32 of a tool 33. Obviously, by operating the screw 30, the wedge member 27 is actuated by tightening or loosening the barrel 25 with respect to the shaft 8.

The stone 11 which is securely fastened on shaft 8 makes a complete assembly. This assembly is put on a valve refacing machine where stone is refaced and the valve is then refaced on

the same valve machine, automatically securing the same angle on both the valve and seat.

While the foregoing specification sets forth the invention in specific terms, it is to be understood that numerous changes in the shape, size and materials may be resorted to without departing from the spirit and scope of the invention as claimed hereinafter.

Having described the invention, what is claimed as new is:

1. A valve grinder comprising a shaft, a grinding stone on the shaft, a member for rotating the stone and shaft, a resilient coupling between the stone and the rotating member, said shaft serving as a pilot, said coupling consisting of a cup secured to the shaft, a resilient insert in the cup, a socket anchored in the insert and to which the rotating member is attachable.

2. A valve grinder comprising a shaft, a grinding stone on the shaft, a member for rotating the stone and shaft, a resilient coupling between the stone and the rotating member, said shaft serving as a pilot, said coupling consisting of a cup secured to the shaft, a resilient insert in the cup, a socket anchored in the insert and to which the rotating member is attachable, said insert being removable from the cup.

3. A valve grinder comprising a shaft, a grinding stone on the shaft, a member for rotating the stone and shaft, a resilient coupling between the stone and the rotating member, said shaft serving as a pilot, said coupling consisting of a cup secured to the shaft, a resilient insert in the cup, a socket anchored in the insert and to which the rotating member is attachable, said insert being removable from the cup, and a retaining spring ring for holding the insert against displacement from the cup.

PAUL WEYNAND.