

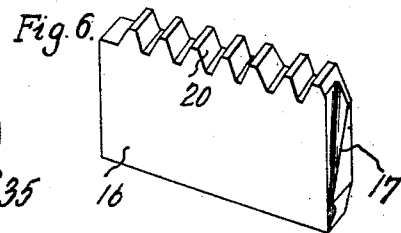
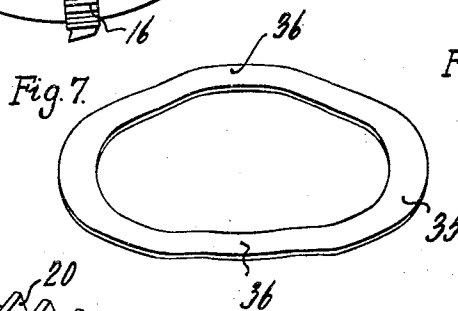
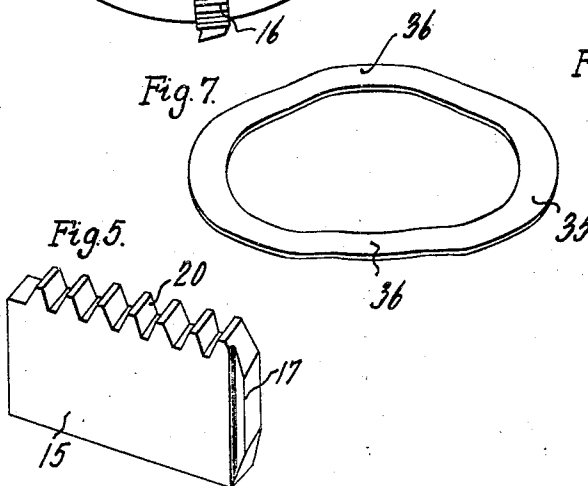
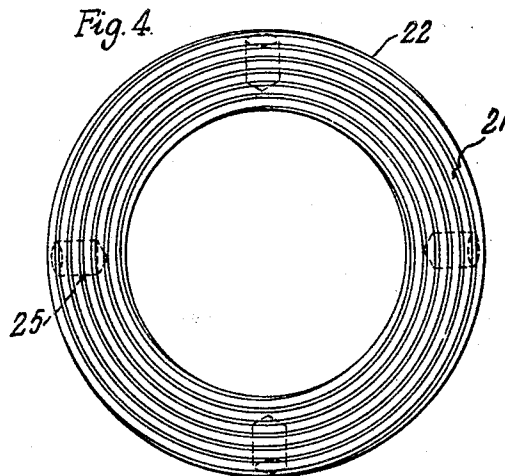
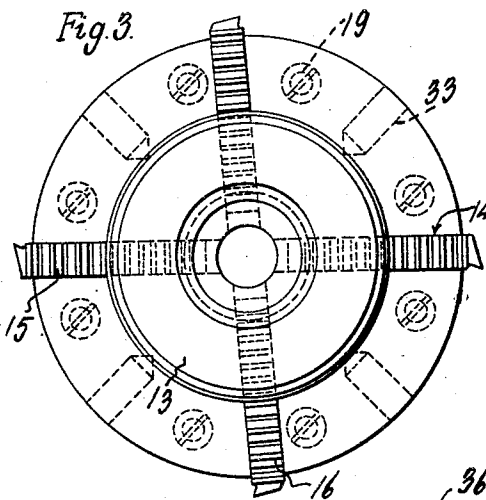
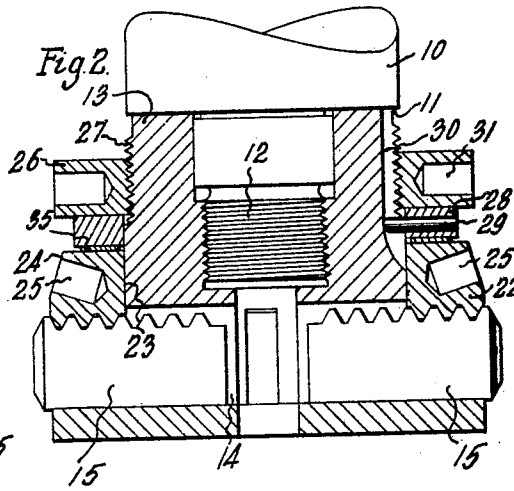
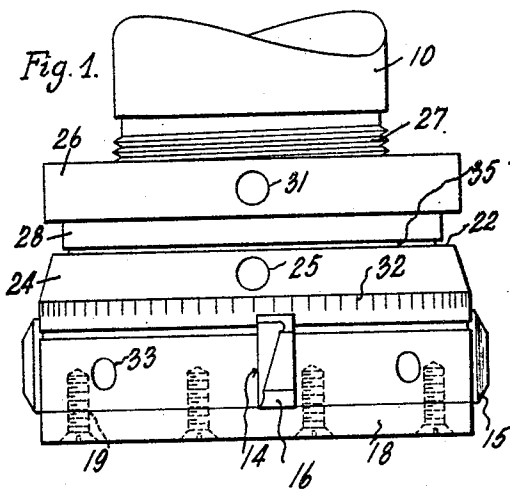
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ADJUSTABLE BORING HEAD

Filed March 1, 1930



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UNITED STATES PATENT OFFICE

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ADJUSTABLE BORING HEAD

Application filed March 1, 1930. Serial No. 432,409.

This invention relates to adjustable boring tools, particularly such as are adapted for use in re boring the cylinders of internal combustion motors. In this type of work it is desirable to secure actual registry of the tool and the cylinder by adjusting the tool so that it exactly fits the cylinder when inserted in it; and then, while preserving this registry, to withdraw the tool from the cylinder and adjust it to the exact size to which the cylinder is to be re bored. In this operation it is desirable, but not practically possible with boring tools previously proposed, to adjust the setting of the tool without removing it from the cylinder more than enough to permit the cutting members to clear the cylinder wall. The saving of time and effort necessary by requiring only this minimum shifting of the tool is obvious. It is the object of the invention to provide a tool in which these advantages can be attained. A further object of the invention is to provide a boring tool in which the cutting elements can be adjusted radially and can also be clamped in adjusted position without requiring access to more than a portion of the side of the tool, and particularly without requiring access to the bottom of the tool.

Referring to the drawing:

Fig. 1 is a side elevation of a boring tool embodying my invention;

Fig. 2 is an elevation thereof in median section;

Fig. 3 is a plan view of the device, with all adjusting parts above the cutting members removed;

Fig. 4 is a bottom plan view of the spirally grooved ring for adjusting the cutting members;

Figs. 5 and 6 are perspective details illustrating the preferred form of cutters used; and

Fig. 7 is a perspective detail of a spring washer.

The tool is shown as supported on a boring bar 10, which may be rotated and fed longitudinally by any desired mechanism, and which is reduced at its end to form a locating shoulder 11 and a threaded extension 12.

The boring tool has a body portion 13, screw-threaded internally to fit on the threads 12, and adapted to abut the locating shoulder 11 when fully screwed in place. At its lower portion, the body 13 is provided with a plurality of radial slots 14 (four as shown), each of which receives a cutting member. These members have been shown as of two types, 15 and 16, having differently formed cutting edges 17, but this variance is not essential to the invention. A disk 18 closes the bottom of the slots, being held in place by screws 19 threaded into the body 13.

Each of the cutting elements is provided with teeth 20 on its upper surface, adapted to mesh with a spiral groove 21 on the bottom of an adjusting ring 22. The teeth are preferably symmetrical, with the sides at approximately a sixty degree angle. Except as constrained by other parts, the ring 22 is freely rotatable upon a cylindrical portion 23 of the body 13, and through its spiral groove imparts, when rotated, a radial in or out motion to the cutting elements. The outside of the adjusting ring is preferably beveled at 24 and is provided with holes 25 for the application of a spanner wrench. To hold the adjusting ring in any desired adjusted position, a lock nut 26 is screwed onto a threaded portion 27 of the body 13, being separated from the ring 22 by a washer 28 held against rotation by a pin 29 running in a slot 30 cut in the body. The lock nut is also provided with holes 31 for the application of a spanner. By the interposition of the non-rotating washer between the adjusting ring and the lock nut, any danger of disturbing the adjustment of the cutting elements when the tool is being locked is eliminated. The adjusting ring may have graduations 32 for assisting in setting the cutting elements. As a convenience in holding the body portion while the other parts are being rotated, it may have holes 33 for the reception of a spanner.

It is preferable to separate the washer 28 from the grooved ring 22 by a spring washer 35 shown in detail in Fig. 7, or by an equivalent device. This washer is provided with diametrically opposed high sides 36 and is

constructed of spring metal. When the lock nut 26 is screwed down, the spring washer is flattened out. As the lock nut is backed off to permit adjustment of the cutters, the spring washer continues to hold the teeth 20 on the cutters in contact with the spiral groove in the adjusting ring. This preserves the adjustment of the cutters except as they may be shifted intentionally by rotating the adjusting head.

The operation of the tool will be described with particular reference to its use in re-boring the worn cylinders of an internal combustion motor. The tool, mounted upon a suitably guided and rotatable boring bar 10, is lowered into the open top of the cylinder (the cylinder head having been removed previously) and the cutting members are moved radially outwardly until they contact with the cylinder walls. This preliminary operation can be used both to get the initial setting of the cutting members and to secure perfect registration between the boring tool and the cylinder. For the latter purpose, the boring bar and the cylinder are not permanently aligned until the cutters are expanded into contact with the cylinder walls. When this has been done, the boring bar and the cylinder are firmly clamped in alignment. The tool is then withdrawn from the cylinder sufficiently to permit the cutting edges to clear the cylinder walls, when the adjusting ring is rotated the proper amount (as shown by the graduations 32) to provide the depth of cut desired. The ring is then clamped by the lock nut, holding the cutters firmly in their adjusted position. During the adjustment of the cutters both in and out of the cylinder, the adjusting ring is accessible for engagement with a spanner, due both to the position of the ring above the cutters and to the location of the spanner holes on the slanting surface 24.

What I claim is:

A boring tool comprising a body portion adapted for attachment to a rotatable shaft, a plurality of cutting members movable substantially radially in the body portion and bearing on side faces thereof teeth having inclined sides, a rotatable adjusting ring surrounding the body portion and having on one of its faces a spiral groove having inclined sides mating with the inclined sides of the teeth on the cutting members, a clamping nut threaded onto the body portion, a second ring mounted between the nut and the first ring, means for preventing rotation of the second ring while permitting it to move in a direction parallel to the axis of the boring tool, and spring means interposed between the first ring and the nut to preserve the frictional contact between the walls of the spiral groove and the teeth on the cutting members when the nut is slightly backed away to permit adjustment of

the cutting members by rotation of the adjusting ring.

In testimony whereof I have affixed my signature.

FREDERICK D. VAN NORMAN.

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