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CYLINDER HONING TOOL

Filed Aug. 10, 1961

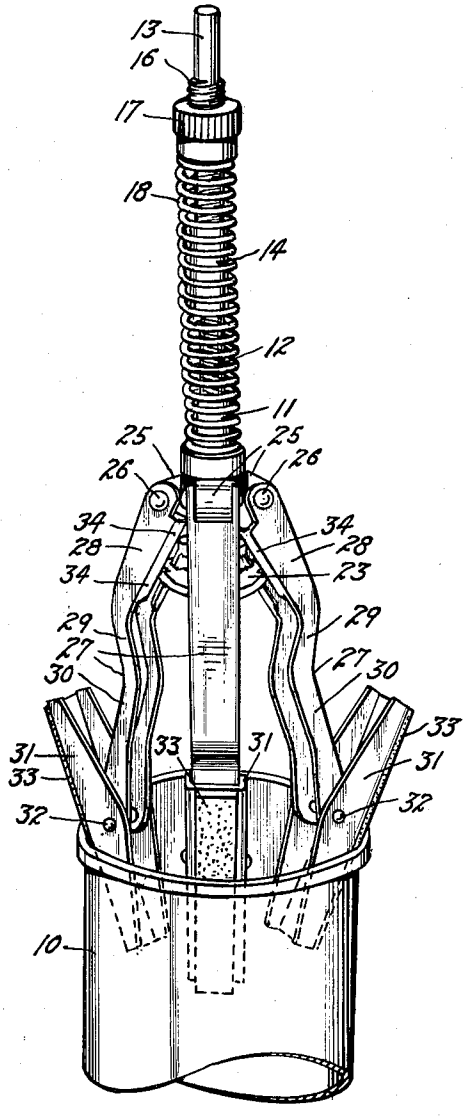



FIG. 1.

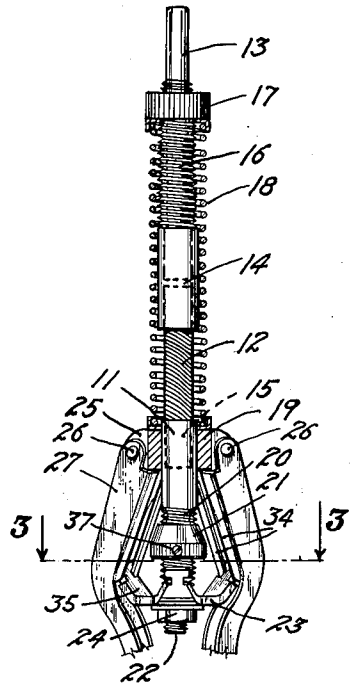



FIG. 2.

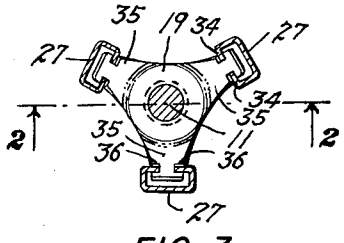



FIG. 3.

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# CYLINDER HONING TOOL

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This invention relates to a rotary cylinder honing tool for deglazing and resurfacing the wall of an internal combustion engine cylinder.

The principal object of the invention is to provide an easily handled, rapid and efficient cylinder honing tool for use in a conventional electric drill which will be self-centering and self-bottoming and which can be quickly slipped into a cylinder of any size and which will automatically, resiliently and uniformly expand to accurately maintain honing elements against the wall of the selected cylinder regardless of the internal diameter of the latter.

While the improved cylinder honing tool will automatically expand to accommodate a wide range of cylinder diameters, for instance a standard model thereof accommodates cylinders from 2" to 7" in diameter, it has been found that in the usual shop, working on the smaller cylinders of the popular brands of automobile engines, it is inconvenient to be required to constantly contract the tool from its large maximum capacity for insertion into the smaller diameter cylinders being conventionally worked upon. Therefore, another object of this invention is to provide, in a honing tool of a large diameter capacity, means for limiting the expansion thereof to a diameter convenient for use upon the particular cylinders upon which the shop is working thus making it unnecessary to constantly contract the hone from its full capacity for insertion into the smaller diameter cylinders.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

FIG. 1 is a perspective view of the improved cylinder honing tool as it would appear when being inserted into the upper extremity of a conventional automotive cylinder liner as indicated at **10**;

FIG. 2 is a fragmentary vertical section taken on the line **2—2**, in FIG. 3; and

FIG. 3 is a cross section looking downwardly on the line **3—3**, FIG. 2.

The cylinder honing tool of this invention employs a vertical pivot shaft portion **11** driven through the medium of a flexible shaft portion **12** from a drive shaft portion **13** arranged to be inserted in the chuck of a conventional electric drill. The drive shaft portion **13** is connected to the flexible shaft portion **12** in any suitable manner, such as by means of a coupling sleeve **14**, and the flexible shaft portion **12** is fixedly mounted in a receiving socket **15** in the upper extremity of the pivot shaft portion **11**.

The drive shaft portion **13** is threaded, as indicated at **16**, to receive a spring-compression-adjusting nut **17** which acts to compress a spring **18** against a yoke **19** which is slidably mounted on the pivot shaft portion **11**.

The pivot shaft portion **11** is also threaded, as indicated at **20**, to receive a maximum-diameter pre-setting nut **21** and the lower extremity of the pivot shaft portion **11** is reduced in diameter and threaded to form a terminal stud **22** upon which an arm spreader **23** is fixedly mounted by means of a suitable clamp nut **24**.



The yoke **19** is formed with three hinge bosses **25** projecting radially at **120°** spacing. Each hinge boss is drilled to receive a hinge rivet **26** upon which the upper extremity of a hone arm **27** is hingedly mounted.

The three hone arms **27** are channel-shaped in cross section and each is convoluted longitudinally to form an outwardly and downwardly inclined upper portion **28**, an inwardly and downwardly inclined medial portion **29** and a downwardly extending lower terminal portion **30** upon the lower extremity of which a foot member **31** is tiltably mounted by means of a pivot rivet **32**.

The foot members **31** carry elongated honing pads **33** adhesively mounted on their outer faces. The pads may be rectangular abrasive stones or may be of felt or similar material. Preferably, one of the foot members **31** will carry a felt pad and the remaining two foot members will carry abrasive stone pads.

The sides of the channels forming the upper arm portions **28** are turned inwardly to form opposed retaining flanges **34**. The arm spreader **23** is shaped to form three spokes **35** the extremities of which extend into the channels of the upper arm portions **28**. The sides of the spokes **35** are notched, as shown at **36**, to receive the inturned retaining flanges **34**, as shown in FIG. 3.

In use, hone arms are squeezed together in the hand until the foot members **31** can be inserted into the upper extremity of a cylinder or cylinder liner. The tool is then forced downwardly so that the hone pads **33** ride flat against the cylinder wall. When the hone arms are compressed together the flanges **34** of their upper portions **28** slide upwardly in the spoke notches **36** forcing the yoke **19** upwardly against the bias of the compression spring.

When the hone arms are released, the expansion of the spring **18** forces the yoke downwardly causing the flanges **34** to ride downwardly and outwardly in their spoke notches **36** to press the pads **33** outwardly against the cylinder walls while the tool is rotated by the electric drill motor. Since the shaft portions **11**, **12** and **13** are flexible any inaccuracies in incline or tilt of the drill motor are automatically accommodated. If cylinders of smaller diameter than the maximum capacity of the tool are being constantly worked upon, the repeated squeezing or contraction of the hone arms to the smaller cylinder diameter becomes a tedious, time-consuming task.

The latter task is avoided by the use of the maximum diameter pre-setting nut **21**. The latter nut acts to stop the descent of the yoke **19**, and the expansion of the hone arms **29**, at any desired point. For instance, if relative cylinders are being honed, the nut **21** is threaded upwardly on the pivot shaft portion **11** until the maximum expansion of the hone arms is just sufficient to position the foot member rivets on a radius slightly less than the radius of the cylinder, as shown in FIG. 1. The nut **21** is then fixed in position in any desired manner such as by means of a suitable set screw **37**. After the latter setting has been made, the tool can be quickly forced into the smaller cylinders without the preliminary "squeezing."

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention what is claimed and desired to be secured by Letters Patent is:

1. A cylinder honing tool comprising: a vertical shaft; an arm spreader mounted on the lower extremity of said shaft; a yoke slidably mounted on said shaft above said spreader; hone arms hinged to and depending from said yoke in contact with said spreader; foot members pivotally mounted on the lower extremities of said hone arms; abrasive means carried by said foot members; a compres-

sion spring acting to urge said yoke downwardly to cause said hone arms to swing outwardly in consequence of their contact with said spreader; and adjustable stop means for stopping the downward travel of said yoke at any desired point, said stop means comprising a nut threaded on said shaft between said spreader and said yoke and positioned to be contacted by the yoke as the latter descends under the influence of said spring.

2. A cylinder honing tool as described in claim 1 having means for fixedly locking said nut at any desired position on said shaft.

3. A cylinder honing tool comprising: a vertical shaft; an arm spreader mounted on the lower extremity of said shaft; a yoke slidably mounted on said shaft above said spreader; hone arms hinged to and depending from said yoke in contact with said spreader; foot members pivotally mounted on the lower extremities of said hone arms; abrasive means carried by said foot members; a compression spring acting to urge said yoke downwardly, said hone arms being channel-shaped in cross section with the open sides of the channels facing said shaft; spokes projecting radially from said yoke and terminating within said channels to cause said hone arms to swing outwardly in consequence of their contact with said spokes; and a nut threaded on said shaft below said yoke to stop the downward movement of the latter at any desired point.



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