Jan. 11, 1938. M. HOLHUT 2,104,900

CARBON REMOVING TOOL

Filed Sept. 16, 1936

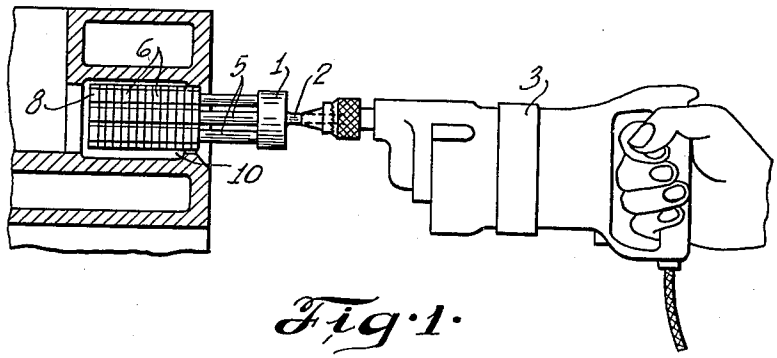


Fig. 1.

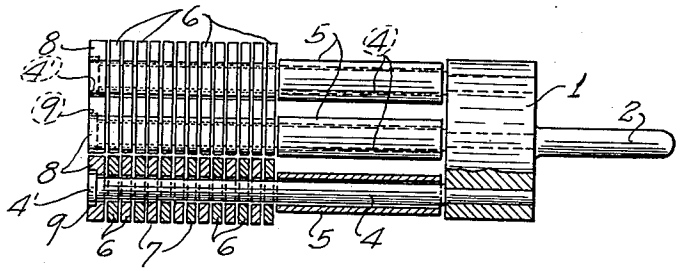


Fig. 2.

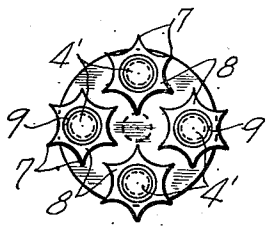


Fig. 3.

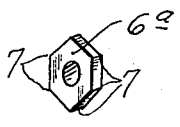


Fig. 4.

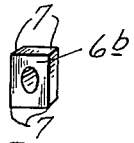


Fig. 5.

INVENTOR
Michael Holhut.
BY Acepa Stevens
ATTORNEY

Patented Jan. 11, 1938 2,104,900

UNITED STATES PATENT OFFICE

2,104,900

CARBON REMOVING TOOL

Michael Holhut, Jennings, Mo., assignor to H & H Machine & Motor Parts Co., St. Louis, Mo., a corporation of Missouri

Application September 16, 1936, Serial No. 101,003

3 Claims. (Cl. 15—104.01)

This invention relates generally to tools for the removal of incrustations from the interior of cylindrical ports, openings, tubes, and the like and, more particularly, to a certain new and useful improvement in tools especially, though not exclusively, adapted for the removal of incrusted carbon from the cylinder ports of internal combustion engines.

My invention has for its primary object the provision of a tool of the type and for the purposes stated, which is simple in structure, which may be inexpensively and economically manufactured, which is durable and conveniently operable, and which is efficient in the performance of its intended functions.

And with the above and other objects in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts presently described and pointed out in the claims.

In the accompanying drawing,—

Figure 1 is an elevational view of a carbon-removing tool of my invention, the tool being shown in operative or working position within a motor-port and driven by a standard electric drill chuck;

Figure 2 is an enlarged side elevational view, partly in section, of the tool;

Figure 3 is an end elevational view of the tool;

Figure 4 is a perspective view of one form of cleaning burr forming part of the tool; and

Figure 5 is a perspective view of a modified form of cleaning burr also forming part of the tool.

Referring now in more detail and by reference characters to the drawing, the tool, as best seen in Figure 2, comprises a head-member 1 preferably, though not necessarily, circular in contour, extending outwardly from a face of which is a preferably circular shank 2 adapted to fit in any suitable rotary actuating member, such, for instance, as an electric drill 3.

Rigidly mounted at an end in, and extending axially outwardly from the other face of, the head 1, is an annular series of spaced rods 4, preferably, though again not necessarily, four in number.

Preferably loosely mounted and freely rotatable about each respective rod 4 and adapted for abutment at an end against the head 1, is a sleeve 5, and also loosely fitted about each respective rod 4 and extending in a series forwardly from the forward end of the sleeve 5, is a plurality of burrs 6, which may be of any suitable shape, although it has been found preferable to utilize a burr having a number of sharp corners, as at 7 and as best seen in Figures 3 and 4, the burrs 6 being so shaped and having such diametrical size that the sharp corners 7 will extend slightly radially outwardly beyond the circumferential limits of the head 1, as best seen in Figure 3.

Also loosely mounted on, and freely rotatable about, the end of each respective rod 4, is an end-burr 8, which is preferably somewhat thicker than the burrs 6 and provided in its outwardly presented face with a circular recess 9 in which the upset end 4' of the particular rod 4 may fit for collectively holding or permanently retaining the end-burr 8, the intermediate burrs 6, and the sleeve 5 in loosely assembled substantially abutting or contiguous relationship thereon.

It should be noted that the length of the sleeve 5 and the combined thickness of the several burrs 6 and the end-burr 8 is such that, when the entire assembly is arranged on a particular rod 4, there will be some freedom to allow for a certain amount of longitudinal slippage along the rod. It will be further noted that the respective rods 4 are free at their forward ends, so that they may move toward or away from each other radially for a purpose presently to be described.

It being understood that, as shown, the tool at its so-called burred end is of a size to freely fit for rotary operation within a cylinder-port 10, in use and operation, the shank 2 is inserted in the chuck of the electric drill or other turning device 3, the burred or forward end of the tool then inserted partially into the motor-port or opening 10 to be cleaned, and the turning device 3 actuated to produce rapid rotation of the tool. As the tool rotates, the sharp corners 7 of the several burrs 6, 8, will dislodge carbon or other such incrustations or the like present on the side of the motor-port. Since the several rods 4 at their respective end-portions are free and may move radially within the limits of axial flexibility of the rods, as the rotary speed of the tool increases, centrifugal force will tend to move or vibrate the several rods 4 at their free forward end-portions radially outwardly, imparting slight outward curvature to the rods, thus enlarging the diametrical size of the tool and bringing greater disruptive force to bear upon the incrustations encountered by the several burrs, removal of carbon or other incrustations being quickly and efficiently effected. Similarly, if the tool encounters an immovable projection in the motor-port, the resiliency and yieldability pro-

vided in the present tool will obviate serious damage to, or breaking of, the tool.

The tool may be constructed in various sizes and may be designed for a variety of cleaning operations. Thus, for instance, in cleaning boiler tubes, the tool may be provided with a flexible power transmitting extension formed on, or operably connected to, the shank 2, so that the tool may be connected to a somewhat remote source of rotary motion. It will also be apparent that, in extremely large tools, the expense of which is comparatively great, it may be desirable to form the rods 4 in such a manner that they may be removed from the head 1, the rods 4 being removably or replaceably secured in the head 1 during operation by a set-screw or other suitable means, not shown. Thus, in the event of the breakage or dulling of any one or more of the burrs 6, 8, the particular rod 4 on which such damaged burr may be mounted may be removed and the particular burrs, or the whole rod or burr assembly, replaced without the necessity of discarding the entire tool.

Preferably the burrs 6, 8, have the form and contour best seen in Figure 3. However, as stated, such burrs may partake of different forms, and may be of hexagonal form, as 6^a, in Figure 4, rectangular form, as at 6^b, in Figure 5, and the like, the burrs, in each instance, having a plurality of projecting relatively sharp corners 7.

It will be understood that changes and modifications in the form, constuction, arrangement, and combination of the several parts of the tool may be made and substituted for those herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is,—

1. In a tool of the class described, a disk-shaped head-member, an annular series of spaced parallel flexible rods each rigidly mounted at an end in the head-member, said rods being at their other ends unrestrained, a plurality of burrs disposed for rotation on the respective rods, and means for retaining the burrs loosely on the respective rods.

2. The herein described rotary tool for endwise insertion into the respective cylinder ports of an internal combustion engine for the removal of carbon, the same including a disk having a shank projecting from an end face thereof for engagement with a tool-actuating member, a plurality of metallic rods each rigidly seated at an end-portion in the opposite end face of the disk, said rods extending outwardly from the disk in a peripherally spaced annular series and being free and disconnected one from the other at their outer ends for independent outward flexure under the influence of centrifugal force on rotation of the tool, and a series of burrs disposed along the respective rods for independent rotation.

3. In a tool of the class described, a head-member, an annular series of spaced parallel flexible rods each mounted at an end in the head-member, said rods being at their other ends unrestrained, a plurality of burrs disposed for rotation on each of the respective rods, a rotatable sleeve loosely mounted on each of the rods between the head-member and the burrs, and means for retaining the burrs and the sleeves loosely on the respective rods.

MICHAEL HOLHUT.