

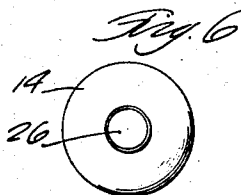
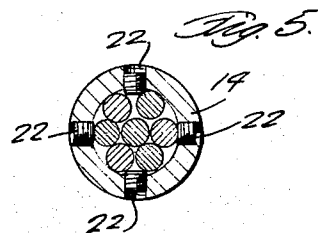
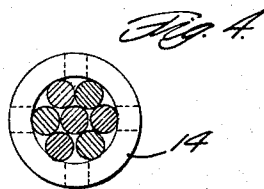
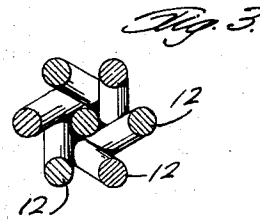
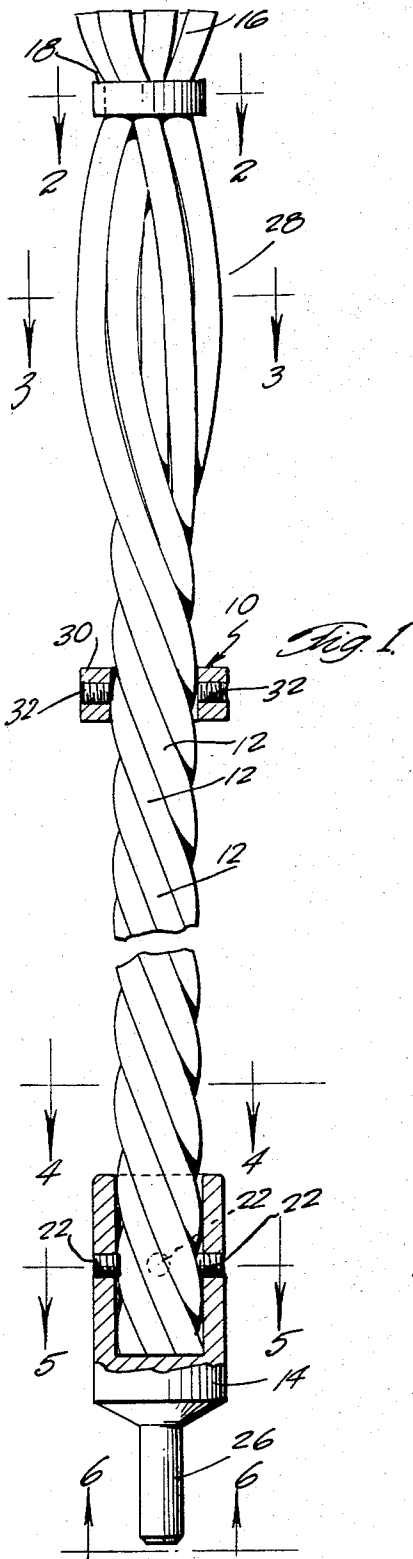
Oct. 18, 1966

A. HORELICA

3,278,964

PORT HOLE REAMER

Filed June 23, 1965



INVENTOR.
ALBERT HORELICA
BY

Victor J. Evans & Co.
Attorneys

1

3,278,964

PORTHOLE REAMER

Albert Horelica, 215 E. Dahlgren St., Wharton, Tex.

Filed June 23, 1965, Ser. No. 466,258

4 Claims. (Cl. 15—104.02)

The present invention relates to an improved and new porthole reamer for being applied as a tool to clean carbon deposited on portholes in internal combustion engines, particularly two-cycle type engines, and more particularly the invention relates to a porthole reamer that is provided with a flared out portion of stranded cable on one end of a braided steel cable and having an adapter at the other end capable of being secured and rotated from an electric drill such as an explosion proof $\frac{3}{4}$ inch electric drill, or an explosion proof $\frac{3}{4}$ inch air drill.

The objects therefore of the present invention are to provide a tool for cleaning carbon from portholes of two-cycle engines, particularly a porthole cleaner that is substantially flexible in design and adaptable to following the contour and curvature of the porthole.

A further object of the present invention is to provide better engine performance having the portholes clean, as well as easier engine balance since the portholes are cleaned with greater facility throughout. Also there is a fuel saving due to less horsepower being consumed in the engine.

Another object of the invention is to provide savings in labor costs in cleaning by means of the construction of the present tool, and by which one man replaces three or more men who would otherwise be required to perform the job of cleaning the portholes.

A further object of the invention is to provide a collar on an intermediate portion of the stranded cable so that that amount of flare is controlled as the braided steel cable is rotated by the adapter connected to an air drill.

A further object of the invention is to provide a collar disposed along an intermediate portion of the braided steel cable for adjustment in the flaring portion as well as providing a stop collar for the work portion of the tool as it is inserted into the portholes to be cleaned, and thus operate in the manner of a depth gauge.

Another object of the invention is to provide a tool particularly adapted for cleaning portholes for two-cycle engines of the order of 2,000–2,600 horsepower.

Another object of the invention is to provide a flexible shank tool adapted to cut and to clean carbon from portholes, and to clean the interior portion of the porthole as well as adjust the top portion so that the porthole is opened and cleaned throughout.

The above and other objects and advantages of the invention will become apparent from a full consideration of the following detailed description and accompanying drawings in which:

FIGURE 1 is a plane view shown partially in cross-section at the adapter portion of a porthole reamer or tool comprising a seven-strand braided steel cable held by said adapter in accordance with the preferred embodiment of the invention;

FIGURE 2 is a cross-sectional view taken along lines 2–2 of FIGURE 1;

FIGURE 3 is a cross-sectional view taken along lines 3–3 of FIGURE 1;

FIGURE 4 is a cross-sectional view taken along lines 4–4 of FIGURE 1;

FIGURE 5 is a cross-sectional view taken along lines 5–5 of FIGURE 1; and

FIGURE 6 is a cross-sectional view taken along lines 6–6 of FIGURE 1.

Referring now to the drawings, there is shown a port-

2

hole reamer or tool 10 comprising a series or plurality of plural stranded braided steel cable 12, 12, 12, in which one end is disposed and received within an adapter 14, and the other end is flared outwardly as shown at 16, and there is disposed proximate thereto a steel band 18. The steel cable has generally a common diameter throughout, as is shown, except for the flared portion. The flared portion is formed in the usual manner, that is by unwinding or unbraiding the cable at that portion. The steel band 18 is secured about the flared portion so that the inwardly disposed flared portion from the steel band is flared outwardly. As the tool 10 is caused to rotate by the adapter being turned by an explosion proof $\frac{3}{4}$ inch electric drill or an explosion proof $\frac{3}{4}$ inch air drill (not shown), the cable is rotated and the flared portion cleans off the carbon which has been formed and settled onto the porthole being cleaned. The cleaning of the portholes requires less engine down time, that is less time in which the engine is disassembled. The steel collar 18 is shown in FIGURE 2 to tightly engage the cable within the band, while the adapter 14 contains a number of Allen head screws 22, 22 for securely retaining the cable 10 within the adapter 14.

The distal end of the adapter 14 terminates in a connection 26 adapted to fit within the coupling portion of a $\frac{3}{4}$ inch electric or air drill (not shown), as above described.

At an intermediate end portion of the cable 10 proximate to the flared portion 28, there is provided a collar 30 having a further set of Allen head screws 32 provided for adjustment of the magnitude of the flared portion 28 as well as providing a stop collar to gauge the depth in which the tool is to be inserted within the porthole sought to be cleaned.

It has been found that the flexibility of the cable of the present invention is significantly important in the invention, and there cannot be any stiff joints or portions in the tool such as a knurled mat or other prior art feature. The tool is adapted to fit within curved portions of the porthole, and the collar 30 will not allow the tool to go deeper into the porthole than is necessary. By the use of the present invention, the porthole is cleaned more than just at the top.

The tool of the present invention has been tested and proven as highly successful for porthole cleaning of two-cycle engines, particularly those of 2,000–2,600 horsepower ratings.

Additional embodiments of the present invention will occur to others and therefore it is intended that the scope of the invention be limited only by the appended claims and not by the embodiment described hereinabove. Accordingly, reference should be made to the following claims in determining the full scope of the invention.

What is claimed is:

1. A porthole reamer comprising a plural stranded, braided steel cable of a consistently common diameter throughout, an adapter at an end of said cable, said adapter having a plurality of securing means to attach the cable end to the adapter, a steel band proximate the other end of said cable, said other end being flared outwardly forming a flared portion on each side of the steel band, and said adapter being capable of rotation by an air drill so that the flared portion is distended for engaging the porthole and thus ream the porthole clean.

2. The invention according to claim 1 wherein an intermediate collar is mounted on the cable having said common diameter throughout, and in which the intermediate collar controls and adjusts the amount of the flared portion between said band and said adapter as well as provides a stop for gauging the depth of the porthole reamer being inserted within a porthole.

3

3. The invention according to claim 2 wherein Allen head set screws are provided for said collar for retaining said collar in place and secured upon said cable.

4. A porthole reamer comprising a plural stranded, braided steel cable, an adapter at one end of said cable and capable of being rotated by attachment to a drill, and an intermediate collar on said cable and disposed proximate to the flared portion a steel band proximate the other end of said cable, said other end being flared outwardly forming a flared portion on each side of the steel band for controlling the amount of the flared portion as the cable is rotated, as well as providing a stop mem-

4

ber to control the amount of depth to which the porthole reamer is inserted within a given porthole.

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CHARLES A. WILLMUTH, *Primary Examiner.*

E. L. ROBERTS, *Assistant Examiner.*