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E. P. CAMPBELL

CYLINDER HONE

Filed May 6, 1924

Fig. 1

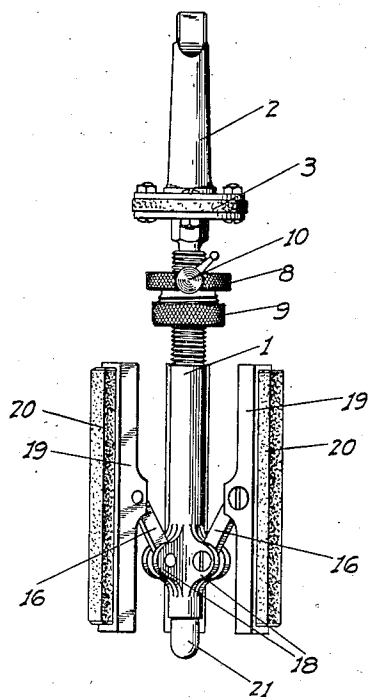


Fig. 2

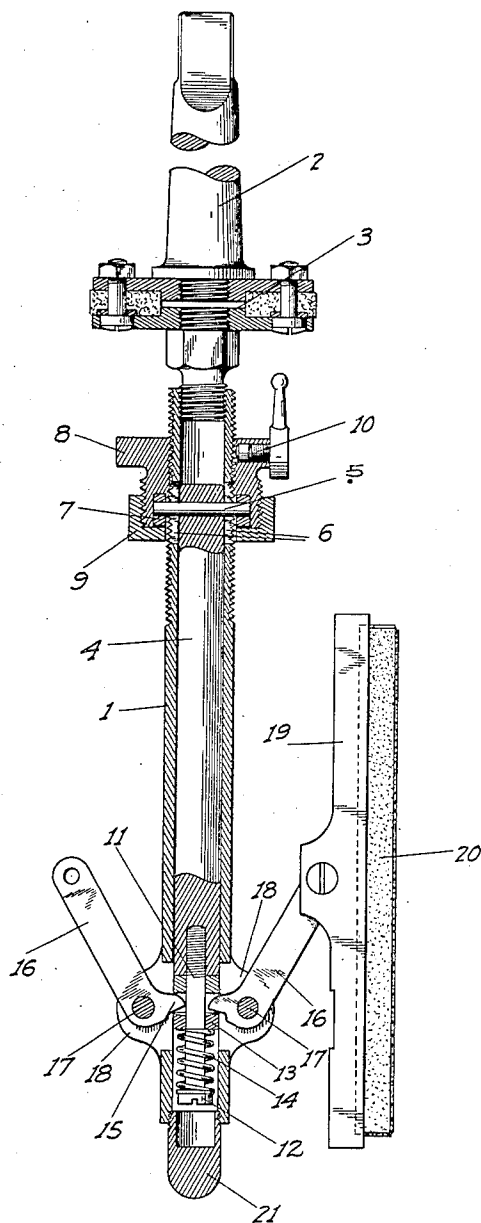


Fig. 3

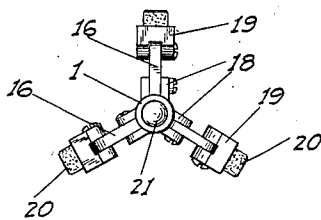
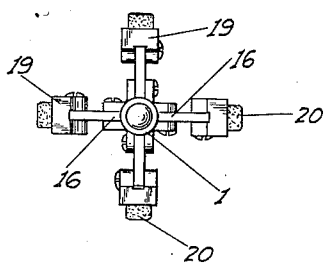


Fig. 4



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CYLINDER HONE.

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To all whom it may concern:

Be it known that I, ERNEST P. CAMPBELL, a citizen of the United States, residing at Stockton, county of San Joaquin, State of California, have invented certain new and useful Improvements in Cylinder Hones; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in rotating bore-finishing tools, and particularly to a hone for finishing the cylinders of gas engines and the like.

The principal object of my invention is to provide a device of this character having a plurality of hones arranged to yieldably press against the walls of the cylinder, and which are so mounted that while the hones may be adjusted to finished cylinders of various different sizes of bore, the pressure holding the hones against the walls will be constant at all times.

Another object of the invention is to mount the hones so that they will always and automatically accommodate themselves throughout their length to the surface against which they bear.

A further object is to arrange the hone adjusting means so that adjustments may be made after the hones are inserted in the cylinder and without removing them from said cylinder.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of my improved hone.

Fig. 2 is an enlarged sectional view of the same.

Figs. 3 and 4 are end views of the device, showing the same equipped with three and four hones respectively.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a sleeve, forming the

shank of the tool, which is removably mounted to a standard taper or other shank 2 for connection to a boring or other machine, with a flexible coupling 3 interposed at a suitable point.

Slidably mounted in the sleeve 1 is a stem 4, having at its end nearest the shank 2 a cross pin 5 projecting through opposed longitudinal slots 6 in the sleeve, the ends of the pin outwardly of the sleeve being fixed in a ring 7 surrounding the latter.

This ring is turnably mounted in a hand nut member 8 threaded on the sleeve, and is held against longitudinal movement relative to the nut by means of a lock nut 9 mounted on one end of the nut 8 and overlapping the ring. A clamping bolt 10 is mounted in connection with the nut 8 for enabling the latter to be held on the sleeve at any position. By means of this construction by turning the nut 8 one way or the other, the stem is moved lengthwise in the sleeve and without rotation, for the purpose hereinafter shown.

In the opposite end of the stem is mounted a relatively small screw or pin 11, between whose head 12 and a washer 13 slidable on said pin is a compression spring 14.

Projecting into the space between the washer 13 and the adjacent end of the stem 4 are the short arms 15 of bell cranks 16, arranged in evenly spaced relation about the sleeve and pivoted on pins 17 fixed in lugs 18 provided on the outside of the sleeve. The bell cranks project toward the shank 2 with a diverging slant relative to the axis of the sleeve and have pivoted on their outer ends rigid carriers 19, extending parallel to the sleeve, and countersunk on their outer faces to seat hones 20 of suitable character, which are cemented in place by any ordinary method.

Three or four bell cranks, and a corresponding number of hones may be used, as shown in Figs. 3 and 4, but I prefer three, since with this number there is no chance that one hone will not contact with the cylinder, as might be the case if four were used.

To prevent the outer ends of the hones from possibly coming in contact with the head of a cylinder, I mount in the adjacent end of the sleeve a removable knob 21, which projects outwardly of the sleeve a sufficient distance to extend beyond the plane of the hones in their outermost position.

Upon removing this knob, the screw-head 12 is exposed, and the screw 11 may be adjusted to adjust the tension of the spring 14 to the desired point.

In operation, it will be seen that by moving the stem 4 lengthwise in the sleeve by manipulation of the nut 8, the short bellcrank arms 15 will also be moved lengthwise of the sleeve, causing the angle of setting of the bellcranks to be altered, and consequently altering the distance of the members 19 from the sleeve. At the same time, the tension of the spring 14 which controls the yielding or resilient movement of the bellcranks and hones, remains undisturbed and hence constant, since the spring, being mounted with the movable stem, moves therewith. The hone carriers, being pivotally connected centrally of their length to the bell cranks, will always accommodate themselves to the surface against which they bear.

By reason of the fact that the adjusting nut 8 is located at the opposite end of the sleeve from the hones, the latter may be adjusted after they are inserted into a cylinder.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A hone including a shank adapted to be rotated, arms projecting radially from the shank, hone carriers pivotally mounted on the outer ends of the arms and extending lengthwise of the shank, spring means acting to force the carriers away from the shank, means for positively altering the distance of the carriers from the shank without altering the spring pressure, and independent means for altering the pressure of the spring means.

2. A hone comprising a sleeve adapted to be rotated, arms pivotally mounted thereon in spaced radial relation and disposed at an angle to the sleeve, hone carriers mounted on the outer ends of the arms, a stem longitudinally adjustable in the sleeve, a pin projecting from one end to the stem, a

washer on the pin, the ends of the arms adjacent the sleeve and beyond their pivots projecting from one end to the stem, a jacent end of the stem and a spring on the pin between the washer and the outer end of the pin without detaching the same from the shank.

3. A hone comprising a sleeve adapted to be rotated, arms pivotally mounted thereon in spaced radial relation and disposed at an angle to the sleeve, hone carriers mounted on the outer ends of the arms, a stem longitudinally adjustable in the sleeve, a pin projecting from one end of the stem, a washer on the pin, the ends of the arms adjacent the sleeve and beyond their pivots projecting between the washer and the adjacent end of the stem and a spring on the pin between the washer and the outer end of the pin, the pin being longitudinally adjustable in the stem whereby to alter the tension of the spring irrespective of any movement of said stem.

4. A hone comprising a sleeve, arms pivotally mounted thereon in radially spaced relation and disposed at an angle to the sleeve, hone carriers mounted on the outer ends of the arms, a longitudinally adjustable stem in the sleeve, means provided with the stem at one end thereof for engaging the inner ends of the arms whereby with a movement of the stem the angle of the arms relative to the sleeve will be altered, a transverse pin mounted in the stem adjacent the other end thereof and projecting through longitudinal slots in the sleeve, and means on the sleeve applied to the pin for moving the same lengthwise in the slots and enabling the pin to be held at any point in the length of the slots.

5. A hone comprising a sleeve, arms pivotally mounted thereon in radially spaced relation and disposed at an angle to the sleeve, hone carriers mounted on the outer ends of the arms, a longitudinally adjustable stem in the sleeve, means provided with the stem at one end thereof for engaging the inner ends of the arms whereby with a movement of the stem the angle of the arms relative to the sleeve will be altered, a transverse pin mounted in the stem adjacent the other end thereof and projecting through longitudinal slots in the sleeve, a ring surrounding the sleeve and in which the ends of the pin are mounted, and coacting nuts on the sleeve between which the ring is interposed.

In testimony whereof I affix my signature.

ERNEST P. CAMPBELL.