

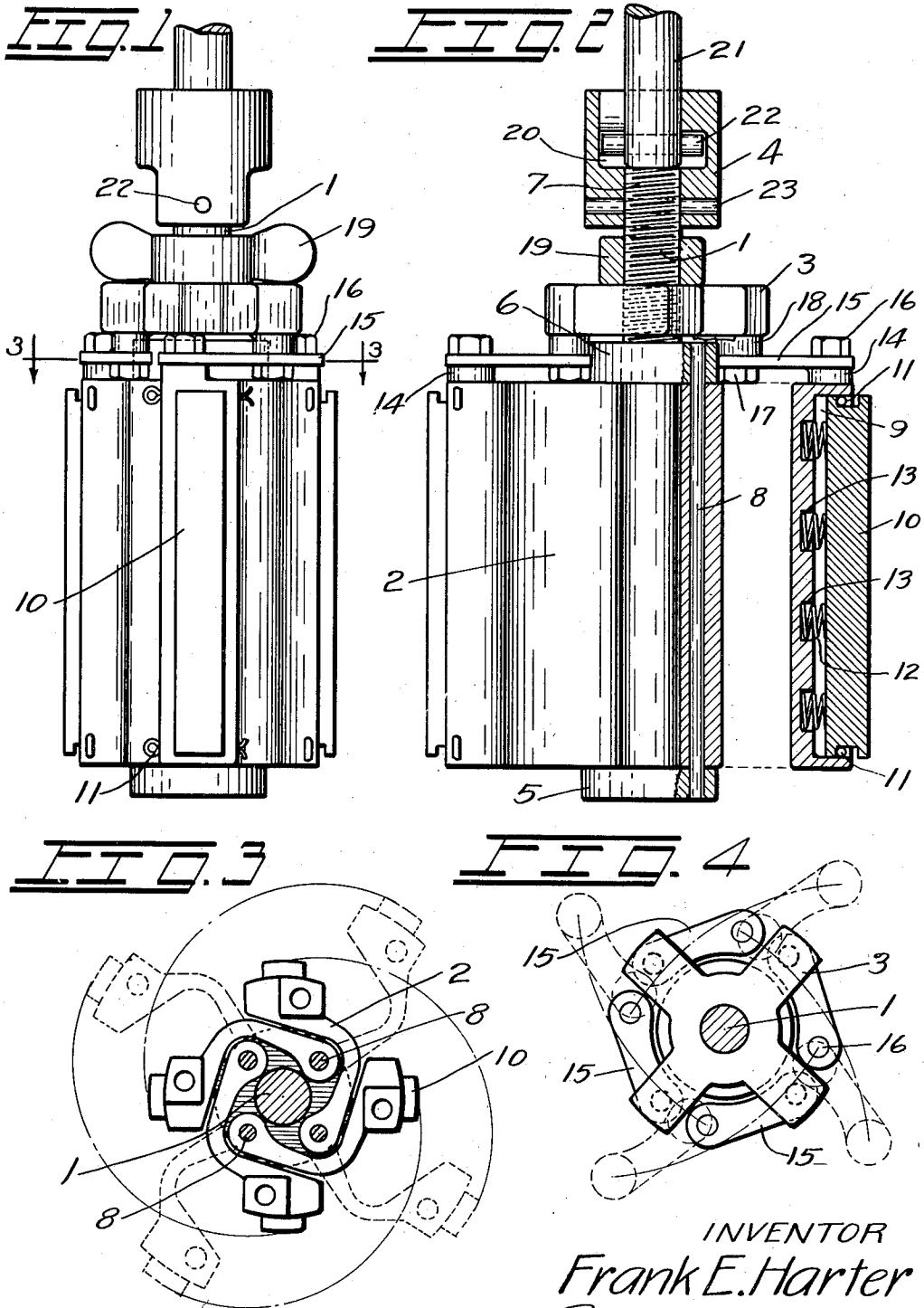
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UNIVERSAL EXPANSION CYLINDER HONE

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UNIVERSAL EXPANSION CYLINDER HONE.

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To all whom it may concern:

Be it known that I, FRANK E. HARTER, a citizen of the United States, residing at Seattle, county of King, and State of Washington, have invented a new and useful Universal Expansion Cylinder Hone; and I do hereby declare that the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention is a hone for finishing engine cylinders which may readily be set to finish cylinders of different diameters, and by which any desired tension against the cylinder walls may be obtained.

The object of the invention is to provide a tool for finishing cylinders that may readily be set for a cylinder of a small diameter or for a cylinder of a large diameter.

Another object of the invention is to provide a tool for finishing cylinders that has hones set with springs in arms that will fold up to a very small diameter or open to a very large diameter.

And a further object of the invention is to provide a simple, economical and efficient tool that may readily be set for cylinders of different diameters.

With these ends in view the invention embodies a spindle having a washer at one end, another washer adjacent the opposite end, arms mounted on pins between the washers, hones in the ends of the arms with springs for holding them outward, a spider on the spindle with links connecting its members with the outer ends of the arms, a lock nut on the spindle, and a socket at the upper end of the spindle.

Other features and advantages of the invention will be seen from the following description taken in connection with the drawings, wherein:—

Figure 1 is a side elevation showing the hone folded to the smaller diameter.

Figure 2 is a similar view with part broken away showing the arms extended.

Figure 3 is a sectional plan on line 3—3 of Figure 1.

Figure 4 is a sectional plan showing the spider and links with the lower part omitted.

In the drawings I have shown my hone as it would be constructed wherein numeral 1 indicates the spindle, numeral 2 the arms, numeral 3 the spider, and numeral 4 the socket.

The spindle 1 may be constructed as shown

with a washer 5 at its lower end, a washer 6 adjacent its upper end, and threads 7 extending from the washer to the upper end. The arms 2 are pivotally mounted on pins 8 between the washers 5 and 6 and are shaped as shown in Figure 3 so that as they are folded they will fit around the hub of the preceding arm. The arms have recesses 9 in their outer ends in which hones 10 may be held by pins 11 and behind the hones are springs 12 which are mounted in pockets 13 for holding the hones outward. On the upper ends of the arms are projections 14 to which links 15 are pivotally held by bolts 16. The inner ends of the links are pivotally held by bolts 17 to hubs 18 on the lower side of the spider 3. And it will be seen that as the spider is twisted the outer ends of the links will move outward from the position shown in full lines in Figure 4 to the position shown in dotted lines and they will in turn move the arms 2 outward from the position shown in full lines in Figure 3 to the position shown in dotted lines. It will be seen that as the spider 3 is twisted the hones will move outward and when they have arrived at the proper position, which may be determined by holding the hone in a cylinder while they are being moved outward, the locknut 19 above the spider may be screwed down until it engages the spider so that it may hold it in any desired position.

The socket 4 may be constructed as shown with an opening 20 in its upper end into which a spindle 21, with a pin 22 projecting through it, may be inserted and twisted to hold the socket and hone. The lower end of the socket may be threaded and screwed onto the upper end of the spindle 1 and then held in place by a pin 23. Although I have shown a socket of this type it is understood that any suitable means may be used for attaching the hone to a spindle or machine.

It will be understood that other changes may be made in the construction without departing from the spirit of the invention. One of which changes may be in the design of the arms, and other may be in the type of stone used in the hone, and still another may be in the means for supporting the hones in the outer ends of the arms.

The construction will readily be understood from the foregoing description. To use the device it may be assembled as shown

and placed in a cylinder that it is desired to have finished. The hones may be moved outward by twisting the spider as herebefore described and when they have been moved outward until they engage the walls of the cylinder with the tension desired the lock nut 19 may be screwed against the spider so that it may be held in place. The hone may then be rotated until the cylinder is properly finished, and it will be seen that while operating an equal pressure will be applied to all parts of the cylinder and as the pivots of the extending arms are very long the arms will move outward and remain in an absolutely parallel position so that the cylinders may be ground absolutely true.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A hone for engine cylinders having a spindle with a washer at one end and a similar washer with a spider above it adjacent the opposite end; arms mounted on pins between the washers with hones having springs behind them held in recesses in their outer ends, said arms being shaped so that as they are folded together they will extend outward and around the hub of the preceding arm; links pivotally attached to the outer ends of the arms and to the projecting members of a spider; a locknut at the upper end of the spindle for engaging the spider to hold it in different positions; and a socket at the upper end of the spindle for attaching the hone to a spindle or arbor.

2. A hone for engine cylinders having expanding arms pivotally mounted on pins between washers on a spindle; hones resiliently held in the outer ends of the arms; a spider having links pivotally attached to its members and to the outer ends of the arms; a locknut for engaging the spider and holding it in any position; and a means for attaching the hone to a suitable machine.

3. A hone having expanding arms with hones resiliently held in their outer ends

pivotally mounted around the spindle, said arms being shaped so that as they are folded together one will extend outward around the hub of the preceding arm; links pivotally attached to a spider and to the outer ends of the arms; a means for locking the spider and holding the arms in different positions; and a means for holding the device in a machine.

4. A device for finishing cylinders having folding arms with stones resiliently held in their outer ends; means for supporting the arms; and other means for locking them in different positions.

5. A device for finishing cylinders having stones resiliently held in the outer ends of folding arms; said arms being pivotally held between washers on a spindle and being shaped so that as they are folded together one will fold around the hub of the other; and a means for holding the arms in different positions.

6. A device for finishing cylinders having a spindle with washers adjacent its ends, folding arms and hones resiliently held in the outer ends of the folding arms, said arms being pivotally held between the washers on pins and being shaped so that as they are folded together one will fold around the hub of the other; a spider having links pivotally attached to its projecting members and to the outer ends of the arms; and a means for locking the spider in different positions.

7. A device for finishing cylinders having a spindle, folding arms and hones resiliently held in the outer ends of the folding arms, said arms being pivotally held around the spindle and being shaped so that as they are folded together one will fold around the hub of the other; a spider on the spindle adjacent the arms having a suitable means for moving the arms as it is rotated; and a means for holding the spider in different positions.

FRANK E. HARTER.