Feb. 14, 1939. E. I. SCHWARZ 2,147,387

HONE FOR HYDRAULIC BRAKE CYLINDERS

Filed Dec. 24, 1937

FIG. 1

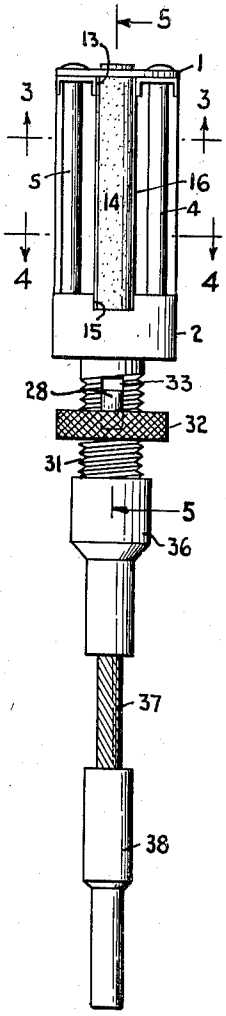


FIG. 3

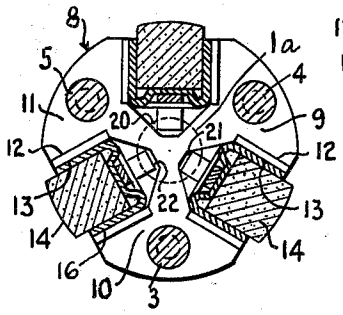


FIG. 4

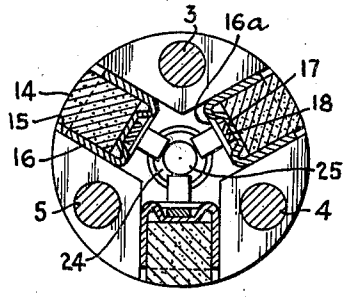


FIG. 5

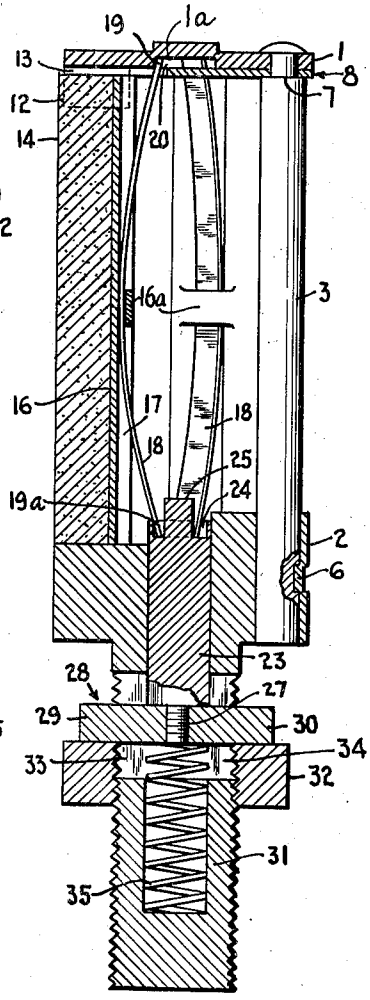
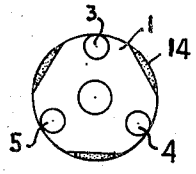


FIG. 2



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HONE FOR HYDRAULIC BRAKE CYLINDERS

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10 Claims. (Cl. 51—184.2)

My invention relates more specifically to such systems used on automobiles, though obviously it is susceptible of use for any kind of cylinder.

My invention has for its object to provide a hone in which the stones are held yieldingly in position and which can be quickly and easily assembled and disassembled.

A further object is to provide a hone in which the abrasive stones may be quickly and easily changed, not only for renewal purposes but to change the hone so that it can be used to burnish cylinders of different diameter.

A further object is to provide means for minutely adjusting the pressure of the abrasive, regardless of the size of the cylinder, from the very lightest to practically a lock.

A further object is to provide a hone in which, when it is being removed after the work is completed, the stones can be made to entirely clear the cylinder walls thereby avoiding one of the objections to the hones of the prior art which mark the walls of the cylinders when being withdrawn from them.

A further object is to provide a flexible drive for the hone so that it may be used to hone cylinders without their being removed from the automobile as well as at the bench.

A further object is to provide means for readily changing the springs which furnish the tension for the abrasive stones.

My means of accomplishing the foregoing objects may be more fully comprehended by having reference to the accompanying drawing, which is hereunto annexed and is a part of this specification in which:

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

Fig. 2 is a top plan view of my device as shown in Fig. 1.

Fig. 3 is a cross section taken on the line 3—3 in Fig. 1 in the direction indicated by the arrows.

Fig. 4 is a cross section taken on the line 4—4 in Fig. 1 in the direction indicated by the arrows; and

Fig. 5 is a vertical section taken on the line 5—5 of Fig. 1 in the direction indicated by the arrows.

Similar reference numerals refer to similar parts throughout the entire specification.

As shown in the drawing, my hone comprises a frame having an outer head 1 having a recessed center portion 1*a* and an inner head 2. These heads are held in spaced relation by three struts 3, 4 and 5. These struts may be secured to the head 1 by riveting as illustrated, or secured in any other convenient manner. They are shown secured to the head 2 by inserting their inner ends in holes drilled in the head for that purpose, a plug 6 being forced into a countersunk hole in struts 3, 4 and 5 as shown in Fig. 5, securing them rigidly in place.

A spider 8 preferably formed of a metal stamping is securely attached to the head 1 by means of the shouders 7 on the struts 3, 4 and 5 which when the ends of the struts are riveted, as shown in Fig. 5, draw the spider 8 tightly against the head 1. The spider 8 is formed with three arms 9, 10 and 11, which are bent at right angles forming flanges 12 which form radial slots 13 which act as guides for the ends of the stones 14. Corresponding slots or guides 15 are formed in the head 2.

The stones 14 are preferably mounted in metal channels 16 the ends of which are slidably fitted to the slots 13 and 15 in the outer and inner heads respectively. A longitudinal groove 17 is formed in the back of each channel 16 with a cross brace 16*a* at the center which acts as a stay for the bow springs 18 which is mounted in the groove 17 formed in each channel. By forming the spider 8 as I do and mounting it on the head 1 it forms with recess 1*a* notches 20, 21 and 22 which fit the ends 19 of the springs 18.

The head 2 is provided with a central aperture in which is slidably mounted a stud 23. This stud 23 is provided with an annular groove 24 adjacent one end, and a neck or stem 25 which projects beyond the walls of the groove 24. The groove 24 is for retaining end 19*a* of spring 18. The other end 27 of the stud 23 is threaded and has mounted thereon a member 28 the ends 29 and 30 of which form lugs. The head 2 is formed with a hollow extension 31 which is provided with external threads upon which is mounted a nut 32. Slots 33 and 34 are formed in the walls of the extension 31 to which are slidably fitted the lugs 29 and 30. A coil spring 35 is mounted in the hollow extension 31. One end of the spring 35 bears against the member 28 and exerts a tension which holds the stud 23 normally projected outwardly.

Means for rotating the hone comprise a sleeve 36 which is screwed onto the end of the extension 31. This sleeve 36 has a flexible cable 37 rigidly fastened to it. A chucking member 38 is secured to the other end of the cable 37 which is adapted to be held in the jaws of a chuck (not shown). In this manner it becomes possible for my hone to be used to hone the cylinders on the automobile as well as at the bench so that it is not absolutely necessary to remove

the cylinder from the car in order to do a finished job.

The assembly and operation of the hone is as follows:—the stones 14 are mounted in the channels 16 and the bow springs 18 are inserted intermediate the bottom of the longitudinal groove 17 and the cross brace 16a. The ends of the channels 16 are inserted in the slots 13 and the ends 19 of the springs 18 are inserted in the notches 20, 21 and 22. The other ends of the channels 16 are then inserted in the radial grooves 15. The operator then grasps the lugs 29 and 30 and by compressing the coil spring 35 is able to retract the stud 23 until the ends 19a of the spring 18 can enter the annular groove 24. The operator then releases the lugs 29 and 30 and the coil spring 35 automatically returns the stud 23 to its normal position the neck or stem 25 serving to center the ends 19a of the springs 18.

The hone is then ready to be inserted into the cylinder which requires honing. It will be clear to those persons skilled in the art that by turning the nut 32 on the threads that the lugs 28 and 29 and in turn the stud 23 will be moved longitudinally outwardly with the result that the springs 18 will be bowed to a greater degree than normal also that this adjustment is minute so that any desired contact between the abrasive stones 14 and the walls of the cylinder (not shown) may be obtained. Indeed it has been found in practice that it can be regulated from the lightest, where it is desired to obtain a glass polish, to practically a lock.

It is also apparent that by loosening the nut 32 the stones 14 can be entirely free from contact with the walls of the cylinder so that no mark is made on the walls of the cylinder in the removal of the hone therefrom.

Having described my invention, what I regard as new and desire to secure by Letters Patent is:

1. In a device of the character described, a frame having a head at each end, a plurality of stones, there being a plurality of radial slots in said heads in which said stones are slidably mounted a spring for each stone, one head having notches which fit the ends of said springs, there being a central aperture in the other head a stud slidably mounted therein, said stud having an annular groove in one end adapted to receive the other ends of said springs, a stem or neck which projects beyond the walls of said groove, said last named head having a hollow extension provided with external threads, a spring in said extension to hold said stud normally projected outwardly, lugs on said stud which extend through the slots in the extension and a nut on said threads which abuts said lugs whereby the tension of the springs for the stones may be adjusted.

2. In a device of the character described, a frame having a head at each end, a plurality of stones, there being a plurality of radial slots in said heads in which said stones are slidably mounted a spring for each stone, one head having notches which fit the ends of said springs, there being a central aperture in the other head a stud slidably mounted therein, said stud having an annular groove in one end adapted to receive the other ends of said springs, a stem or neck which projects beyond the walls of said groove, said last named head having a hollow extension provided with external threads, a spring in said extension to hold said stud normally projected outwardly, means on said extension whereby the axial position of said stud may be adjusted thereby varying the tension of the springs.

3. In a hone for cylinders, a frame having a head at each end, a plurality of stones, there being a plurality of radial slots in said heads, channels in said slots in which said stones are mounted, a leaf spring for each channel to project said stones outwardly, means on said channels to detachably secure said springs in position, and means mounted for axial movement in one head to adjust the tension of said springs.

4. In a hone for cylinders, a frame having a head at each end, a plurality of stones, there being a plurality of radial slots in said heads, channels in said slots in which said stones are mounted, a leaf spring for each channel mounted for unrestricted outward radial movement to project said stones outwardly, means to detachably secure said springs to said channels, and means mounted in one of said heads to adjust the tension of said springs.

5. A hone for cylinders comprising a frame, an inner head, an extension thereon, an outer head, means to connect said heads, a plurality of radially slidable stones mounted in said frame, a flat spring mounted for unrestricted outward radial movement for each stone to project it outwardly, an axially slidable stud in which the inner ends of said spring are detachably held mounted in the inner head, lugs on said stud, and means on said extension to vary the tension of said springs.

6. In a hone for cylinders, a frame having a head at one end, a plurality of stones, there being a plurality of radial slots in said heads, channels in said slots in which said stones are mounted, a leaf spring for each channel to project said stones outwardly, means on said channels to detachably secure said springs in position, an axially slidable stud in said inner head adapted to receive the inner ends of said springs, and means to adjust the axial position of said stud.

7. In a hone for cylinders, a frame, an inner and outer head therefor, the outer head having a recess therein, a spider which abuts the outer head, radial flanges on said spider, there being a plurality of notches in said spider, channels in each of said flanges, a stone mounted in each channel, a leaf spring for each channel to project the channel and stone outwardly, an axially slidable stud mounted in the inner head, said stud having an annular groove therein to receive one end of each spring, the other ends of said springs being inserted in the notches in said spider, and means to adjust the position of said stud and thereby vary the tension of said springs.

8. In a hone for cylinders, a frame, an outer and inner head therefor, a plurality of radial slots in said heads, a stone mounted in the slot, a leaf spring for each channel to project the stone outwardly, an axially slidable stud mounted in the inner head, said stud adapted to receive one end of each spring, the other end of said spring extending into the outer head, and means to adjust the axial position of said stud and thereby vary the tension of said springs.

9. In a hone for cylinders, a frame having a head at each end, a plurality of stones, a plurality of radial slots in said heads in which said stones are slidably mounted, leaf springs mounted for unrestricted outward radial movement to project said stones outwardly, an extension on one head having a central aperture therein which abuts one end of said springs, an axially slid-

able stud in said aperture, and means mounted on said extension to adjust the position of said stud and thereby the tension of said springs.

10. In a hone for cylinders, an inner and outer head, a plurality of struts to secure said heads in position, a plurality of radially movable abrasive stones mounted in said heads, a plurality of springs one for each stone mounted for unrestricted outward radial movement detachably secured to said stones to project said stones outwardly, longitudinally movable spring pressed means to hold said springs and stones in place, and manually operable means mounted in one of said heads to adjust the tension of the springs.

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