July 3, 1945. A. J. DAVIS 2,379,627

PISTON EXPANDING MACHINE

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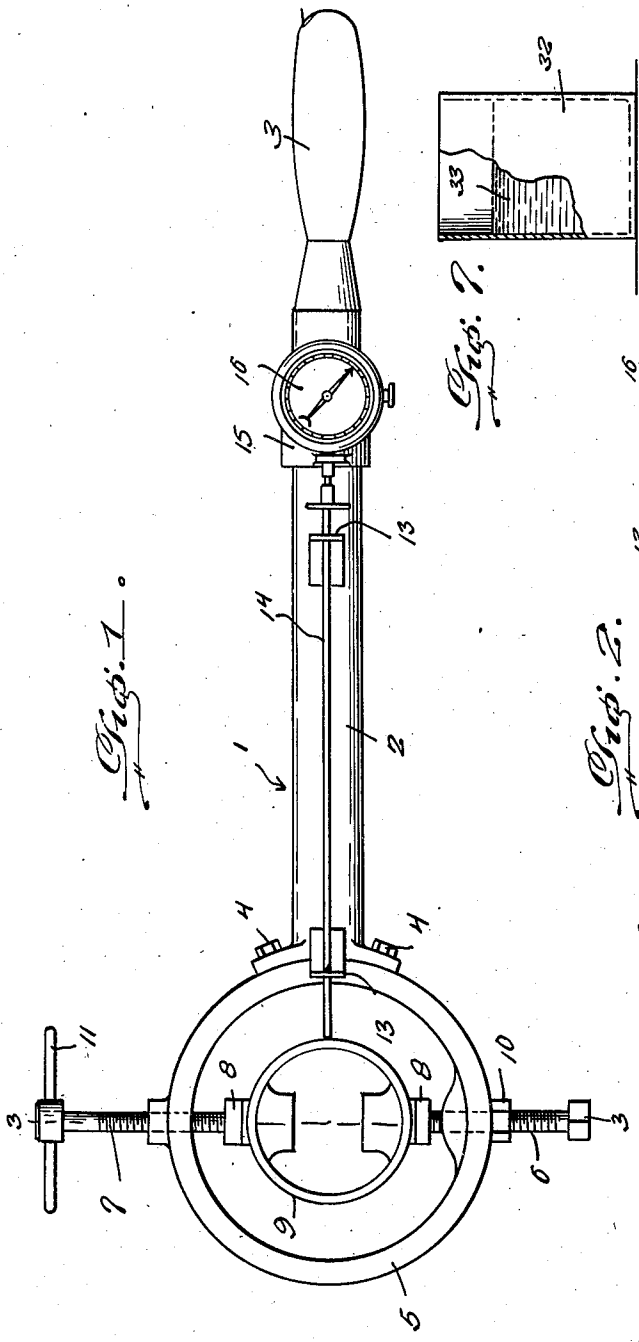


Fig. 1.

Fig. 3.

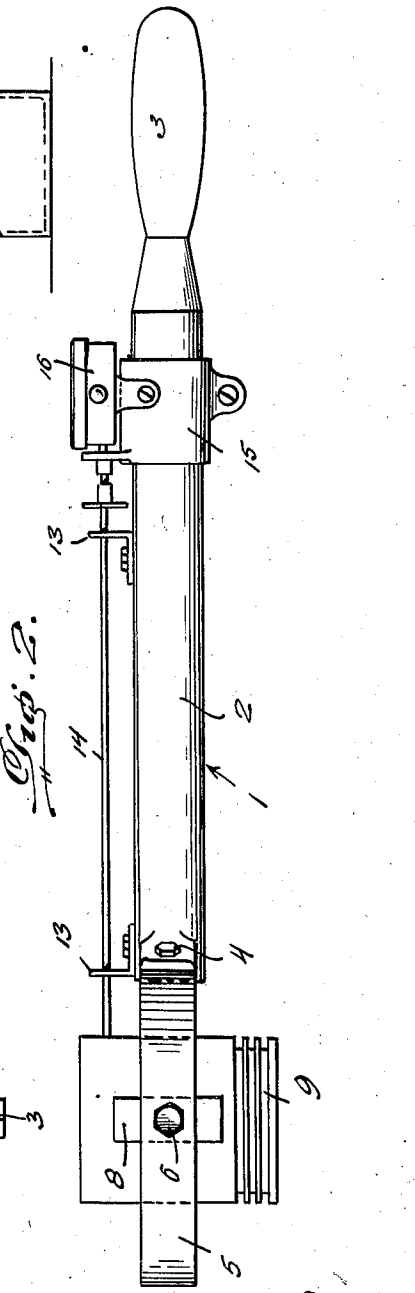


Fig. 2.

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Fig. 3.

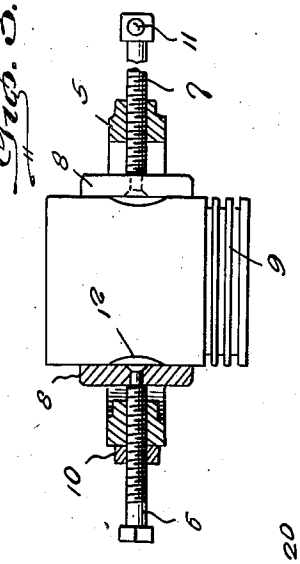


Fig. 6.

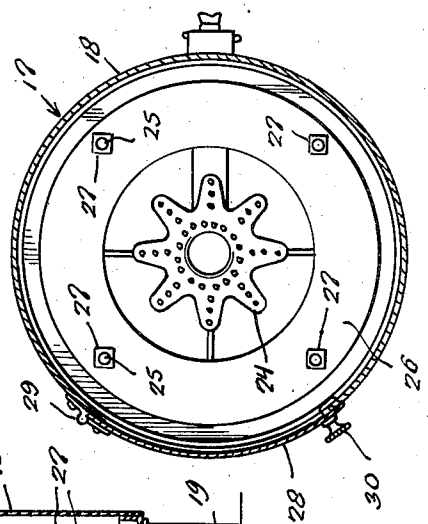


Fig. 5.

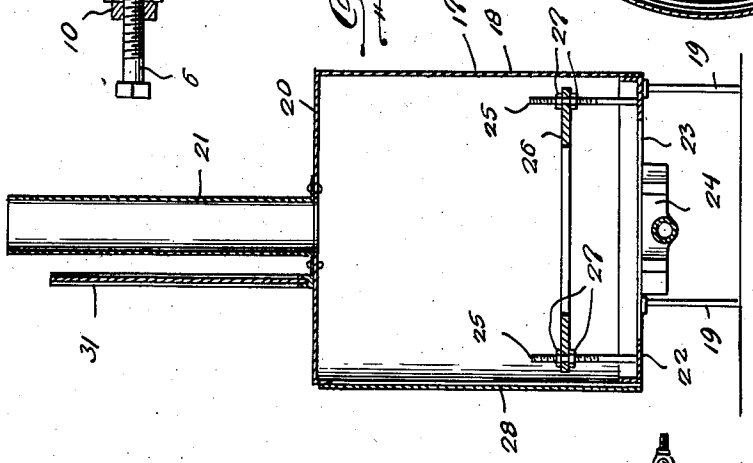
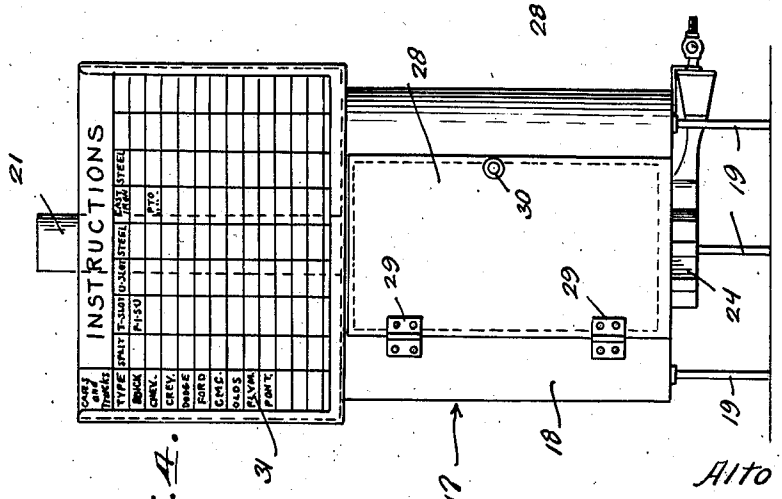


Fig. 4.



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PISTON EXPANDING MACHINE

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Application July 18, 1944, Serial No. 545,510

4 Claims. (Cl. 263—4)

The present invention relates to the art of reconditioning pistons, and has for its primary object to provide, in a manner as hereinafter set forth, an apparatus comprising a novel combination and arrangement whereby worn or collapsed pistons may be expeditiously expanded to the desired size for further use.

Another very important object of the invention is to provide a piston expanding apparatus of the aforementioned character embodying a novel construction and arrangement of gauge whereby the piston may be accurately expanded to the desired size.

Still another very important object of the invention is to provide an apparatus of the character described in which the piston may be expanded in the desired direction to compensate for uneven wear on the piston or for an out-of-round cylinder in which the piston operates.

Other objects of the invention are to provide a piston expanding machine of the character set forth which will be comparatively simple in construction, strong, durable, highly efficient and reliable in use, compact and which may be manufactured at low cost.

All of the foregoing and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views, and wherein:

Figure 1 is a top plan view of a piston handling tool constructed in accordance with the present invention, showing a piston mounted therein.

Figure 2 is a view in side elevation thereof.

Figure 3 is a view in transverse section, taken substantially on the line 3—3 of Figure 1.

Figure 4 is a view in front elevation of the heating oven.

Figure 5 is a vertical sectional view through the oven.

Figure 6 is a view in horizontal section through the oven.

Figure 7 is an elevational view of the cooling container with a portion thereof broken away in section.

Referring now to the drawings in detail, it will be seen that the embodiment of the invention which has been illustrated comprises a tool which is designated generally by reference character 1. The tool 1 includes a tubular metallic shaft 2 of suitable length and diameter having fixed on its rear end a handle 3. Removably secured by screws 4 on the forward end of the tubular shaft 2 is a ring 5.

Threadedly mounted in diametrically opposite sides of the ring 5 are screws 6 and 7. Opposed jaws 8 are swivelly mounted on the inner ends of the screws 6 and 7 for receiving and clamping therebetween the piston to be expanded, as at 9. A lock nut 10 secures the screw 6 in adjusted position. A turning rod 11 is mounted in the head on the outer end of the screw 7. It will be observed that the piston 9 is mounted in the device in an inverted position and that the jaws 8 are engaged with said piston over the wrist pin openings 12 therein.

Guides 13 are mounted at spaced points on the tubular shaft 2. Slidable in the guides 13 is a rod 14 which is engageable at one end with the skirt of the piston 9. A sleeve 15 is mounted for longitudinal sliding adjustment on the rear end portion of the tubular shaft 2. Mounted on the adjustable sleeve 15 is a gauge 16 which is engageable with the rod 14 for actuation thereby.

Referring now to Figures 4, 5 and 6 of the drawings, it will be seen that reference character 17 designates generally an oven for heating the piston to be expanded. The oven 17 includes a substantially cylindrical vertical drum 18 which is supported in elevated position by legs 19. Rising from the top 20 of the drum 18 is a flue 21.

The bottom 22 of the drum 18 has formed therein a circular opening 23. Removably mounted beneath the bottom 22 for heating the drum 18 through the opening 23 is a gas burner 24. If desired, an electric hot plate may be substituted for the gas burner 24. Threaded rods 25 are mounted vertically in the drum 18. Mounted for vertical adjustment on the rods 25 is an annular rest 26. Pairs of nuts 27 on the rods 25 secure the rest 26 in adjusted position.

Access to the rest 26 is had through a door 28 which is rigidly mounted at 29 on the front of the drum 18. A knob or handle 30 is provided on the free end of the door 28. Mounted on the top 20 of the drum 18, in front of the flue 21, is an instruction chart 31.

In Figure 7 of the drawings there is shown a receptacle 32. The receptacle 32 is filled to the desired level with water, as at 33, for cooling the pistons when they are immersed therein.

It is thought that the operation of the machine will be readily apparent from a consideration of the foregoing, particularly to those skilled in the art to which the invention relates. Briefly, the inverted piston, as at 9, is centered in the ring 5

and secured between the jaws 8. The desired pressure is applied to the piston and the rod 14 is engaged with the skirt thereof. The sleeve 15 is then adjusted forwardly on the tubular shaft 2 for engaging the gauge 16 with the rear end of the rod 14. The tool 1, with the inverted piston mounted therein, is then placed in the oven 17, the ring 5 resting on the member 26 with said piston extending downwardly therethrough over the burner 24. With the piston 9 inverted, it will be observed that the head of said piston will receive the direct heat from the burner 24. The piston is heated in the oven 17 until the desired expansion, as indicated by the gauge 16, has taken place. The temperature that various heights and sizes of pistons should be subjected to, the length of time, et cetera, may be readily ascertained by consulting the chart 31. When the piston has been expanded to the correct size, it is removed from the oven 17, and, still in the tool 1, is cooled by immersion in the water 33 in the receptacle 32. The operation has now been completed. By clamping the piston in the ring 9 with the wrist pin eyes between the jaws 8, expansion of the piston in this direction will be prevented and expansion in a direction at right angles will occur, thereby shaping the reconditioned piston to compensate for the usual uneven wear that has occurred on the skirt thereof and to conform to an out-of-round cylinder in which it may be mounted for operation.

It is believed that the many advantages of a piston expanding machine constructed in accordance with the present invention will be readily understood, and although a preferred embodiment of the apparatus is as illustrated and described, it is to be understood that changes in the details of construction and in the combination and arrangement of parts may be resorted to which will fall within the scope of the invention as claimed.

What is claimed is:

1. A piston expanding apparatus comprising, in combination, an oven, heating means in the oven, an annular rest in the oven above said heating means, a ring removably mounted on the rest, and means for securing a piston in said ring over the heating means.

2. A piston expanding apparatus comprising, in combination, a piston handling tool, and an oven for the reception of the tool, said oven including a drum, heating means in the lower portion of the drum, a plurality of vertical rods in the drum, an annular rest mounted for vertical adjustment on said rods, the tool including a shaft, a ring on one end of said shaft adapted to be removably mounted on the annular rest, and means for securing a piston in the ring in spaced relation thereto for supporting said piston over the heating means.

3. A piston expanding machine comprising a shaft, a handle on one end of the shaft, a ring on the other end of said shaft, means for clamping a piston in the ring in spaced relation thereto, a rod slidably mounted on the shaft and engageable, at one end, with the piston for actuation thereby, and a gauge mounted on the shaft and engageable with the other end of the rod for actuation thereby.

4. A piston expanding machine comprising a tubular shaft, a handle fixed on one end of said shaft, a removable ring mounted on the other end of the shaft, aligned screws threadedly mounted in diametrically opposite sides of the ring, coacting jaws on the inner ends of said screws engageable with the piston for securing said piston in the ring in spaced relation thereto, guides mounted at spaced points on the shaft, a rod slidable in the guides and engageable at one end with the piston for actuation thereby, a sleeve mounted for longitudinal sliding adjustment on the shaft, and a gauge mounted on said sleeve and engageable with the other end of the rod for actuation thereby.

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