May 7, 1940. A. WIEBKE 2,199,474

METHOD FOR EXPANDING PISTONS

Filed Dec. 6, 1937

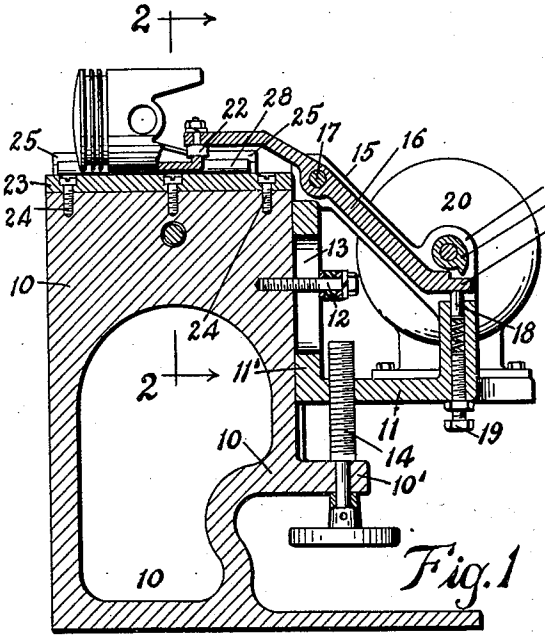


Fig. 1

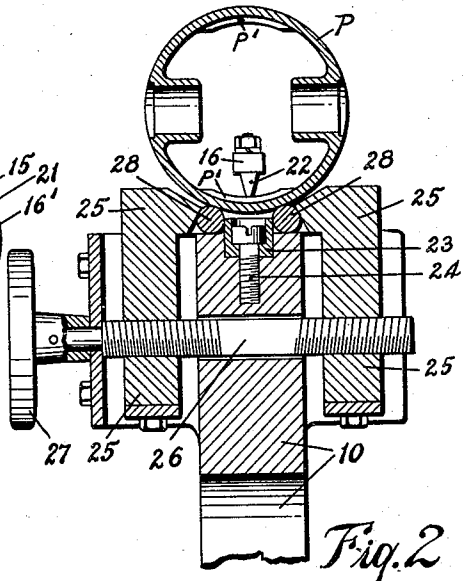


Fig. 2

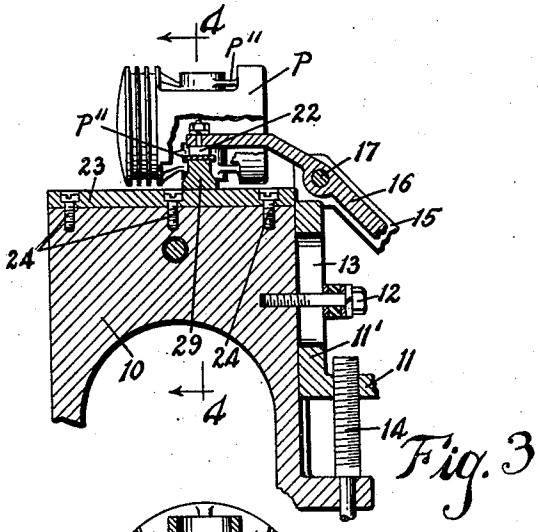


Fig. 3

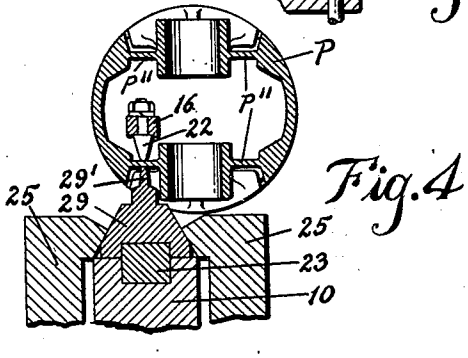


Fig. 4

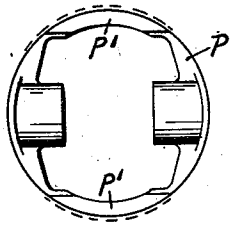


Fig. 5

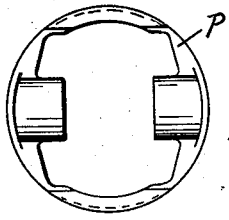


Fig. 6

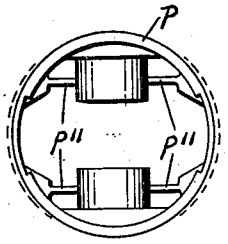


Fig. 7

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METHOD FOR EXPANDING PISTONS

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Application December 6, 1937, Serial No. 178,323

3 Claims. (Cl. 29—156.5)

My invention relates to that type of apparatus shown and described in my pending application, Serial No. 120,028, and it has among its principal objects to provide an improved mechanism of the character referred to by means of which certain improved results can be secured and by means of which my new method of expanding pistons can be effectively accomplished.

I have found that by supporting the wall of a piston upon two spaced supports and applying the hammering action thereto between said supports, there is in effect a bending of the wall portions of the piston outwardly, and that then by resting these bent-out portions directly upon an anvil and applying the hammering action thereto, there is caused a certain expansion of the wall in both directions circumferentially and an equalizing of the bent-out portions and the rest of the circumference of the piston wall.

I have also provided an auxiliary anvil for use with the anvil proper, whereby certain interior struts or web portions of a piston can be reached for the hammering or swaging action.

In order to more fully explain my invention, I have shown the same in illustration on the accompanying sheet of drawings, in which

Figure 1 is a vertical sectional view through a machine embodying my invention;

Figure 2 is a vertical sectional view taken on line 2—2 of Fig. 1;

Figures 3 and 4 are fragmentary sectional views, similar to Fig. 1, showing my auxiliary anvils in place for treating an inner part of a piston; and

Figures 5, 6 and 7 are views of pistons in different stages of treatment.

Referring now in detail to the drawing, my invention as here embodied comprises a body casting 10, upon which is adjustably mounted a shelf or supporting member 11, held in place by a screw bolt 12, in a slot 13, in the vertical portion 11' of said member 11, and by means of an adjustment screw 14, operating in an extension 10' of the body 10. Thus said supporting member can be adjusted vertically on said body.

Pivotally mounted between two portions of an angularly positioned part of said supporting member, designated 15, is an operating lever 16, pivoted at 17 and having its lower end 16' normally resting upon a spring pressed pin or plunger 18, adjustable as to tension by means of a screw 19, as clearly illustrated in Fig. 1.

A motor 20 is mounted upon said supporting member 11, and has mounted on its shaft an eccentric cam 21, which operates on the end of said operating lever 16, as clearly indicated, and as will be understood from the showing thereof.

The upper end of said operating lever is provided with a hammer 22, of chisel-like form, having its tapering end rounded smooth. Thus it will be seen that the supporting member 11, carries all the operating mechanism thus far described and can be adjusted vertically, according to requirements.

Mounted upon the top of the body 10, is an anvil 23, held in place by means of screw bolts 24, 24, countersunk thereinto, as seen in Fig. 2. At opposite sides of said body and said anvil are two jaw members, 25, 25, operated together by means of a right and left hand screw member 26, having the operating hand wheel 27, whereby said jaw members can be moved toward and from each other, said jaw members having their upper or operating ends angularly formed to overlie the anvil 23, substantially in the manner indicated.

I have provided two round bars, 28, 28, which can be laid upon the top of the body casting, at opposite sides of the anvil proper, as indicated, said bars extending parallel with said anvil, and being of a diameter greater than the portion of the anvil above the body, as seen, so that when a piston P, is placed longitudinally upon said bars, 28, 28, it will be held slightly above the anvil thereunder.

Referring to Figs. 3 and 4, I have shown an auxiliary anvil 29, of general pyramidal form and having a small upper work end 29', while its base is formed to slide upon and be guided by the anvil proper 23. This auxiliary anvil 29 is also adapted to be held in position by the jaw members 25, 25, adjusted thereto, as indicated.

In all places the piston is designated P. In Figs. 1 and 2, the piston P is shown in position, supported upon the two round bars 28, 28, so that the hammer 22 operates on the segmental flange P' of said piston, between said supporting bars, as the piston is turned back and forth by hand circumferentially on said round bars. The operation of the hammer along this internal segmental flange P' operates to bend the side of the piston outwardly, substantially as indicated by the light broken lines in Fig. 5. This is due to the fact that the hammering or swaging is upon that portion of the piston between the round bars and where the body of the piston is above the anvil proper.

Now the piston in this bent outward form is placed directly upon the anvil, the round bars 28, 28, having been removed, and the swaging action of the hammer is directly upon the flange

p' of said piston with the piston resting upon the anvil, whereupon the action is to expand the flange portions of the piston circumferentially in opposite directions from the place of treatment, which operates to draw in the portions which were bent outwardly as indicated in Fig. 5, to the positions indicated by the light broken lines in Fig. 6. The result, however, is an enlargement of the piston. It must be remembered that the pistons are turned by hand back and forth circumferentially as the treating process is carried on. The shape of the hammer and the speed thereof accomplishes this.

In Figs. 3 and 4, pistons having the internal struts or webs P'' are shown, with the use of the auxiliary anvil **29**, and by means of which these webs or struts P'' can be reached and treated to expand the pistons outwardly in the manner indicated by the light broken lines in Fig. 7.

I believe my method of expanding pistons is absolutely new. Through much experimentation with my first machine and improvements from time to time, I have found that by holding a piston upon two spaced supports and hammering the wall of the piston outwardly between said supports, there seems to be a bending of the wall portions outwardly between said supports. Then when I remove the supports and apply said bent out portions directly upon the anvil and hammer them so as to cause a certain expansion of said wall in both directions circumferentially, the result is either to expand the wall outwardly circumferentially to the bent-out position, or to cause a retraction of the bent-out portions slightly, but with the result that the circumference of the piston is expanded as required. Actual tests have proven this method to be successful, and while I have shown means for accomplishing this result, and have described the general operation of the machine shown, I do not limit my invention to the details of construction and arrangement shown and described except as I may be limited by the hereto appended claims.

I claim:

1. The herein described method of expanding pistons which comprises supporting a piston upon spaced supports, hammering said piston between said supports with high speed strokes to bend the wall of said piston outwardly, between said supports, then similarly hammering the wall portions of said piston which have been bent while resting them directly upon an anvil, whereby to cause a circumferential expansion of the metal of said wall portions and a drawing in of said bent portions.

2. The method of expanding pistons which includes holding the piston rotatably upon two spaced supports and hammering the wall of said piston outwardly between said supports with short high speed strokes of a hammer, whereby said piston wall is bent outwardly between said supports as it is turned by hand, then resting the bent portion of said piston wall directly upon an anvil and similarly hammering it to expand the metal of said wall circumferentially, whereby said bent portions of said piston wall are drawn inwardly slightly, substantially in the manner indicated.

3. The method of expanding pistons which includes holding the piston rotatably upon two spaced supports and hammering the wall of said piston with rapid short-strokes to bend said piston wall outwardly between said supports while manually turning said piston back and forth on said supports, then holding said bent portions of said piston wall directly upon an anvil and applying said hammer strokes thereto to expand the metal of said wall circumferentially.

AUGUST WIEBKE.