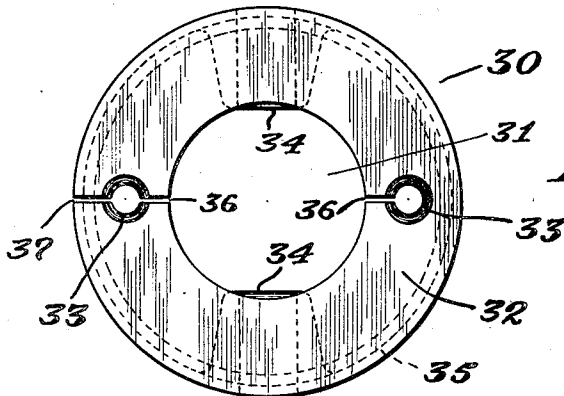
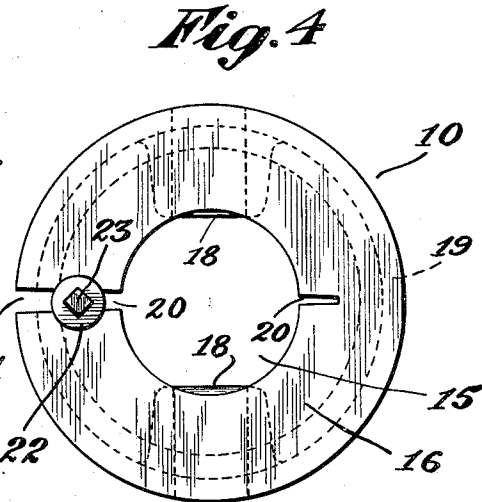
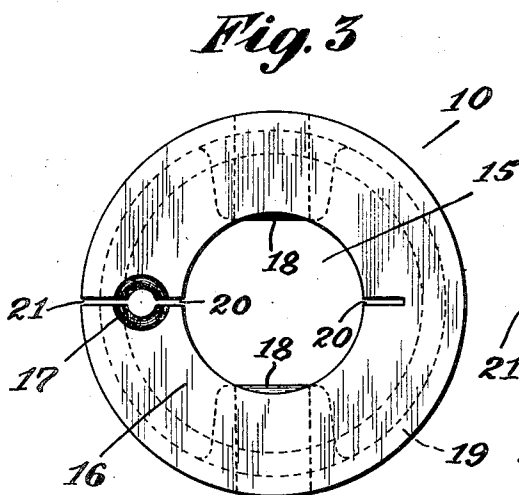
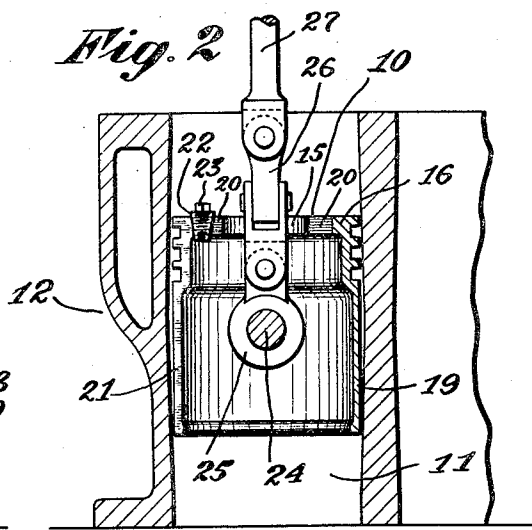
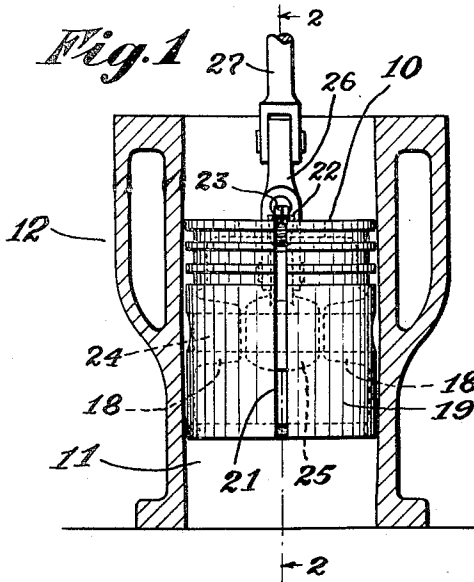


1,428,126.

Patented Sept. 5, 1922.



Inventor
Robert S. Taylor.
Attorney
Frank Warren

UNITED STATES PATENT OFFICE.

ROBERT S. TAYLOR, OF SEATTLE, WASHINGTON.

EXPANDIBLE LAP.

Application filed April 14, 1921. Serial No. 461,406.

To all whom it may concern:

Be it known that I, ROBERT S. TAYLOR, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a certain new and useful Improvement in Expandible Laps, of which the following is a specification.

My invention relates to improvements in expandible laps and the method of forming the same and the object of my invention is to provide an expandible lap that is adapted for use in lapping, abrading and polishing the walls of the cylinders of internal combustion engines, or motors, pumps and the like, which walls have become worn in use, to thereby realign the said walls in cylindrical and parallel relation with respect to the axis of said cylinders.

Another object is to provide a novel method for fabricating an expandible lap from the discarded piston of the cylinder to be lapped.

A further object is to provide an expandible lap embodying simplicity, durability and economy in construction, that is positive and efficient in operation and that will not readily get out of order.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination, adaptation and arrangement of parts hereinafter described and claimed.

I accomplish these objects by devices illustrated in the accompanying drawings, wherein—

Figure 1 is a view in elevation of an expandible lap constructed in accordance with my invention, as it would appear when operatively disposed within the cylinder of an internal combustion engine, said cylinder being illustrated in vertical transverse section to more clearly illustrate the features of my invention;

Fig. 2 is a view in vertical section of the same taken on a broken line 2, 2 of Fig. 1;

Fig. 3 is a top plan view of the expandible lap with the expanding plug removed therefrom, to thus illustrate the lap in an unexpanded condition;

Fig. 4 is a similar view of the same with the expanding plug operatively disposed therein, to thus illustrate the lap in an expanded condition; and

Fig. 5 is a top plan view of an expandible lap of a type or form adapted to receive a plurality of expanding plugs, which type is normally used for laps of large sizes.

Referring to the drawings, throughout which like reference numerals designate like parts, the numeral 10 designates my expandible lap as fabricated from an internal combustion engine piston, which expandible lap I have illustrated as being operatively disposed in a cylinder 11 of an internal combustion engine 12.

In fabricating the expandible lap 10 I have found it both convenient and economical in practice to utilize the discarded piston of the cylinder to be lapped for the lapping operation.

The method of fabricating the expandible lap 10 from the aforesaid discarded piston consists of drilling a concentric hole 15 of the desired size in the upper or top wall 16 of said piston; then drilling and tapping a tapered hole 17 also of the desired size in said upper wall 16, which hole 17 is disposed substantially midway of the hole 15 and the periphery of said piston. The said hole 17 is also disposed in diametral perpendicular relation with respect to the axes of the wrist pin bosses of said piston, as shown more clearly in Fig. 3.

The upper wall 16 and the side wall 19 of the piston are then cut to form a diametrically disposed slit 20 in said upper wall and a longitudinally disposed slit 21 in said side walls.

The slit 20 in the upper wall 16 is cut in perpendicular relation with respect to the axes of the bosses 18 to thus diametrically divide the concentric hole 15 and the tapered hole 17 formed in said upper wall, as shown in Fig. 2.

To facilitate and expedite the circumferential expansion and contraction of the renovated piston, when and as desired by the operator, and to complete the conversion or alteration of the piston to thereby permit the same to properly function and operate

as an expandible lap or lapping element, I provide a tapered expanding plug 22, which plug is normally adapted to be threadably disposed for adjustment in the tapered hole 17.

To permit of the rapid manipulation or adjusting of the plug 22 I provide the upper end of said plug with a squared portion 23, which portion is adapted to be engaged by a socket wrench or other suitable tool.

Concentrically disposed in the bosses 18 is a wooden wrist pin 24, which wooden wrist pin is adapted to replace the metallic wrist pin normally disposed in the said bosses. In practice I have found it advisable and necessary to substitute a wooden wrist pin for a metallic pin in order to prevent or obviate the scoring of the cylinder walls during the lapping operation.

Loosely mounted on the wrist pin 24 between the bosses 18 is an eye member 25 of a universal joint 26, which universal joint is adapted to be connected at its upper end to a rotary and reciprocatory rod 27 of a suitable actuating mechanism, not shown, which actuating mechanism, is adapted to simultaneously rotate and reciprocate the expandible lap 10 to thereby perform the lapping operation, said mechanism is also further adapted to independently rotate or reciprocate said expandible lap 10 during the lapping operation when desired and found expedient.

It is well known that while in use the cylinders of internal combustion engines become slightly elliptical in cross section and also wear lengthwise in the manner illustrated in Figs. 1 and 2 of the drawings, the maximum wear in a lengthwise direction being at a point substantially midway of the length of said cylinders and the minimum wear at the ends thereof.

It will be obvious from the foregoing that the maximum amount of material will be removed from the ends of the cylinder walls and the minimum amount from the medial portions thereof during the lapping operation.

In the operation of my expandible lap, the actuating mechanism having been secured in an operative position on the engine 12 with respect to the cylinder 11 to be lapped, the expandible lap 10 is then secured by the wrist pin 24 to the universal joint 26 of the actuating mechanism, the periphery of said lap is then smeared with a suitable lapping compound and the lap 10 inserted in the cylinder 11.

The lap 10 is next expanded to fit snugly in the most constricted portions of the bore of the cylinder 11, which constricted portions are normally at the ends of the bore of said cylinder as hereinbefore stated.

The actuating mechanism, not shown, is then set in motion to rotate and reciprocate

the lap 10 and as the ends of the cylinder 11 are lapped the operator screws the plug 15 down to further expand the lap 10 to thereby maintain the aforesaid snug fit of the lap 10 at all times during the lapping operation and till such time as the walls of the cylinder 11 are in true parallel relation with respect to the axis thereof.

The method of fabricating an expandible lap 30 of the type illustrated in Fig. 5 from a discarded piston is substantially similar to that described for the fabrication of the expandible lap 10 which method consists of drilling a concentric hole 31 of the desired size in the upper wall 32 of said piston; then drilling and tapping two tapered holes 33 of the desired size in said upper wall 32, said holes 33 being disposed in diametrically opposite relation on each side of the hole 31 and substantially midway between said hole 31 and the periphery of said piston.

The holes 33 are also disposed in perpendicular relation with respect to the axes of the wrist pin bosses 34 of the said piston, as more clearly shown in Fig. 5.

The upper wall 32 and the side walls 35 of the piston are then cut to form a diametrically disposed slit 36 in said upper wall and a longitudinally disposed slit 37 in said side walls.

The slit 36 in the upper wall 16 is cut in perpendicular relation with respect to the axes of the bosses 34 to thus diametrically divide the concentric hole 31 and the tapered holes 33.

The lap 30 is expanded by tapered plugs, not shown, which plugs are adapted to be threadably engaged in the holes 33.

The mounting of the lap 30 on its associated actuating mechanism, not shown, and the operation of said lap is substantially similar to that described for the lap 10.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation of my expandible lap will be apparent to those skilled in the art to which my invention pertains, to thus enable those so skilled to construct and operate the same, while I have shown and described the construction and operation of an expandible lap embodying the features and principles of my invention which I now consider to be the best embodiment thereof, and which is adapted for use in any well known type of internal combustion engine or motor, pump or the like, I desire to have it understood that the expandible lap shown is merely illustrative and that such changes may be made when desired as are within the scope of my invention and embodied in the accompanying claim.

What I claim is:

An expanding lap comprising a hollow cy-

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lindrical body having a concentrically disposed hole formed in the end wall thereof and a longitudinally and diametrically disposed slit formed in the side and end walls thereof, said end wall having a threaded tapered hole formed therein in alignment with the diametral position of said slit and at a point adjacent the outer end thereof, and an expanding plug adapted to be threadably engaged in said tapered hole. 10

In witness whereof, I hereunto subscribe my name this 2nd day of April A. D., 1921.

ROBERT S. TAYLOR.