Feb. 6, 1940. E. EDWIN ET AL 2,189,242

DEVICE FOR GRINDING ECCENTRICITY IN PISTONS

Filed March 2, 1939

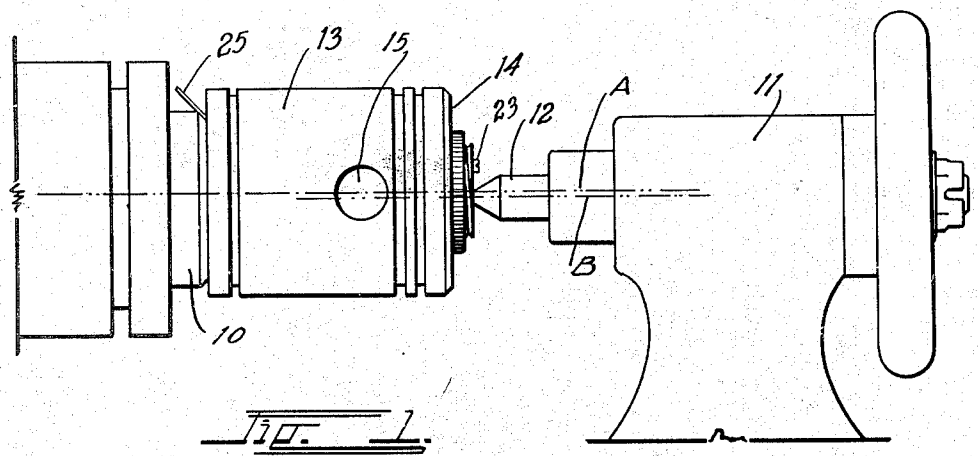


Fig. 1.

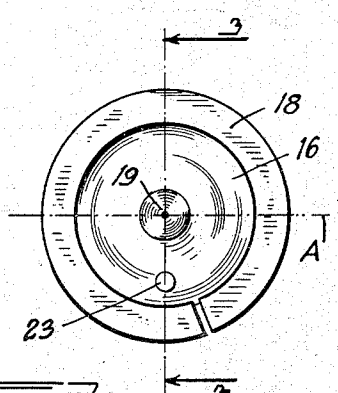


Fig. 2.

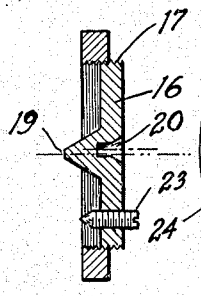


Fig. 3.

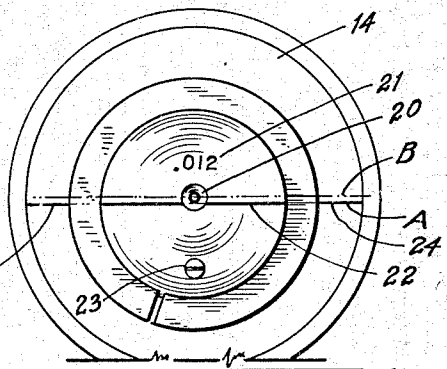


Fig. 4.

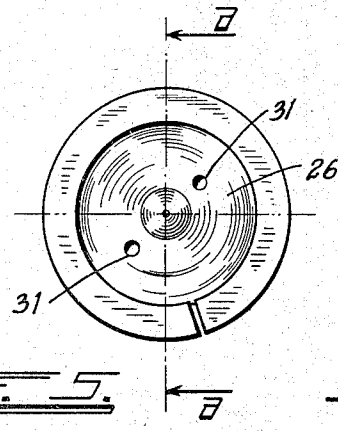


Fig. 5.

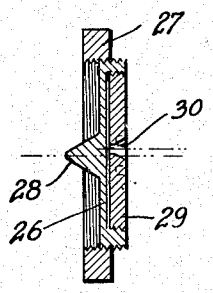


Fig. 6.

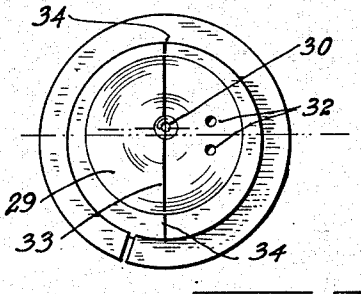


Fig. 7.

INVENTORS
ERIC EDWIN.
MERLE PETERSON.

BY

ATTORNEY.

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DEVICE FOR GRINDING ECCENTRICITY IN PISTONS

Eric Edwin and Merle Peterson, Denver, Colo.

Application March 2, 1939, Serial No. 259,364

6 Claims. (Cl. 82—40)

This invention relates to a device for cam-grinding pistons. The pistons in modern automotive engines are ground to an oval shape to accommodate the unequal expansion due to the uneven heating of the piston. This allows a much closer fit to be made of the pistons without danger seizing when hot. The usual piston grinding machine is designed to grind pistons to a cylindrical shape and cannot impart an oval shape thereto.

The principal object of this invention is to provide an accurate device which can be placed on a piston in the usual grinding machine to cause the piston to rotate eccentrically so that the piston may be ground to lesser diameter on one axis than on the other to produce an oval shape which will fit the new piston to the oval shape of the old cylinders.

Other objects of the invention are: to provide a device of this character which can be adjusted to place the eccentricity in any desired position; which can be adjusted to fit the depth and size of the center punch hole in any given piston so that there will be no lost motion or looseness during the grinding operation; and to provide a device which will require no changes whatsoever in the present grinding equipment.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 illustrates the invention applied to a piston in the usual grinding head.

Fig. 2 is an inner face view of one form of the invention.

Fig. 3 is a cross-section therethrough, taken on the line 3—3, Fig. 2.

Fig. 4 is an outer face view thereof.

Fig. 5 is an inner face view of an alternate form of the invention.

Fig. 6 is a cross-section therethrough, taken on the line 6—6, Fig. 5.

Fig. 7 is an outer face view of the alternate form of the invention.

In Fig. 1 the chuck of a typical grinding machine is indicated at 10, the tail stock at 11, and the dead center at 12. A typical automotive piston is indicated at 13 with its head 14, wrist pin opening at 15. Pistons of this type carry a conical, counter-sunk center punch socket in the head 14 into which the point of the dead center is inserted to support the piston on the live center or chuck for turning or grinding operations.

This invention consists of a device which may be placed between the piston head 14 and the dead center 12 to offset the latter from the center punch socket in the head to cause the piston to swing or gyrate about its true center as it rotates before the grinding wheel of the grinder.

The device consists of a circular disc 16 with a threaded periphery 17, upon which a threaded, split, clamping ring 18 is threaded.

On the forward face of the disc 16 a tapered center point 19 is formed at the exact center of the disc and ring. A center socket 20 is indented in the rear face of the ring to one side of the center of the disc and ring.

The amount of eccentricity of the socket 20 is equal to one-half the difference desired between the long and short diameters of the finished piston. A set of devices of differing offsets will be provided to suit the desired conditions, each being marked for its offset as shown at 21.

The outer face of each disc contains a gauge line 22 across its face drawn at right angles to the line of offset of the socket 20. A sharpened set screw 23 is threaded through the disc so as to project from the front face thereof.

Let us assume it is desired to cam-grind a piston for ".012" eccentricity. A gauge line 24 is scribed across the head 14, exactly over the axis of the wrist pin opening 15. The device marked ".012" is selected and its point 19 is inserted in the center punch socket of the piston so that it firmly seats therein. The ring 18 is now screwed toward the piston head until it rests firmly thereagainst, but not sufficiently far to lift the point 19 from its seat in the piston center punch socket. This adjustment prevents the device from moving sideways on the piston and also prevents it from rocking or tilting on the piston head.

The piston and the device are now inserted in the lathe or grinding machine with the dead center in the socket 20 of the disc; the gauge line 22 on the disc is turned into alignment with the gauge line 24 on the piston; a piece of shim stock 25 is inserted between the chuck 10 and the piston skirt on the side of the piston to which the dead center is eccentric; and the tail stock is tightened. This positions the piston to one side of the grinding machine center as indicated

by the offset center lines "A" and "B" in Fig. 1.

Grinding is now commenced, the major portion of the metal being taken from the eccentric side of the piston.

Upon completion of this side the tail stock is loosened and the device is given a one-half turn to bring the gauge lines again into alignment with the center socket on the opposite side, the shim is changed to the opposite side and the grinding is repeated for the opposite side of the piston.

It has been found that the frictional engagement between the device and the piston head is ordinarily sufficient to hold it in proper adjusted position. The set screw **23** however is provided to insure the set position. If this screw be tightened after the piston is in position in the grinder its point will engage the piston head to prevent relative movement between the device and the piston.

In Figs. 5, 6, and 7, an alternate form of the device is shown consisting of a disc **26** upon which a split ring **27** is threaded, and upon which, a center point **28** is formed similar to the previous device. In this form, however, the outer face of the disc is hollowed and internally threaded to receive a threaded button **29** which is tightly threaded therein. The hollow in the disc is eccentric of the disc center and eccentric of the center point **28**. A center socket **30** is drilled into the outer face of the button on the center axis of the point **28** and disc **26** which, of course, places the socket to one side of the center of the button. The disc **26** is provided with wrench openings **31** and the button is provided with wrench openings **32** by means of which the two may be relatively rotated. A gauge line **33** is inscribed across the button through the center socket **30** on the axis of greatest eccentricity of the latter and gauge lines **34** are inscribed on the disc **26** at each side of the button on the axis of greatest eccentricity of the button socket in the disc.

The second form of the device is used similarly to the first form. In this form, however, the amount of eccentricity may be regulated by rotation of the button **29**. When in the position of Fig. 7, the socket is at its point of greatest eccentricity. When rotated one-half turn from that position the socket **30** becomes concentric.

While specific forms of the improvement have been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a socket on the other face of the disc for engagement with the center point, said point and said socket being out of axial alignment with each other; and a peripheral rim member about said disc.

2. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a socket on the other face of the disc for engagement with the center point, said point and said socket being out of axial alignment with each other; and a peripheral rim member about said disc, the projection of said rim member beyond the face of the disc and about said projecting point being adjustable.

3. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a socket on the outer face of the disc for engagement with the center point, said point and said socket being out of axial alignment with each other; and a peripheral rim member about said disc, the projection of said rim member beyond the face of the disc and about said projecting point being adjustable; and means for preventing relative movement between said device and said work.

4. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a hollow in the other face of said disc, said hollow being eccentric of the center of said disc and said projecting point; a button fitted into said hollow; a socket in the outer face of said button for engagement with the center point, said socket being eccentric with said projecting point.

5. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a hollow in the other face of said disc, said hollow being eccentric of the center of said disc and said projecting point; a button fitted into said hollow; a socket in the outer face of said button for engagement with the center point, said socket being eccentric with said projecting point; and a peripheral rim member about said disc, the projection of said rim member beyond the face of said disc and about the projecting point being adjustable.

6. A device for supporting work eccentrically on a center point comprising: a disc; a projecting point on one face of said disc for engaging the work; a hollow in the other face of said disc, said hollow being eccentric of the center of said disc and said projecting point; a button fitted into said hollow; a socket in the outer face of said button for engagement with the center point, said socket being eccentric with said projecting point; and a peripheral rim member about said disc, the projection of said rim member beyond the face of said disc and about the projecting point being adjustable; and means for relatively rotating said button and said disc to adjust the degree of eccentricity between said socket and said projecting point.

ERIC EDWIN.
MERLE PETERSON.