Sept. 4, 1951 M. T. GEORGIAN 2,566,660

APPARATUS FOR GRINDING AND REFINISHING CRANKPINS

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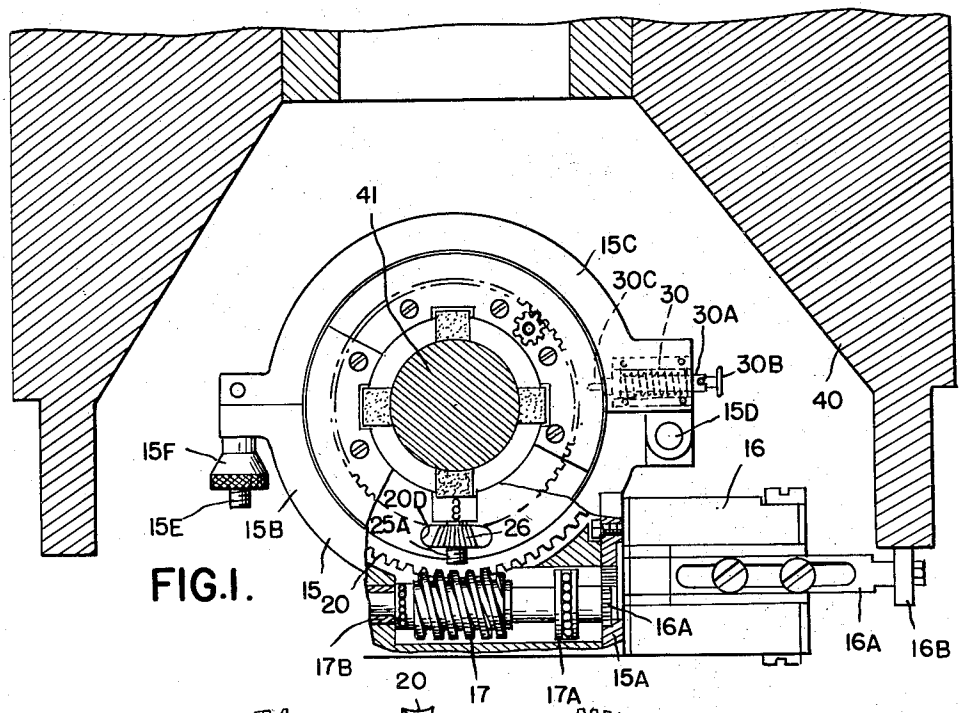


FIG.1.

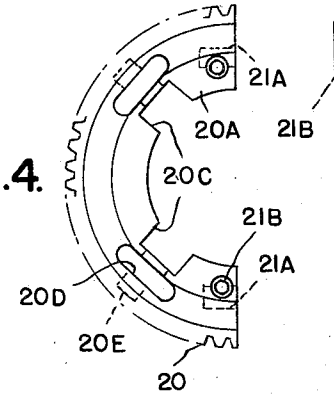


FIG.4.

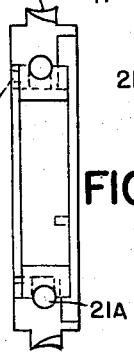


FIG.6.

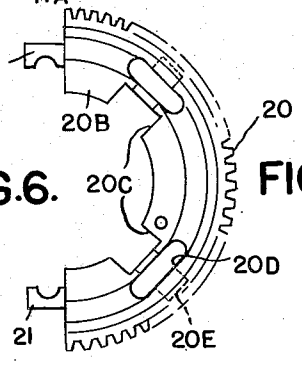


FIG.5.

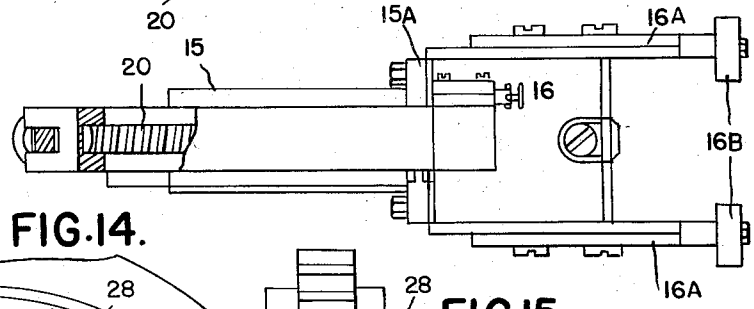
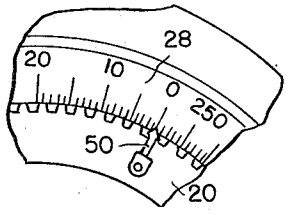


FIG.2.

FIG.14.



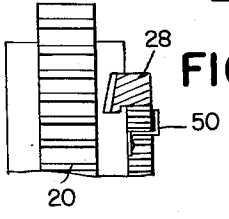


FIG.15.

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FIG.3.

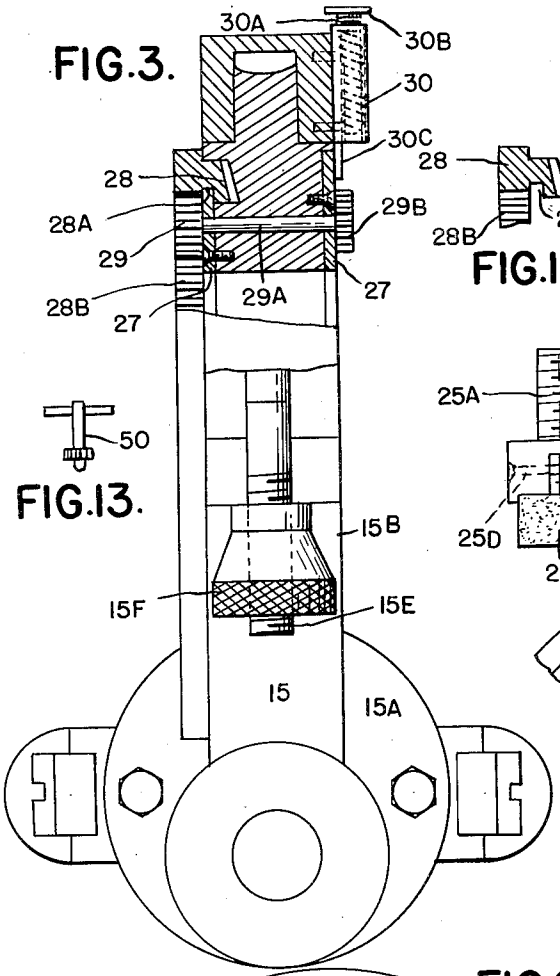


FIG.11.

FIG.7.

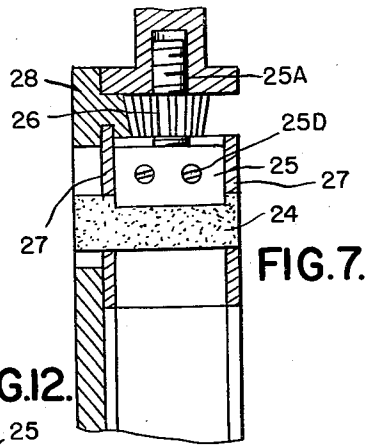


FIG.12.

FIG.10.

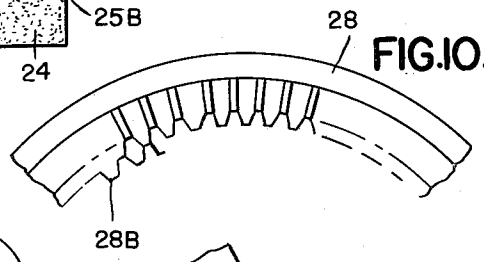
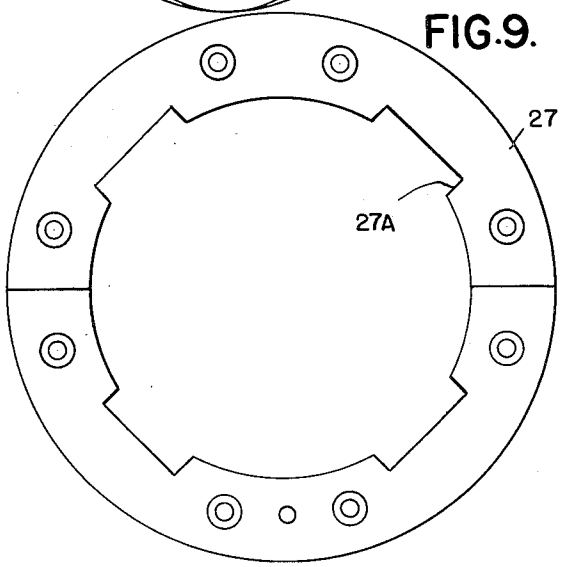


FIG.9.



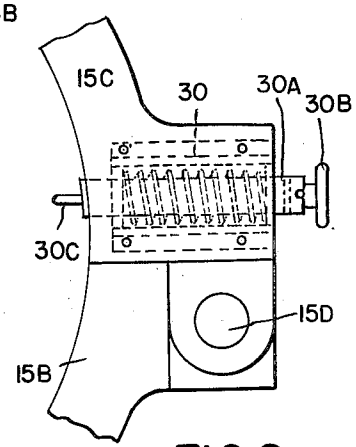


FIG.8.

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UNITED STATES PATENT OFFICE

2,566,660

APPARATUS FOR GRINDING AND REFINISHING CRANKPINS

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Application July 9, 1949, Serial No. 103,787

3 Claims. (Cl. 51—241)

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The present invention relates to service tools for the internal combustion or other reciprocating engines for automotive vehicles and specifically apparatus for grinding and refinishing the crankpins or throws of the crankshafts of such engines without the necessity of removing such shafts from the engines.

Among the objects of the invention is a grinding apparatus which may be applied to the shaft upon removal of the lower portion of the crankcase and be supported in its operative position by the crank itself.

Another object is a device of the character described which is so constructed that it automatically trues the crankpin if the latter has become worn to an out-of-round condition.

Still another object is a grinder in which the feed-in of the grinding elements is automatic or hand regulated at will.

Other objects will readily occur to those skilled in the art upon reference to the following description and accompanying drawings in which

Fig. 1 is an end elevation of the device as mounted upon a crankpin, parts being in section.

Fig. 2 is a plan view of the device.

Fig. 3 is an end view as from the left of Fig. 1 and shows parts in section.

Figs. 4 to 15 show details of construction.

As indicated in the drawings, the device comprises a frame member 15 provided at one end with a suitable flange 15A to which is secured a motor 16. The lower portion of frame 15 is enlarged laterally sufficiently to provide for housing a worm 17 driven by the motor through the reduction gearing 16A. The worm 17 is carried in suitable bearings 17A and 17B in the housing.

The upper portion of frame 15 is formed and finished to provide a semicircular seat 15B and bearing for a ring member shown in detail in Figs. 4, 5 and 6, which member is provided on its periphery with a worm gear 20 constructed and arranged to coact with the worm 17. The semicircular seat 15B is completed by a complementary semicircle 15C, hinged at one end 15D to the portion 15B and at its other end carrying a hinged threaded bolt or pin 15E adapted to swing into a suitable notch in portion 15B and cooperate with a thumb nut 15F to clamp the two semicircular portions together to produce the complete bearing for the ring member.

The ring member mentioned is shown in detail in Fig. 4, 5 and 6 and is also made of two semicircular portions 20A and 20B which are substantially identical. Each is provided with two rectangular notches 20C placed 90° from each

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other and 45° from the adjacent semicircle end so that when the two parts are assembled, the four notches will be equispaced. Between the bottom of each notch and the outer bearing portion of the ring is a tangentially arranged through slot 20D and extending radially through the bottom of each notch and through the slot into the ring body is a smooth bore 20E. The only difference between the ring parts 20A and 20B lies in the provision of the circularly notched pins 21 in the abutting radial faces of part 20B and sockets 21A for the reception of such pins in the corresponding faces of part 20A along with the means 21B for holding the pins in the sockets.

This holding means consists of suitable pins 21B, also notched, extending through and intersecting sockets 21A, the axial lines of the pins 21B will of course be tangent to the cylindrical socket 21A and the notch of the pin of a shape to permit the withdrawal of a pin 21 when the pin 21B is partially rotated. It is preferred also to form the intermediate portions of pins 21B with a slight cam so that they will draw the ring halves tightly together.

In the notches 20C are located rectangular blocks 25 each provided with a threaded stud 25A adapted to extend into the bores 20E and through the internally threaded bevel gears 26 located in the slots 20D, so that rotation of such gears will produce radial movement of the blocks 25.

The blocks 25 at their radially inward faces are provided with short flanges 25B along two opposite edges and are also split as indicated at 25C, so that by means of screws 25D, suitable abrasive stones 24 may be gripped between the flanges 25B.

Upon each side face of bearing ring 15B—15C is fixed an annular plate 27 each being in two halves as indicated in Fig. 9. These plates complete the rectangular sockets for blocks 25 and are notched as at 27A so as not to interfere with the stones 24.

One of the plates 27 also serves as a retaining ring for a bevel ring gear 28 shown in cross section in Fig. 11. This ring gear, also in two halves, meshes with the bevel gears 26 and when rotated will of course rotate all of the latter simultaneously.

As shown in Figs. 3 and 7, the plate 27 enters the notch 28A to retain the gear in position. Gear 28 is also provided with teeth 28B on its inner periphery adapted to cooperate with a small spur gear 29 fixed on a short shaft 29A

extending through ring 20 and plates 27 and carrying fixed at its other end a small gear or ratchet wheel 29B.

Carried upon the face of bearing ring 15B—15C adjacent gear 29B is a small housing 30 in which is mounted in a radial position a spring actuated plunger 30A provided at its outer end with a suitable knob or handle 30B and at its inner end with a finger 30C which, when the plunger is in its radially inward position will contact the teeth of gear 29B and when in operation, rotate the latter one tooth. Suitable means may be provided for maintaining the plunger 30A in retracted position when desired.

Extending rearwardly from motor 16, is a pair of arms 16A, adjustable in length, carrying rollers 16B adapted to coact with the lower edge of a cylinder block 40 and absorb reaction forces when the device is in operation.

Further, by spacing the rollers 16B well apart, parallelism of the axis of the device with the axis of the crankpin is maintained.

In assembling the device, the semicircular parts are of course put together with their division planes all coinciding so that the bearing ring portion 15C may be swung about the hinge 15B and carry with it those semicircular parts carried by it. This permits mounting the device upon a crankpin 41 and of course permits removal after operation.

In operation, with the device clamped about a crankpin as shown in Fig. 1, the ring gear 28 is actuated preferably by the use of a suitable wrench 50 such as is illustrated in Fig. 13, until the stones 24 contact the surface of the pin, and the motor started, the crankshaft being maintained against rotation.

With the ring gear 20 and the associated parts rotating, and the plunger 30A in its inward position, each revolution of gear 20 causes the gear 29B to be moved one tooth and through gears 29, 28 and 26 and threaded studs 25A causes a slight radially inward movement of the stones 24. When the required grinding has been accomplished, the semicircular parts are moved back to registering position by the use of wrench 50 and the device removed.

As indicated in Figs. 14 and 15, the gear 28 may be provided with suitable graduations and a pointer 50 mounted on the ring gear 20 in order to provide the operator with an indication of the progress of the grinding.

Now having described the invention and the preferred embodiment thereof, it is to be understood that said invention is to be limited, not to the details herein set forth, but only by the scope of the claims which follow.

I claim:

1. A device for grinding the crankpins of the crankshaft of an engine without removing said shaft from the engine, said device comprising a frame member including a semicircular bearing portion, a complementary semicircular bearing portion hinged thereto, a ring member also in two semicircular parts mounted in said bearing, said ring member having worm gear teeth on its outer periphery and carrying a plurality of equispaced stone holders extending radially from its inner periphery, abrasive stones in said holders, means for simultaneously moving said holders radially of the ring member, means carried by said frame for actuating said holder moving means, a housing forming part of said frame and open to said bearing, a worm in said housing adapted to mesh with said worm gear, a motor for driving said worm and means coacting with an engine part for absorbing reaction forces.

2. In a crankpin grinding device, a rotatable ring, a plurality of rectangular blocks equispaced peripherally of and mounted for radial movement in said ring, said blocks extending radially inward of the ring, abrasive stones carried by the inner ends of said blocks, a threaded radially extending stud on the rearward end of each block, an internally threaded bevel gear on each of said studs, a bevel ring gear meshing with each of the first mentioned bevel gears and means for rotating said ring gear relative to said rotatable rings whereby to rotate the meshing bevel gears simultaneously and thus cause radial movement of said blocks.

3. In a crankpin grinder a stationary bearing ring, a rotatable ring mounted therein, abrasive stones carried by said rotatable ring and adapted to contact the pin to be ground, mounting means for said stones consisting of rectangular blocks, said rotatable ring having rectangular sockets for said blocks in which the latter are radially slidable, and means for sliding said blocks, said latter means consisting of threaded studs extending radially outward from said blocks, an internally threaded bevel gear on each of said studs, a bevel ring gear carried by said rotatable ring and meshing with each of said bevel gears, said bevel ring gear having spur gear teeth on its inner periphery, a spur gear meshing therewith and means carried by said stationary bearing ring for rotating the latter gear part of a revolution for each revolution of said rotatable ring.

MICHAEL T. GEORGIAN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
899,536	Jacobs	Sept. 29, 1908
1,563,712	Johnson	Dec. 1, 1925
2,001,497	Lawhorn et al.	May 14, 1935
2,162,187	Tharp	June 13, 1939
2,201,664	Ferguson	May 21, 1940

FOREIGN PATENTS

Number	Country	Date
573,713	Germany	Apr. 5, 1933