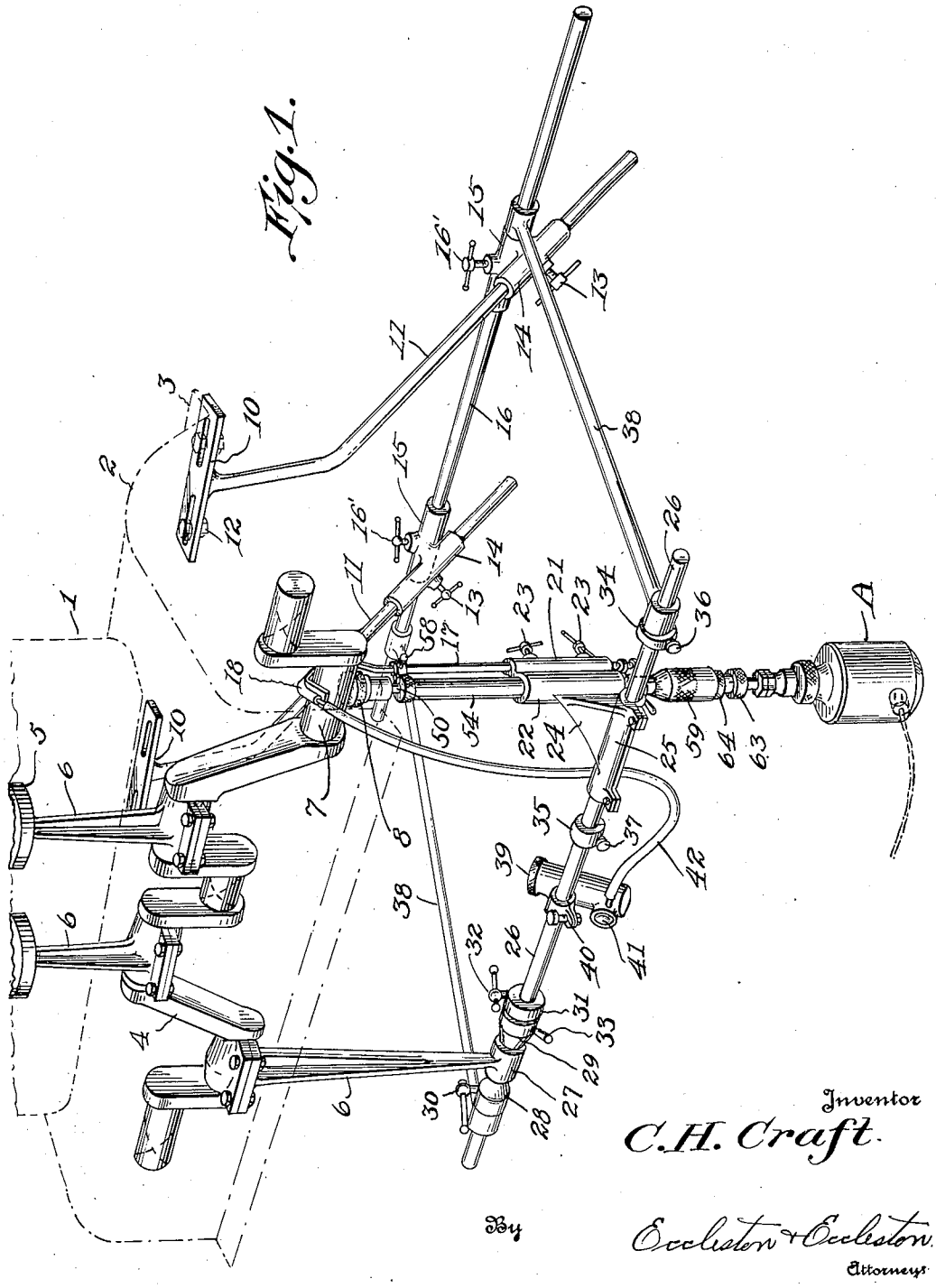
July 24, 1934. C. H. CRAFT 1,967,744

CRANKSHAFT GRINDER

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Fig. 1.



Inventor

C. H. Craft.

By Eccleston & Eccleston.

Attorneys

July 24, 1934. C. H. CRAFT 1,967,744

CRANKSHAFT GRINDER

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Fig. 2.

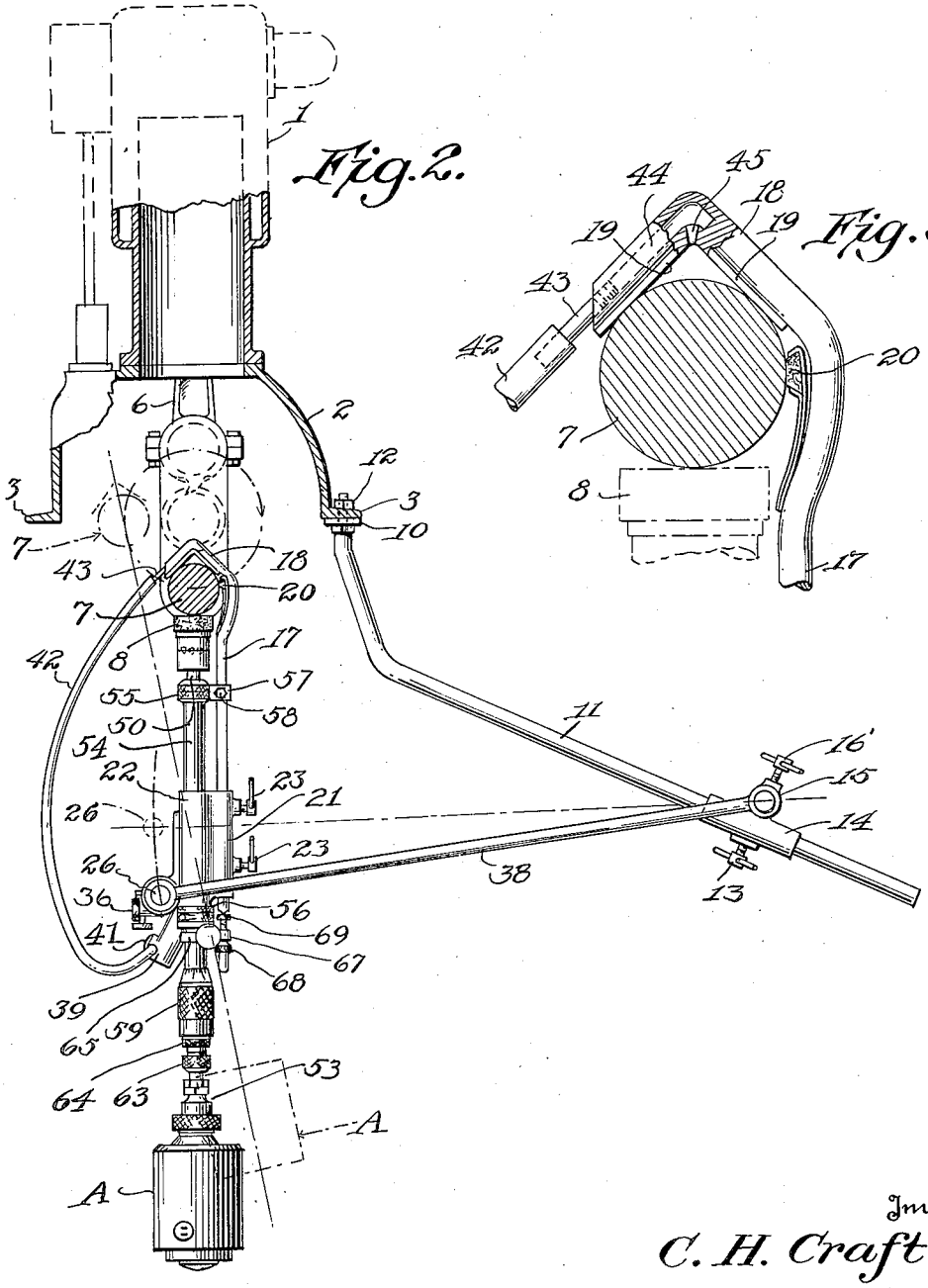


Fig. 3.

Inventor

C. H. Craft

By Eccleston & Eccleston.

Attorneys

July 24, 1934. C. H. CRAFT 1,967,744

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Fig. 4.

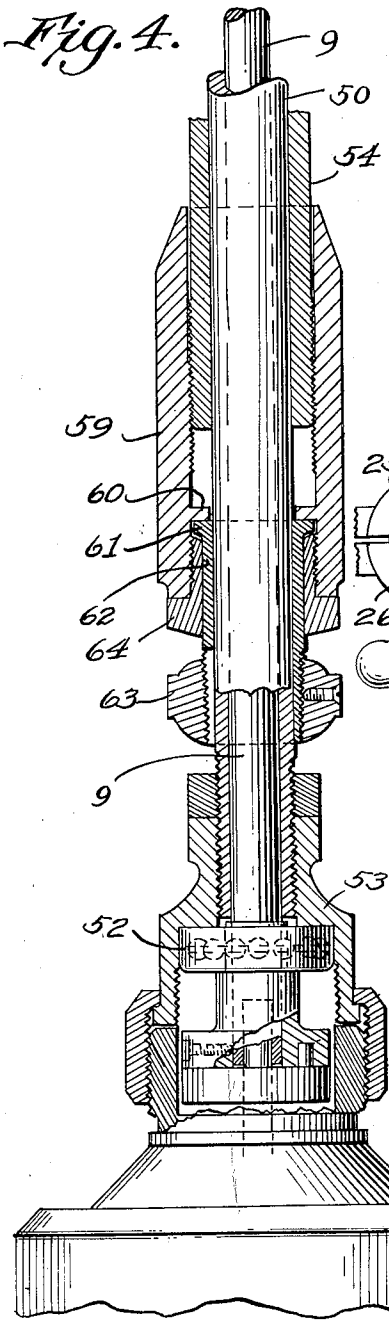


Fig. 5.

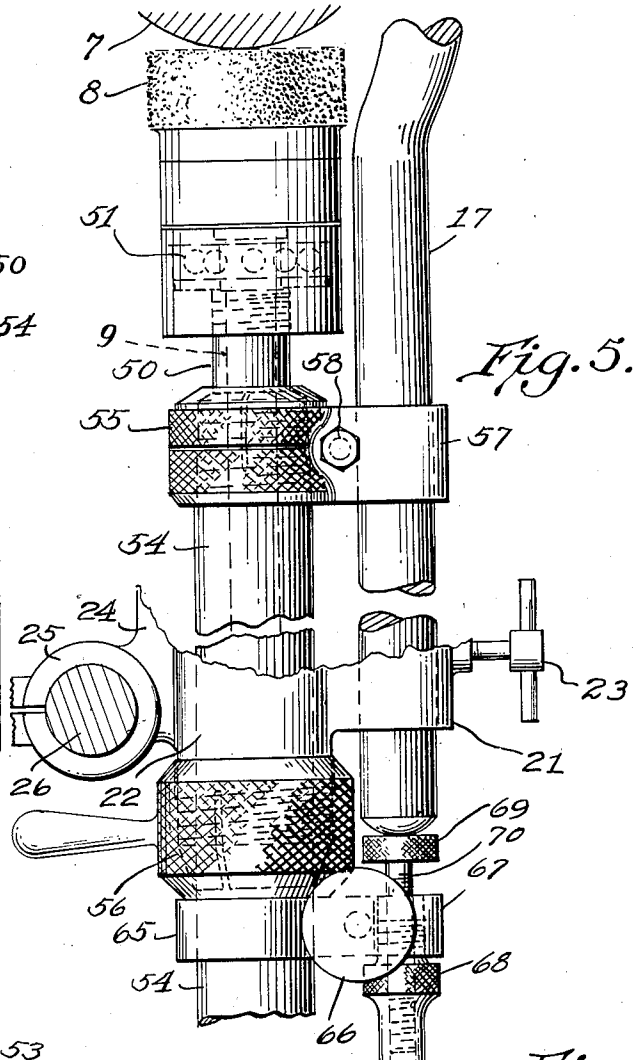
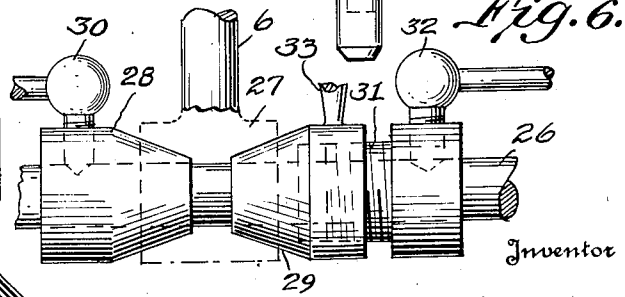


Fig. 6.



Inventor

C. H. Craft

By Eccleston & Eccleston.

Attorneys

Patented July 24, 1934 1,967,744

UNITED STATES PATENT OFFICE

1,967,744

CRANKSHAFT GRINDER

Clarence H. Craft, Uniontown, Pa., assignor of one-half to Wallace Miller, Uniontown, Pa.

Application September 11, 1931, Serial No. 562,399

5 Claims. (Cl. 51—241)

This invention relates to grinding apparatus and especially to a grinding device for crankshaft journals.

One of the primary objects of the invention resides in the provision of a grinding apparatus which may be mounted on the crank-case of an ordinary automobile engine and grind the crankshaft bearings without removing the shaft from the engine.

Another object of the invention consists in the provision of a device of this type with the necessary adjustments to adapt it to crankshafts of various dimensions and to provide the precision necessary to work of this type.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which,

Figure 1 is a perspective view of the apparatus supported from the crank-case of an automobile engine.

Figure 2 is an end view of the apparatus with a portion of the engine block shown in vertical section.

Figure 3 is an enlarged sectional detail view through a crankshaft and showing the suspending means for the grinding apparatus in position.

Figure 4 is a vertical sectional view through the lower portion of the operating shaft of the grinding apparatus.

Figure 5 is an elevational view of the upper part of the operating shaft, grinding disc and related parts, and

Figure 6 is an enlarged detail view of one form of attaching means for supporting a portion of the apparatus.

Referring to the drawings in more detail, the numeral 1 indicates any conventional type of internal combustion engine provided with an upper crank-case portion 2 provided with flanges 3 to which the lower crank-case portion (not shown) is adapted to be bolted.

The engine is shown as provided with the usual crankshaft 4, pistons 5, and piston rods 6.

The present invention relates to means for suspending from the crankshaft a grinding wheel and driving means therefor, by means of which the bearing 7 of the crankshaft may be ground while the crankshaft remains mounted in the engine. The grinding means comprises a wheel 8 of any preferred material which is mounted on a shaft 9. I will now describe the construction by which the grinding wheel 8 and its shaft 9 are suspended from the crankshaft so as to permit an accurate grinding and truing of the bearing 7 and will thereafter describe the details of the mounting of the shaft 9 and its adjustments.

The drip pan being disconnected from the flanges 3 of the crank-case and removed, brackets 10 provided with downwardly and outwardly directed arms 11 are bolted to one of the flanges 3 by means of bolts 12 as indicated in Figures 1 and 2. Adjustably mounted on the rods 11 as by means of set screw 13 are sleeves 14 which carry angularly arranged sleeves 15. The sleeves 15 form a support for a shaft 16 which is adjustably secured in the sleeves 15 by set screws 16'. The angular arrangement of the respective sleeves 14—15 is such that by reversing their positions, that is, by placing the sleeves 14 on the shaft 16 and the sleeves 15 on the arms 11, the position of the shaft 16 may be altered to suit varying conditions in engine construction.

A rod 17 is provided for suspending the grinding mechanism from the bearing to be ground, and this rod is provided with a hooked upper end 18 and flat portions 19 adapted to rest on the bearing as indicated in Figures 1 and 3. This hooked portion of the suspending means is also preferably provided with a wiper 20 which is adapted to remove grindings, etc., from the bearing so as to prevent any interference with the proper grinding and truing of the bearing.

Adjustably supported on the rod 17 is a duplex sleeve comprising the sleeve members 21 and 22, the latter being provided with set screws 23 by means of which it is secured to the rod 17. Permanently secured to the sleeve 22 as by means of web 24 is sleeve 25.

This sleeve 25 is arranged at right angles to the sleeve 22 and forms one support for a horizontally arranged pivot shaft 26. The opposite end of the shaft 26 is supported by one of the piston rods 6 of the engine. For this purpose the piston of the particular piston rod is removed and the shaft 26 is passed through eye 27 of the piston rod. In order to properly center the shaft 26 with respect to the eye 27 of the piston rod and to rigidly secure these elements together, clamping and centering means 28 and 29 are provided. These members are provided with frustoconical ends adapted to be projected into the interior of the eye 27, and the member 28 is provided with a set screw 30 for securing it in operative position on the pivot shaft 26. The member 29 is preferably threaded onto a sleeve 31 which is slidably mounted on shaft 26 and may be secured in adjusted position by a set screw 32. This member 29 is provided with a handle 33 by means

of which it may be rotated on the sleeve 31 so as to tightly wedge its conical end into eye 27. By this construction it will be apparent that the shaft 26 is accurately centered with respect to the eye or bearing sleeve 27 of the particular piston rod 6 and that it is firmly held with respect thereto. It will be obvious therefore that the pivot shaft 26 is directly suspended from the crankshaft 4 at two different points and that the suspending means including the rod 17 is adjustable so that the shaft 26 may be supported in parallel relation to the crankshaft 4 and in the same vertical plane.

In the grinding of a bearing 7 it will be understood that the grinding wheel 8 is moved back and forth longitudinally of the bearing as the wheel is being rotated by its motor A, and in order to define the extent of longitudinal movement of the wheel 8, sleeves 34 and 35 are adjustably mounted on the pivot shaft 26 as by means of set screws 36 and 37. These sleeves when properly spaced and secured on the shaft 26 will limit the movements of the sleeve 25 and hence the longitudinal movement of the wheel 8 so as to allow it to grind the full length of the bearing 7 and the fillets connecting the bearing with the arms of the crankshaft.

In the grinding of a bearing 7 by the rapid rotation of the grinding wheel 8 it will be understood that the crankshaft 4 must be slowly rotated in its bearings, and it is for the purpose of maintaining the proper relation between the wheel 8 and bearing 7 during this rotation of the crankshaft that secondary shaft 16 heretofore described is provided. This shaft forms a pivotal support for two connecting rods 38 which have their opposite ends pivotally supported on the pivot shaft 26. It will be apparent therefore by reason of these connecting rods 38, that the proper alignment of the shaft 26 beneath the bearing 7 is maintained at all times with the result that the grinding wheel 8 is accurately guided back and forth along the length of the bearing 7.

It is desirable that the bearing being ground be supplied with water or other liquid, and to this end a pump 39 is supported on the shaft 26 by means of a sleeve 40. This pump is provided with a flexible diaphragm 41 adapted to be occasionally depressed by a finger of the operator thereby forcing liquid through a flexible tube 42. This tube is connected at its opposite end with a nipple 43 which is secured into a passage 44 formed in the hooked end 18 of the supporting rod 17. The passage 44 is provided with a discharge outlet 45 which permits the liquid to drop onto the bearing from which the grinding wheel is suspended. It will be understood that the diaphragm 41 is only operated from time to time as deemed necessary by the mechanic attending the grinding operation.

The drive shaft 9 of the grinding apparatus extends through a casing 50 and is provided adjacent its upper and lower ends with thrust bearings 51 and 52; the latter being located in a head 53 secured to the casing of the motor A. The shaft 9 of course is rigidly connected with the motor shaft at its lower end and has the grinding wheel 8 rigidly secured to its upper end. The cylindrical casing 50 for the shaft 9 is rigidly secured within a cylindrical jacket 54 by means of a nut 55 which is threaded onto the upper end of the jacket 54 and causes the slitted end of the latter to securely grip the casing 50. The nut 55 is provided with a lateral extension 57 which encircles the supporting rod 17 and is caused to releasably grip the same by means of a clamping nut 58. The casing 54 is also secured to the rod 17 by means of the duplex sleeves 21 and 22 heretofore referred to and which are clamped to the rod 17 by the set screws 23. A nut 56 serves to secure the sleeve 22 to the jacket 54.

A micrometer adjustment for the jacket 54 consists of a threaded sleeve 59 which is threaded to the lower end of the jacket 54. This sleeve is provided with an internal annular shoulder 60 which rests upon an external shoulder 61 formed on a sleeve 62 slitted at its lower end, which sleeve is secured to the casing 50 by means of a tapered nut 63. The lower end of the micrometer 59 is internally threaded for the reception of a wedging nut 64 which serves to lock the micrometer in adjusted position. With this construction it will be apparent that by loosening the connections of the jacket 54 with the rod 17 and by rotating the micrometer in the proper direction, the effective distance between the hook portion 18 of the supporting rod 17 and the grinding wheel 8 may be varied to suit the particular work at hand.

It will be readily understood that when several bearings of a crankshaft are ground, they should be ground to the same extent and in order to produce this result I have provided a gauge member adapted to be brought into contact with the lower end of the rod 17 after the same is set for grinding the first bearing of a shaft. After this member is set the relative positions of the grinding tool and rod 17 may be altered as necessary for dismounting the apparatus or for remounting it on another bearing, without liability of discrepancy occurring in the extent of grinding for the reason that it is only necessary to bring the lower end of the rod 17 into contact with the gauge in order to insure a setting of the apparatus which is an exact duplication of the original setting. This stop member consists of a bracket 65 clamped to the jacket 54 by a clamping screw 66 and provided with a boss 67 into the lower end of which is threaded a hollow screw 68. Extending through the upper end of the boss 67 is the gauge or stop member 69 mounted on the upper end of a screw 70 which is threaded into the hollow portion of the screw 68. After the rod 17 is properly adjusted with respect to the grinding wheel 8 the nuts 68 and 69 are properly adjusted so as to bring the gauge member into contact with the lower end of the rod 17. Obviously, therefore, after the bearing is ground and the parts released and again remounted on another bearing of the same crankshaft, it is only necessary to adjust the micrometer 59 so as to again bring the lower end of rod 17 into contact with stop 69, to assure an identical grinding and truing of the next bearing of the crank-shaft.

The function and operation of the various features of the construction have been described in connection with the detailed description of the parts and a repetition of the operation is believed unnecessary except to say that in the mounting of the apparatus it is essential that the shafts 16 and 26 be accurately positioned so as to assure the suspension of the shaft 26 directly below the crankshaft 4 and in parallelism.

From the foregoing description taken in connection with the accompanying drawings it will be apparent to those skilled in the art that I have devised a rather simple yet highly accurate apparatus for regrinding and truing the bearings of a crankshaft; that the apparatus may be mounted and operated without removing the crankshaft from its position in the engine thereby greatly

reducing the cost of regrinding; and that means are provided for so mounting the grinding apparatus as to assure the proper truing of the bearings.

In accordance with the patent statutes I have described what I now believe to be the preferred form of construction, but inasmuch as it is quite obvious that various minor changes may be made in the details of the construction without departing from the spirit of the invention, it is intended that all such changes be included within the scope of the appended claims.

What I claim is:

1. A grinding and truing apparatus for crankshafts including a grinding wheel and drive shaft therefor, means for suspending the wheel and shaft from the crankshaft, a rod to which the shaft is pivotally connected and means associated with the rod for maintaining the wheel and shaft in proper relation to the crankshaft as the latter is rotated in its bearings.

2. A grinding and truing apparatus for crankshafts including a pivot shaft, means for suspending the pivot shaft from the crankshaft, a grinding wheel and drive shaft connected to said pivot shaft, and means for maintaining said pivot shaft in parallelism with crankshaft.

3. A grinding and truing apparatus for crankshafts including a pivot shaft, means for suspending the pivot shaft from the crankshaft, a grinding wheel and drive shaft supported on said pivot shaft, a secondary shaft parallel to the pivot shaft and rigidly supported from one or more points, and adjustable connections between said shafts, and a clamp on the pivot shaft for engaging the piston rod.

4. A grinding and truing apparatus for crankshafts including a pivot shaft, means for suspending the pivot shaft from the crankshaft, said means including clamps mounted on the pivot shaft for engaging an end of one of the piston rods, a grinding wheel and drive shaft supported on said pivot shaft, a secondary shaft parallel to the pivot shaft and rigidly supported from one or more points, and adjustable connections between said shafts.

5. A grinding and truing apparatus for crankshafts including a grinding wheel and drive shaft therefor, means for suspending the wheel and shaft from the crankshaft, said means being partly hollow and a connection with said suspending means for feeding a liquid to the grinding wheel.

CLARENCE H. CRAFT.