

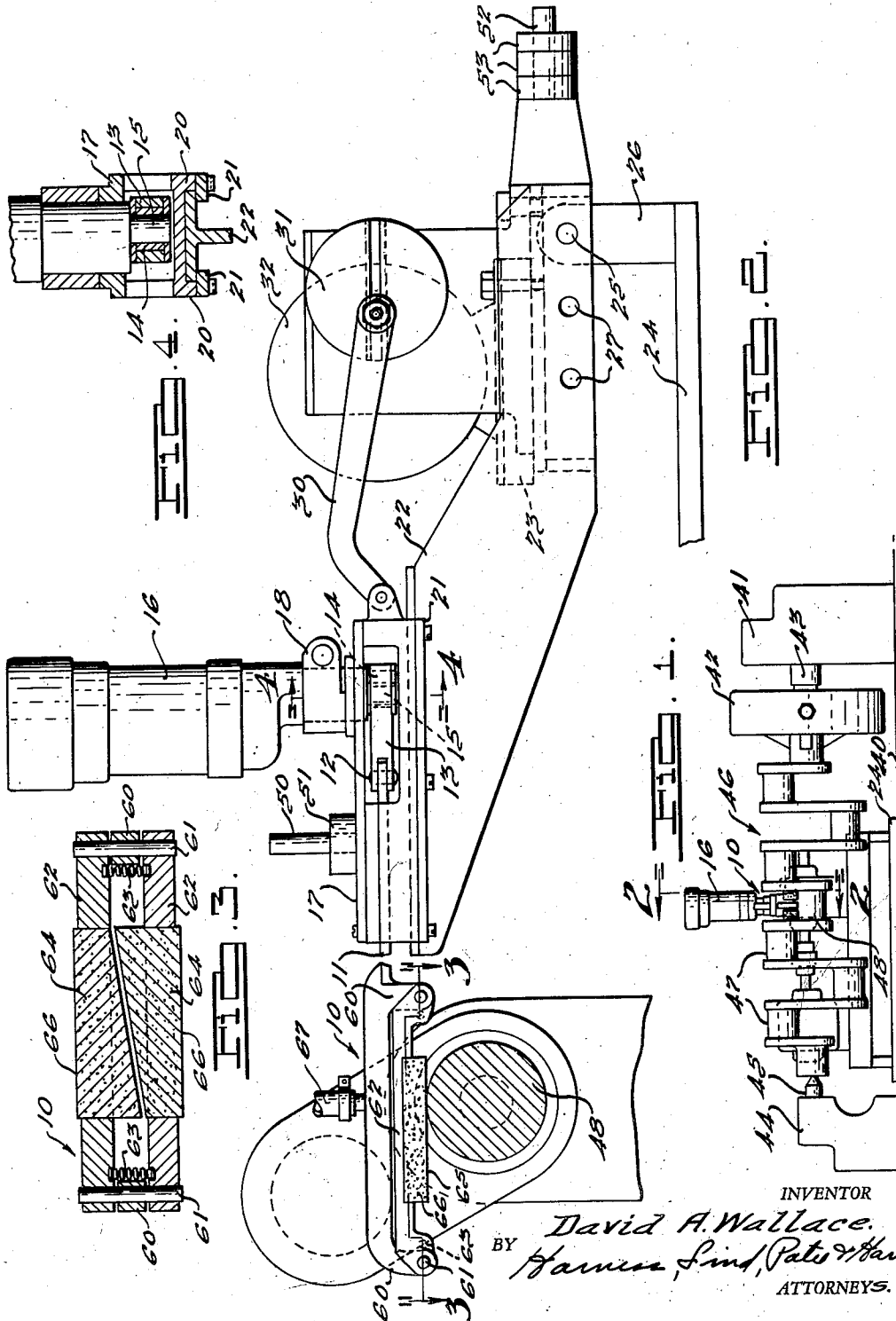
Feb. 23, 1943.

D. A. WALLACE

2,312,014

LAPPING APPARATUS

Filed Nov. 7, 1941



INVENTOR

David A. Wallace.

BY

Harness Lind, Pat. & Harris

ATTORNEYS.

UNITED STATES PATENT OFFICE

2,312,014

LAPPING APPARATUS

David A. Wallace, Detroit, Mich., assignor to
Chrysler Corporation, Highland Park, Mich., a
corporation of Delaware

Application November 7, 1941, Serial No. 418,107

4 Claims. (Cl. 51-204)

The present invention relates to a means for finishing the surface of a cylindrical body, or a cylindrical body having inwardly facing end flanges which are also to be finished. By means of the present invention a high degree of smoothness may be imparted simultaneously to members such as the bearing surfaces and thrust flanges of a crankshaft. A battery of machines embodying the present invention may be employed simultaneously to finish a plurality of bearing surfaces and thrust flanges of a multiple throw crankshaft.

The present invention embodies means of the type wherein a multiplicity of motions are imparted to the surface finishing tool at the same time that further relative motion between the work surface and the finishing tool is achieved by rotating the crankshaft or other member to be finished during the time that the finishing tool is in operation. In general, such types of machines and the methods of finishing involved are well-known in the art, and my present invention comprises specifically a finishing tool of such character as to be of extreme utility in such machines and in carrying out such methods.

More specifically, my invention comprises a finishing tool adapted to be reciprocated relative to a rotating work surface of cylindrical shape, or of cylindrical shape and having internally facing end flanges thereon, the finishing tool having front and side working surfaces adapted simultaneously to impart a smooth finish to the cylindrical surface and the internally facing end flanges. The tool comprises a plurality of finishing stones so constructed and arranged as positively to impart the same degree of finish to all of the surfaces being finished regardless of the amount of wear to which the stones have been subjected by previous operations.

A further object of my invention is to provide a tool dresser for reshaping the finishing tool of the present invention, in the event that a portion of the finishing tool should become unduly worn or chipped at its edges, so as to prolong the life of the finishing stones.

The foregoing and other objects and advantages of the present invention will be more readily apparent by reference to the following specification taken in connection with the accompanying drawing wherein like numerals refer to like parts throughout.

In the drawing, Fig. 1 discloses a tool of the present invention in end elevation as the same

appears when operating upon a multiple throw crankshaft;

Fig. 2 is a sectional view taken through the crankshaft and a side elevation of the operating mechanism and tool of the present invention taken substantially along line 2-2 of Fig. 1;

Fig. 3 is a horizontal sectional view through the tool of the present invention taken substantially along line 3-3 of Fig. 2 and looking in the direction of the arrows; and

Fig. 4 is a sectional view of a portion of the operating mechanism taken substantially along line 4-4 of Fig. 2 and looking in the direction of the arrows.

The present invention comprises a surface finishing tool 10 including a longitudinally extending rod 11 adapted to be pivotally connected by pivot member 12 to a connecting link 13, the opposite end of link 13 being provided with an opening snugly embracing an eccentric 14 mounted upon the end of a motor shaft 15 driven by motor 16. Motor 16 is mounted upon a frame 17 by a clamp 18 in such position as to have its shaft 15 extend normal to the rod 11, so that rotation of the eccentric 14 imparts rapid reciprocations of short length to the operating tool 10. The frame 17 is provided with parallel depending flanges 20 to which are attached inwardly extending retainers 21 embracing the arms of a T-shaped frame guide 22. The leg of the frame guide 22 is so shaped as to extend downwardly and outwardly from the frame in order that the frame guide may be attached to a bed 24. The bed 24 is adapted to be pivotally mounted upon a table or support 23 by means of trunnions 25 on a pair of spaced trunnion legs 26. A plurality of trunnion journals 27 may be provided in bed 24 for the purpose of shifting the position of the working tool with respect to a member to be finished.

The frame 17 is adapted to be reciprocated longitudinally of the frame guide 22 through the means of a link 30 pivotally connected to the rear of the frame and adjustably and pivotally connected to a T slot operating wheel 31 driven through reducing gearing connected to a motor 32 mounted upon the table 23. Longitudinal reciprocations of adjustable length are thus imparted to the working tool 10 by the motor 32, these reciprocations being out of phase with, and preferably of a greater amplitude than, the reciprocations imparted by motor 16 so as to cause the working surface to change its general relationship to the surface to be finished during the time that small portions of the working surface

reciprocate rapidly with respect to small portions of the surface to be finished.

The bed 24 is mounted upon the bed frame 40 of a turning lathe or similar mechanism comprising a head stock 41 carrying a chuck 42 adapted to be rotated through the medium of shaft 43, and a tail stock 44 carrying a center point 45. A crankshaft 46 having cylindrical bearing surfaces and thrust surfaces may be clamped in the jaws of the chuck 42 and retained against the center point 45 so as to permit the crankshaft to be rotated during the time that the finishing tool is operating upon a portion thereof. In the present disclosure the crankshaft 46 comprises a plurality of throws 47 and a center bearing portion 48 upon the latter of which the tool is shown in operation in Fig. 1. The speed and amplitude of the reciprocations imparted to the tool by motor 32 will, of course, be so related to the rotations of the crankshaft as to keep some portion of the tool in contact with the surface to be finished at all phases of rotation.

In order that the pressure imparted to the finishing tool may be controlled within desirable limits, the frame 17 may be provided with an upright peg 50 upon which one or more weights 51 may be mounted. Counterbalancing means is preferably provided by a rearwardly extending peg 52 upon the table 23 upon which one or more weights 53 may be placed.

The tool 10 preferably comprises a central extension of rod 11 from which depend lugs 60 at each end of the tool. The lugs 60 carry transversely extending guide rods 61 upon which a pair of mounting members 62 are slidably mounted for movement transversely of the longitudinal axis of the tool. Springs 63 adjacent each lug 60, having their ends suitably retained in sockets in the mounting members 62, or other resilient means, are adapted to force the mounting members 62 outwardly along the guide rods 61. Each mounting member carries a finishing stone 64. Each stone 64 has a front working surface 65 lying in the plane of the front working surface of the other stone, and each stone has a side working surface 66 lying in vertical planes parallel to the longitudinal axis of the tool. However, each stone is wider at one end than it is at the other, and the stones are placed in reverse position with respect to each other with the wider end overlapping the longitudinal axis of the tool to a considerable extent. The stones are similarly shaped so that the inner side surfaces are substantially parallel and intersect the longitudinal axis of the tool. Thus, even though the stones may be spread to a considerable extent by the resilient means 63, each reciprocation of the tool from end to end by the motor 32 will result in overlapping operation by each tool, thus preventing the formation of high spots by the separation of the stones. A polishing or lubricating fluid may be supplied to the stone through a flexible hose 67 extending upwardly from the tool.

Having described a preferred embodiment of the present invention, it should be apparent to those skilled in the art that modifications in arrangement and detail may be devised. All such modifications as come within the scope of the following claims are considered to be a part of my invention.

I claim:

1. A surface finishing tool adapted to be reciprocated along its longitudinal axis comprising a pair of finishing stones having front working surfaces lying in the same plane, said stones having parallel, inner side faces lying at an angle to and intersecting the longitudinal axis of the finishing tool so as to permit variable separation of the stones without leaving a clear space therebetween in the direction of the longitudinal axis of the tool, and mounting means for said stones permitting variable separation thereof in a direction substantially normal to the longitudinal axis of the tool.

2. A surface finishing tool adapted to be reciprocated along its longitudinal axis comprising a pair of finishing stones having front working surfaces lying in the same plane, said stones having parallel, inner side faces lying at an angle to and intersecting the longitudinal axis of the finishing tool so as to permit variable separation of the stones without leaving a clear space therebetween in the direction of the longitudinal axis of the tool, and mounting means for said stones permitting variable separation thereof in a direction substantially normal to the longitudinal axis of the tool, and resilient means urging said stones apart along said mounting means.

3. A surface finishing tool for simultaneously finishing a cylindrical body and the inwardly facing surfaces of end flanges thereon such as the crankpin and thrust flanges of a single throw of a crankshaft, comprising a pair of longitudinally extending mounting members, guide means upon which said mounting members are slidably positioned, said guide means extending normal to the longitudinal axis of the finishing tool so as to permit movement of said mounting members toward or away from the longitudinal axis of the finishing tool, resilient means tending to separate said mounting members, and a finishing stone mounted on each of said mounting members, said stones having front working surfaces lying in the same plane, and each of said stones having an outer side working surface substantially parallel to the longitudinal axis of the finishing tool and an inner side surface angularly intersecting the longitudinal axis of the finishing tool.

4. A surface finishing tool for simultaneously finishing a cylindrical body and the inwardly facing surfaces of end flanges thereon such as the crankpin and thrust flanges of a single throw of a crankshaft, comprising a pair of longitudinally extending finishing stones, means mounting said finishing stones for movement toward and away from each other in a plane normal to the longitudinal axis of the finishing tool, and resilient means tending to separate said finishing stones, each of said stones having a front working surface lying in a plane parallel to the plane of movement thereof toward and away from each other, an outer side working surface substantially parallel to the longitudinal axis of the finishing tool and an inner side surface angularly intersecting the longitudinal axis of the finishing tool, said inner side surfaces lying in substantial parallelism so that the front working surface of each stone extends across the longitudinal axis of the finishing tool.

DAVID A. WALLACE.