Feb. 24, 1942. T. C. JARRETT 2,274,332

LAPPING OR POLISHING MACHINE

Filed Jan. 30, 1939 2 Sheets-Sheet 1

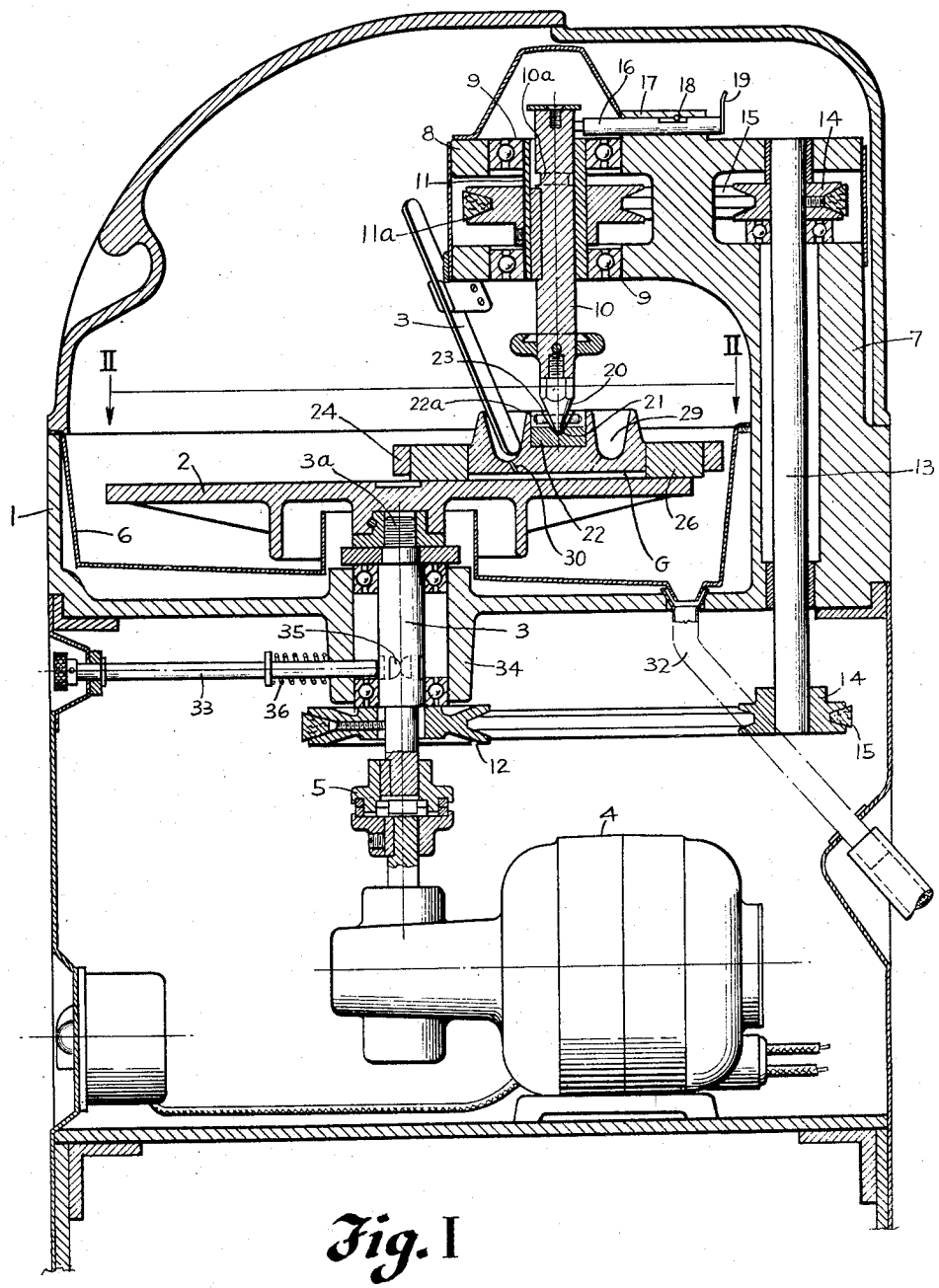


Fig. I

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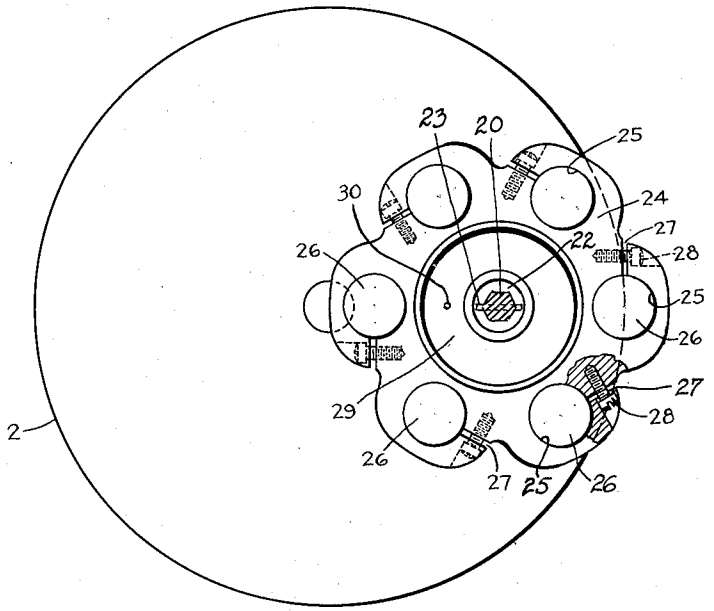


Fig. 2

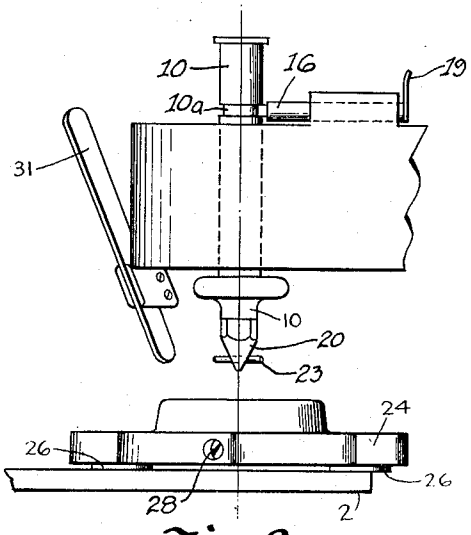


Fig. 3

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Patented Feb. 24, 1942 2,274,332

UNITED STATES PATENT OFFICE

2,274,332

LAPPING OR POLISHING MACHINE

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Application January 30, 1939, Serial No. 253,576

2 Claims. (Cl. 51—131)

The present invention relates to lapping or polishing machines, and has for its object to provide a machine of the above indicated character, that is adapted by its operation, to impart uniformly finished, polished surfaces to a plurality of similar articles.

The machine of the present invention is particularly adapted to simultaneously operate on a number of articles, such as metallurgical specimens, so that each specimen will be subjected to a uniform lapping or polishing action in the same plane. As a result, each specimen of a given group, handled by the machine in one operation, will present substantially the same degree of polish, or finish, a result highly advantageous when it is desired to subject the finished surfaces of a number of similar specimens to microscopic examination, or other study.

The above and other advantageous features of the invention will hereinafter more fully appear from the following description, considered in connection with the accompanying drawings, in which:

Fig. 1 is a view partially in vertical section and partially in elevation, of a machine embodying the invention.

Fig. 2 is a horizontal sectional view along the line 2—2 of Fig. 1, looking in the direction of the arrows.

Fig. 3 is a fragmentary view of a portion of the parts of Fig. 1, showing the work holder shaft in raised position.

Referring to the drawings, the machine consists of a base 1, in which a lap 2 is mounted for rotation on a shaft 3, about a vertical axis. The shaft 3 is adapted to be driven from a suitable motor 4, located within the base, by means of a coupling 5. The upper end of the shaft 3 is threaded at 3a, so that the lap 2 may be removed therefrom, and the flat surface of the lap 2 may be of any desired material, such as cast iron, cloth, pitch or wax. The lap 2 is surrounded by a circular container 6, supported from the base 1, the purpose of which container will be hereinafter referred to.

The base 1 provides an upward extension 7 at one side, from which extends an arm 8, partially overhanging the lap 2 and providing bearings 9 for rotatably supporting a shaft 10, with its axis offset with respect to the axis of the lap shaft 3. The shaft 10 is slidably keyed to a bearing sleeve 11, on which is mounted a pulley 11a, located between the bearings 9. The shaft 10 is driven from a pulley 12 on the lap shaft 3, through a counter shaft 13, pulleys 14, and belts 15. The shaft 10 is adapted to be held in the raised position of Fig. 3 by a latch bolt 16, cooperating with a groove 10a formed in the shaft 10. The bolt 16 passes through an opening 17, within which it is engaged by a spring 18 to frictionally hold it against movement toward the shaft 10. The outer end of the bolt 16 provides a finger 19, by which it may be pulled outwardly to disengage the end of the bolt 16 from the shaft groove 10a, and so permit the shaft 10 to be lowered to the position of Fig. 1, for the lapping operation.

The lower end of the shaft 10 provides a tapered extension 20, which is received in a tapered seat 21, provided by a bushing 22, with a drive pin 23 carried by the shaft fitting in a cross slot 22a in the bushing 22. The bushing 22 is located centrally of a work holder 24, so that rotation of the shaft 10 is imparted to the work holder when the pin 23 is in the slot 22a. By means of this pin and slot driving connection, the work holder 24 can be readily disconnected from the shaft 10, upon raising the shaft 10 to the position of Fig. 3, wherein it is held by the bolt 16.

As best shown in Fig. 2, the work holder 24 is generally in the form of a circular plate, with a series of openings 25 for receiving cylindrical articles or specimens 26. The periphery of the holder 24 provides a series of slots 27 communicating with the openings 25, with set screws 28 threaded into one side of each slot, as indicated at the broken-away portion of Fig. 2. By turning a set screw 28, the sides of a slot 27 can be drawn together, so as to clamp a specimen 26 in position. The work holder 24 also provides an annular trough 29 within the series of openings 25, and one or more small passages 30 extend through the bottom of the trough 29 to the lower surface of the holder 24.

In operation of the machine, a number of specimens 26 are placed in the openings 25 of the work holder, and clamped in position by the set screws 28, with each specimen 26 projecting beyond the lower face of the holder 24 the same amount. The holder 24 is then placed on the surface of the lap 2, below the then raised shaft 10, with the ends of the specimens 26 lying in the same plane at one side of the lap. The latch bolt 16 is then withdrawn from the groove 10a in the shaft 10, and the shaft 10 lowered, so as to bring the pin 23 into register with slot 22a in the bushing 22, with the tapered surfaces tending to center the holder 24. In this position, it is to be noted that an appreciable gap

G is provided between the parallel surfaces of the holder 24 and lap 2, respectively.

The motor 4 is then operated to rotate the lap 2 and work holder 24 in unison, with the lap 2 being driven at substantially the same speed as that of the holder 24. At the same time, a polishing solution is delivered to the trough 29, and this solution passes slowly through the passage 30, from which it falls upon the surface of the lap 2. An agitator 31 mounted on the arm 8 dips into the trough 29 and keeps the solution stirred up. Since the holder 24 is rotating about an axis offset with respect to the axis of the lap 2, the specimens 26 travel in a circular path on the moving lap surface and the polishing solution is uniformly distributed, with the specimens always bearing on different portions of the lap. As a result, an extremely effective and uniform polishing effect is obtained, with the surface of each specimen receiving the same degree of finish or polish.

During the operation of the machine, the several work pieces 26 bear with a uniform pressure on the surface of the lap 2. This is due to the fact that the shaft 10 driving the holder 24 may move vertically in its bearings 9, so that the free action of the pin and slot driving connection, insures the maintenance of a parallel relation between the opposed surfaces of the lap 2 and the holder 24. As the polishing operation continues, the polishing solution flows over the edge of the lap 2, and collects in the container 6 surrounding the lap, from which it may be removed as required, through a drain pipe 32.

At the completion of the polishing operation, the shaft 10 is raised to the position of Fig. 3, and after it has been locked in position by the bolt 16, the holder 24 can be readily lifted from the lap 2, for removal of the finished work pieces. In order to expedite removal of the lap 2, when desired, a plunger 33 extends inwardly through the bearing housing 34 for engagement with a notch 35 on shaft 3, to hold the latter against rotation. A spring 36 surrounding the plunger 33 normally holds the end of the plunger free of the shaft 3.

From the foregoing, it is apparent that by the present invention there is provided an improved lapping or polishing machine, that is adapted to operate simultaneously on a number of similar work pieces, in a uniform manner. As a result, all the specimens of a given group handled by the machine in one operation, will individually receive the same degree of polish or finish.

I claim:

1. In a machine of the class described, a rotatably mounted lap, a shaft rotatably and slidably mounted in bearings overhanging a portion of said lap, a holder providing a series of openings for receiving work pieces resting on the surface of said lap, a slot provided by said holder centrally of said openings, a driving pin at the lower end of said shaft for engaging said slot and centering the same on said shaft when the latter is lowered, and an annular container for a polishing medium formed integrally with said holder between said openings and said slot, with a passage extending through the bottom of said container to just above the surface of said lap.

2. Apparatus for polishing metal specimens, comprising in combination, a rotatably driven lap providing a flat surface, a specimen holder providing means for clamping identical specimens around its edge, with the flat end surfaces of said specimens bearing freely on said lap surface at one side of its central axis, and with said holder providing an annular container for a polishing medium surrounded by said specimens and in communication with said lap surface, a rotatably driven shaft capable of movement with respect to said holder along an axis offset from the rotative axis of said lap, and means for connecting the lower end of said shaft to said holder, whereby rotation of said holder serves to uniformly distribute polishing medium from said container on the moving lap surface, within a zone continuously traversed by the ends of the specimens bearing on said lap surface.

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