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ROTARY LAPPING MACHINE

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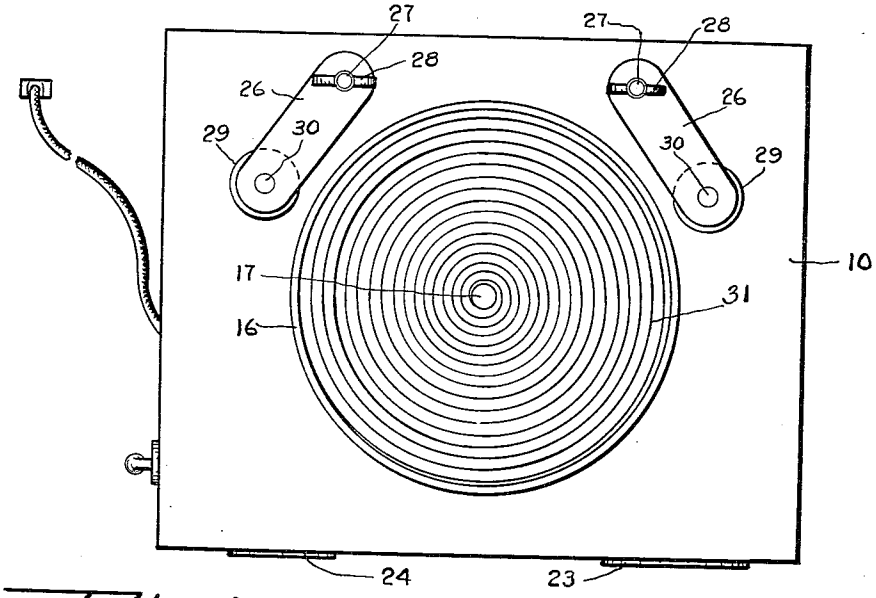


Fig. 1.

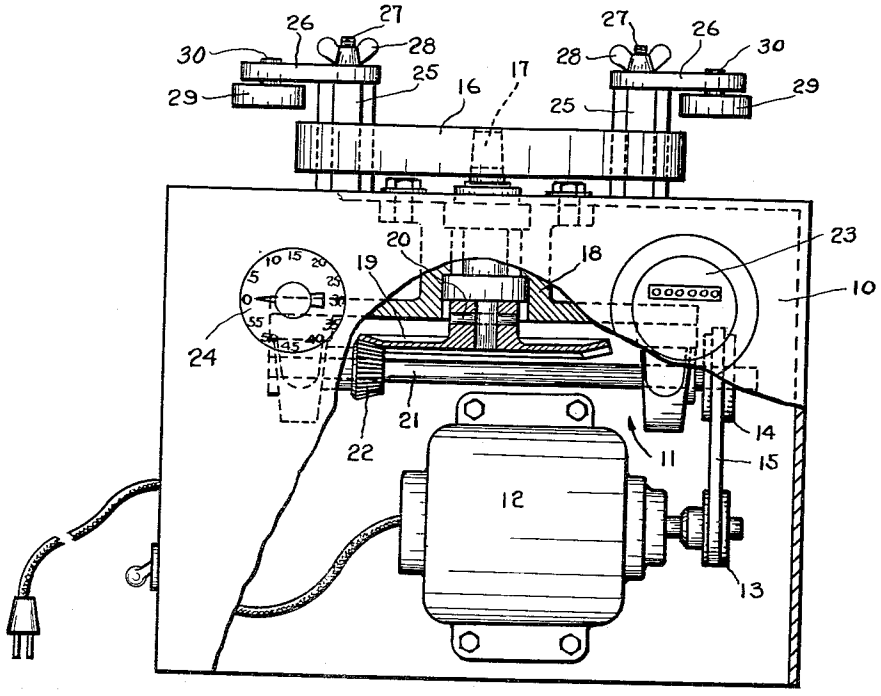


Fig. 2.

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ROTARY LAPPING MACHINE

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1 Claim. (Cl. 51—129)

This invention relates to new and useful improvements in rotary lapping machines and has particular reference to such a machine which is relatively simple and economical in construction yet rugged and accurate and wherein the working plate may be maintained flat without recourse to other equipment.

An object of the invention is to provide a new and improved rotary lapping machine which is relatively simple, rugged and inexpensive in construction and extremely accurate.

Another object is to provide a rotary lapping machine of the type set forth wherein the use of mated plates and a plurality of plates, preferably three, progressively lapped together and with a minimum of care maintains working surfaces of optical flatness.

Another object is to provide a new and improved rotary lapping machine of the type set forth with means for recording the total running time and also, automatically, whereby the timing of operation of the device may be controlled.

Another object is to provide new and improved rotating guides for a rotary lapping machine.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that changes may be made in the details of construction and arrangement of parts without departing from the spirit of the invention as set forth in the accompanying claim, as the preferred form has been given by way of illustration only.

Referring to the drawings:

Fig. 1 is a top or plan view of a rotary lapping machine constructed according to the invention; and

Fig. 2 is a front view, partly in section, of the apparatus shown in Fig. 1.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout, the apparatus shown comprises the housing **10** in which is contained the lapping plate drive assembly **11** adapted to be driven by the motor **12** through the pulleys **13** and **14** and belt **15**.

Above the upper surface of the housing **10** is positioned the lapping plate **16** which is mounted on the drive shaft **17** which is journaled in the support **18** and which has the beveled gear **19** secured thereon by the pin **20**.

Pulley **14** is mounted on drive shaft **21** on which is positioned pinion gear **22** which meshes with beveled gear **19** for driving the same.

The timing device **23** is provided for indicating the total hours of operation and may be utilized to aid in determining when the lapping plates need relapping and to help determine production costs.

The timing control mechanism **24** contains an on and off switch for turning the machine on and off, and timing mechanism which allows operation of the device for a predetermined desired period, such as one hour, without the necessity of attention of the apparatus and then automatically shuts off the apparatus.

Adjacent the lapping plate **16** is provided a plurality, preferably a pair, of supports **25** on each of which is adjustably mounted a bracket or locating arm **26** which is retained on the stud **27** on the support **25** by means of the wing nut **28**.

Each of the brackets **26** has a buffer or guide or rotary support **29** on a shaft **30** and mounted for revolution relative to its respective bracket **26**.

Each rotary lapping machine is provided with three lapping plates **16** which are preferably spiral grooved fine cast iron plates having the spiral grooves **31** in the lapping surfaces which grooves are charged with suitable grinding or lapping material. By providing three such plates with each machine, the plates are mated and progressively lapped together and therefore each of the plates will, with a minimum of care, maintain a working surface of optical flatness and thereby any wear on the existing working plate can be lapped out.

The locating arms **26** rotating support or fixtures **29** are adapted for automatic operation of the device and thereby allowing the adaptation to automatic operation of what would otherwise be numerous slow and tedious hand lapping operation and thereby results in the saving of time and the increase of the quality of the lapped surface produced. The locating arms are adjusted by loosening of wing nuts **28** and then moving the locating arms until the members or guides **29** are in engagement with edges of the work and the wing nuts **28** are then tightened. By this means, when the lapping plate **16** is rotated the work is automatically rotating on the lapping plate during the lapping operation.

The operation of the apparatus is believed apparent from the foregoing description.

From the foregoing it will be seen that I have provided simple, economical and efficient means for obtaining all of the objects and advantages of the invention.

I claim:

In a rotary lapping machine, a support, a lapping plate mounted on said support and adapted to support a work piece, said lapping plate having a spiral groove in its working surface with abrasive material filling said spiral groove, means for rotating said lapping plate comprising a spindle on which said plate is concentrically mounted, a bevel gear on said spindle, a motor, and means including said bevel gear operatively connecting said motor to said spindle, two separate relatively movable locating arms pivotally mounted on said frame at spaced points for adjustment in a plane parallel to and over said lapping plate, a guide rotatably mounted on each of said arms and adapted to engage the edges of a single work piece so that rotation of said work piece will be effected by rotation of said lapping plate, control means including an automatic timing device and an automatic switch for controlling said motor whereby the machine may be operated for a predetermined period of time without attention by the operator, and an indicating means for indicating the total time of operation of the machine so that the operator is advised of the need for resurfacing the lapping plate.

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