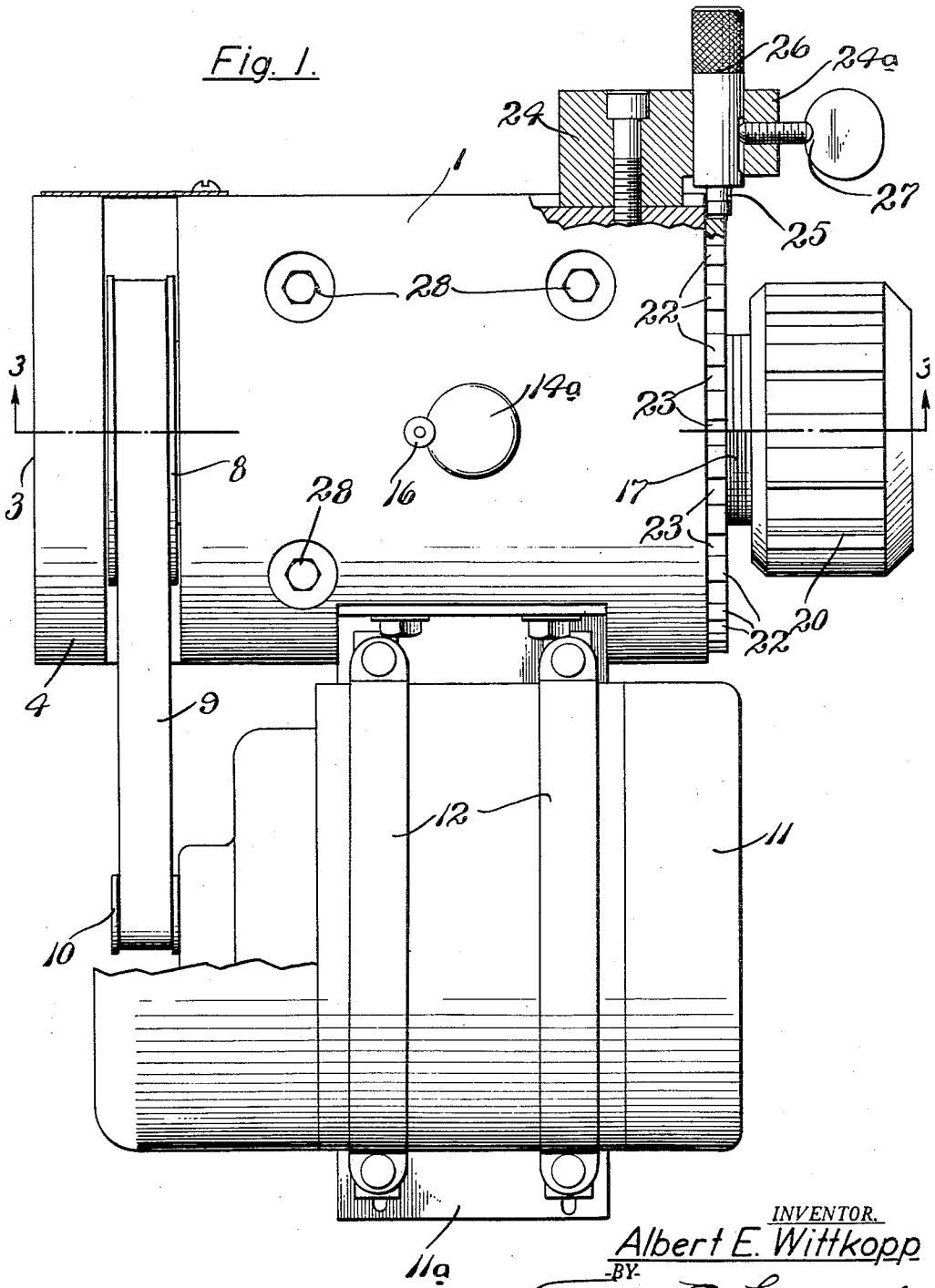
Aug. 26, 1958 A. E. WITTKOPP 2,848,853

MOTORIZED MILLING AND GRINDING HEAD

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Fig. 1.



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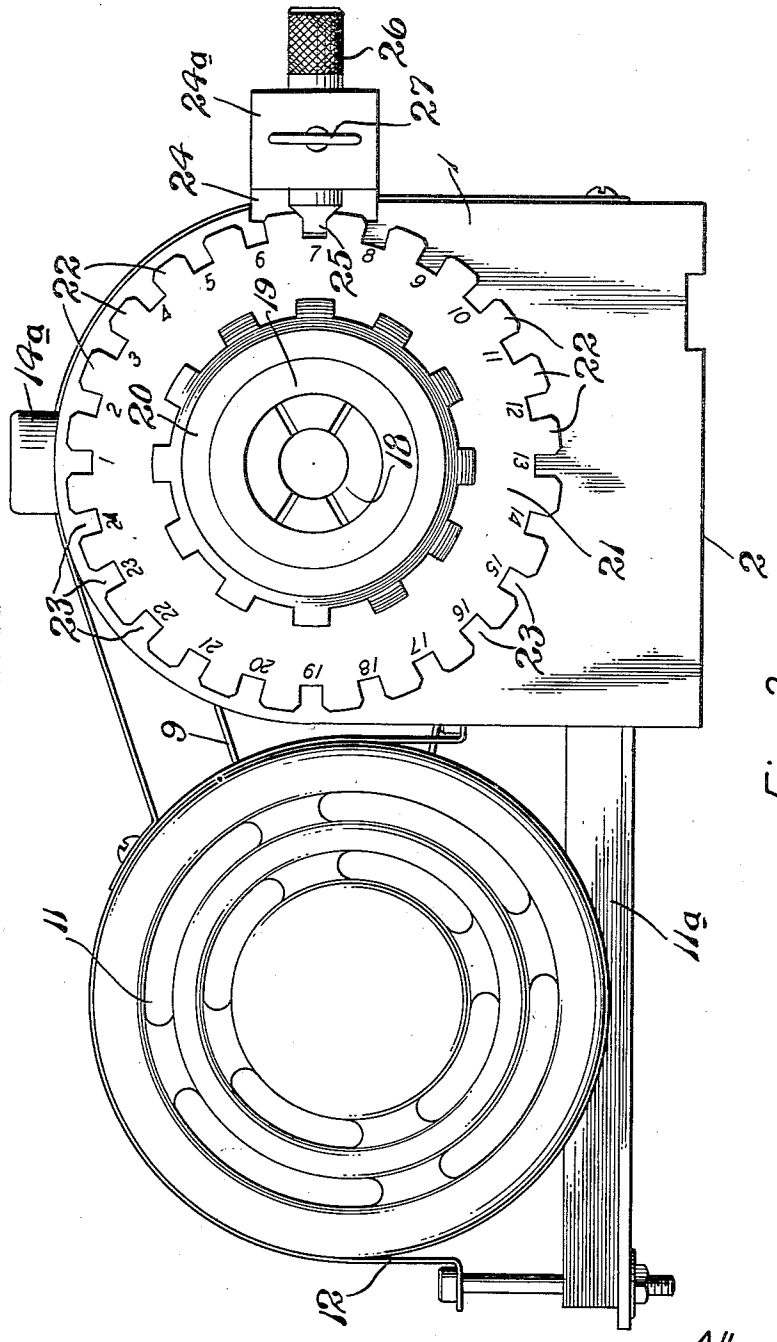


Fig. 2.

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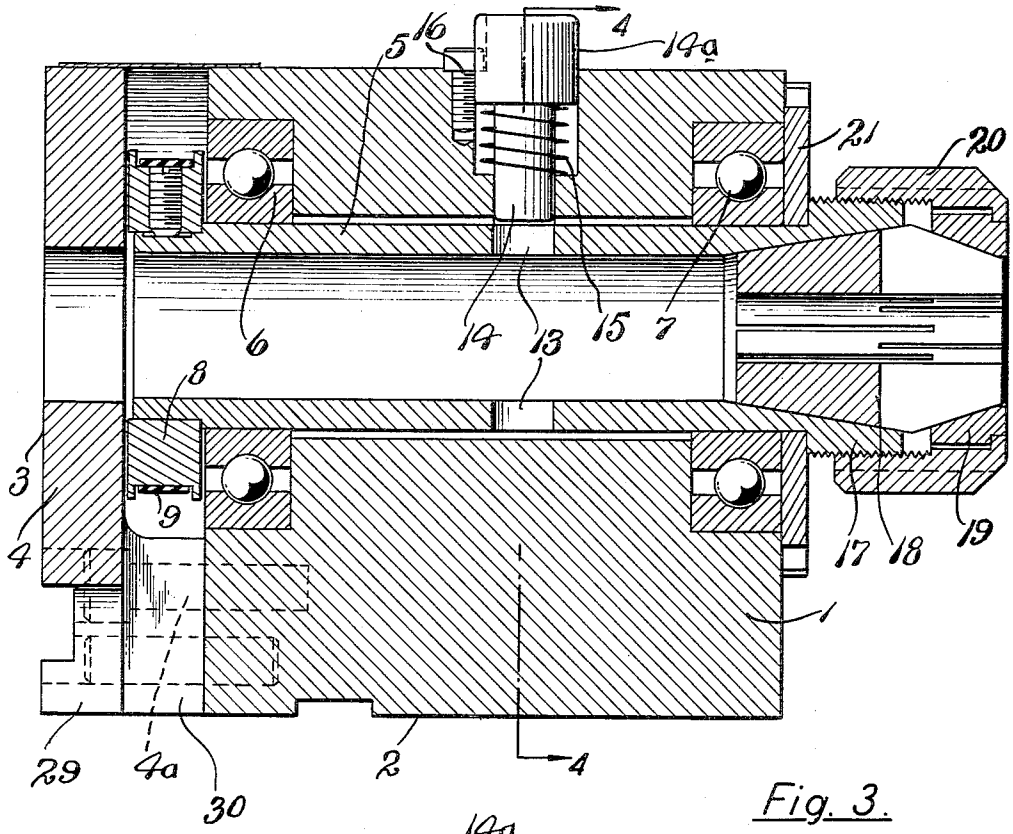


Fig. 3.

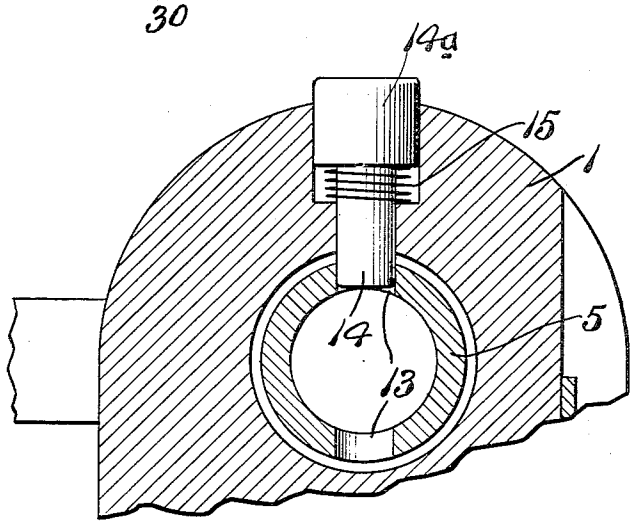


Fig. 4.

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MOTORIZED MILLING AND GRINDING HEAD

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Application January 26, 1956, Serial No. 561,391

1 Claim. (Cl. 51—237)

The present invention relates to a motorized milling and grinding head, in one use of which and for which it has been designed it may be secured at the upper side of the table of a grinding machine either on its base or in a vertical position with one end of the milling and grinding head against the upper side of the grinding machine table. Work driven by an electric motor forming a part of the milling and grinding head is rotated either about a vertical axis or a horizontal axis and moved back and forth with respect to the grinding wheel of the grinding machine. Means are provided for locking the work against rotation and at predetermined positions so that longitudinal flutes or flat surfaces or ends of the work may be ground to precision dimensions. With my invention work carried by the motor driven head which holds the work may be ground to proper form and dimensions before it is thereafter ground to provide such flutes, flat surfaces, etc. in different angular planes with respect to each other and the like, there being a marked increase in facility of production and in accuracy of work produced.

One major feature of my invention is in connection with a novel mounting and use of an index wheel so that the position of the work which is to be ground to provide flutes, flat surfaces and the like may be controlled with precision accuracy. Such structure is novel and of relatively simple and economical construction. It has proved very useful and practical in service.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a plan view of the motorized milling and grinding head in its horizontal position, certain parts being broken away and shown in section for a better disclosure of structure.

Fig. 2 is a front end elevation thereof.

Fig. 3 is a vertical section substantially on the plane of line 3—3 of Fig. 1 looking in the direction indicated, and

Fig. 4 is a fragmentary transverse vertical section on the plane of line 4—4 of Fig. 3.

Like reference characters refer to like parts in the different figures of the drawings.

In the structure illustrated, a relatively heavy cast housing body 1 of generally rectangular parallelepiped form, but curved longitudinally at its upper surface in the arc of a cylinder, has a flat horizontal under base 2 which is at right angles to the rear end face 3 of a member 4 (Fig. 3) spaced from the adjacent end of the housing body 1 except at the lower portion of said body, the memger 4 being fixedly secured to the body by means of screws 4a shown in dash lines in Fig. 3. The under face 2 and the end face 3 are carefully machined and are at as an exact angle of 90 degrees to each other as precision workmanship can accomplish.

Lengthwise of the housing body 1 it is bored from one end to the other and a hollow shaft 5 extends through such bearing carried by roller bearings 6 and 7

(Fig. 3). The rear end of the shaft 5 extends into the space between the body 1 and member 4. It has a driven pulley 8 fixed in said space driven by a belt 9 which goes around such pulley and also around the drive pulley 10 on the shaft of an electric motor 11. The motor 11 is located to one side of the housing body 1, as shown in Fig. 2, and carried on the carrier member 11a bolted to the adjacent side of the housing 1 and extending horizontally outward therefrom. Such motor is secured in place by spaced metallic bands or straps 12 which are connected at their ends to the body 1 and the outer end of the support 11a, using bolts as shown in Fig. 2 to tighten the bands and snugly secure the motor in place.

The shaft 5 (Fig. 3) between its ends has two diametrically opposed openings 13 as shown, through one of said openings only may be used. On the housing 1 at the upper portion thereof a pin 14 having a head 14a is normally lifted upwardly by a coiled spring 15 against the under side of said head and around the pin 14, the pin 14 having a diameter such that it may upon compressing spring 15 be pushed downwardly into an opening 13 (Fig. 4) and thereby hold the shaft against rotation. The head 14a extends above the upper side of the housing 1 and is accessible for pushing downwardly thereon with the thumb. It is limited in its upward movement by the head of screw 16 as shown in Fig. 3.

The front end of the hollow shaft 5 is enlarged in exterior diameter and exteriorly threaded as at 17. A contractable collet 18 has rearwardly and inwardly inclined sides which fit against complementary interior sides of the shaft 5 extending from the front end thereof through the head 17 and a distance back of it as shown in Fig. 3. Said collet has a front portion inclined downwardly and outwardly opposite to the rear portion thereof around which is a collar 19, the inner sides of which are correspondingly inclined to engage the front end portion of the collet. A ring 20 interiorly threaded at its rear portion is screwed onto the head 17 and at its outer end has an annular lip engaging the collar 19 to move it rearwardly when the ring 20 is turned in the same direction, thereby clamping the collet on any rod of proper shape and diameter which may be inserted thereinto. The ring 20 longitudinally at its outer sides is made, as best shown in Fig. 2, with a plurality of longitudinally spaced ribs with alternate grooves between the ribs for wrench application.

Between the inner or rear side of the head 17, the front side of the housing body 1 and the front roller bearings 7, an index plate or disk 21 is located having a secure connection to the shaft 5 and its head 17 to rotate therewith. Such indexing disk at its peripheral edges is formed with a successive series of spaced radial teeth 22 of the same width separated by like equal width recesses 23. Such indexing member is carefully machined to precision dimensions, each of the recesses being numbered and the successive recesses beginning with the one numbered "1" being consequently numbered until the last one is reached adjacent the first one as shown in Fig. 2. At the front end portion of body 1 opposite where the motor 11 is located a block 24 is permanently secured in place entering a groove in a side of the housing body 1 so that it is held against any turning movement. The block 24 has a forwardly extending projection 24a a short distance outward from the periphery of the index disk 21. On such projection a holding member 25 accurately machined and shaped to enter a recess 23 between two consecutive teeth 22 of the index disk is carried, being at the inner end of a rod 26 which passes freely through the projecting portion 24a of the block 24. Such rod 26 movable inward and outward is releasably held in place by a thumb screw 27 as shown

in Fig. 1. At its inner position, as in Fig. 1, the recess engaging end **25** is in one of the recesses **23** of the index disk. By moving it outward to its outermost position such inner end part **25** of the rod **26** is outwardly beyond the outer ends of the teeth **22** of the index disk. Rod **26** is held in either position by thumb screw **27**.

The housing block **1**, as shown in Fig. 1, may have holding bolts **28** with heads at their lower ends engaging with the usual T-shaped grooves on the table of a grinding wheel, and passing upwardly therethrough to receive nuts so that the housing **1** is securely connected with the grinding table with the lower face **2** against the upper side of the table. With the disk engaging member **25** moved to its outer position disengaged from the index disk and with the holding pin **14** in its upper inoperative position, as in Fig. 3, work held in the collet **18** may be rotated about its longitudinal axis at high speed driven by the motor **11** and various types of finishing work done on the work as, for example, by moving the work back and forth underneath the grinding wheel of the grinding machine. Such work is connected with the collet and the ring **20** turned to contract the collet against the work by applying a wrench to the ring **20** at its outer side and holding shaft **5** against rotative movement by pressing the pin **14** into an opening **13**. Such work when it is thus clamped will be freed for rotation and driving by the electric motor on removing pressure on the head **14***a* which has been exerted to move the pin **14** into an opening **13**.

After the work has been ground to cylindrical shapes all of the same diameter, or with parts in the length thereof of different diameters, rod **26** may be moved in to bring its recess engaging end **25** into a recess **23** of the index disk **21**. The work which has been ground to proper dimensions may have any portion of it, for example, a head at the outer end of the work of a greater diameter than the stem thereof, flattened at different sides thereof, it being held against any turning movement by engagement of the end portion **25** of the rod **26** with the index wheel, the grinding wheel being moved inwardly toward the work so as to grind such flat surface wanted inwardly to the extent desired. Then by withdrawing the rod **26** and its engaging end **25**, the work may be turned to another position to grind a second face at a predetermined and selected angle to the first face. With twenty-four of the recesses **22** in the index plate **21**, a change of position of the index wheel with a corresponding change of position of the work carried by the shaft will be a 15 degree change for each consecutive recess. A 15 degree change in position or multiples thereof is readily obtained depending upon the amount of rotative movement of the index plate from its first position to the next selected position. Thus a head may be flattened at the outer end of a bolt or other similar article, may be readily ground at its sides so that it may be of hexagonal, octagonal or other form, may be flattened at opposite sides with the flattened faces parallel to each other, may be of a triangular form, square, or have five, six, seven and other sides to and including a head having twenty-four sides.

A machined rod or shaft first ground to size may be processed by moving the shaft lengthwise back and forth underneath a flute grinding wheel of preselected dimensions which grinds longitudinal grooves at the outer surface of the shaft, spaced from each other at selected spaces, measured by the degree of change when the index wheel is moved from one position to the next selected position.

The unit described may also be placed on a grinding machine table with the shaft in vertical position and with the end **3** of the member **4** against the upper side of the table. In such position it is secured in place by a bolt which passes through a slot **29** at the lower side of the member **4** (Fig. 3), the shank of the bolt being in said slot and the head extending into wider extensions **30** at the inner end of said slot **29** so as to engage against the block for connecting securely to the grinding machine table. In such position, for example, an end of a rod or the outer side of an enlarged diameter head at the end of the rod may be ground by a grinding wheel as the table carrying the milling and grinding unit is moved back and forth underneath the wheel.

The structure described is practical and useful for the purposes for which it has been designed. While it has been described for use in connection with a grinding machine and has been used in that manner it is not to be restricted in use solely therewith but may be availed of for any purpose it may serve. Accuracy and rapidity in processing work as set forth is accomplished. As an accessory for a grinding machine it has proved exceptionally satisfactory.

The invention is defined in the appended claim and is to be considered comprehensive of all forms of structure coming within its scope.

I claim:

A motorized milling and grinding head unit comprising: a motor; a housing separate from said motor and including a block of material the composite weight of which is substantially heavier than said motor, said block having an underside with a flat support surface and front and rear ends; said rear end having a flat support surface disposed at right angles to said underside support surface; said block of material having a bore extending from the front end of said block parallel to said underside support surface and perpendicular to said rear end support surface; a spindle rotatably mounted in said bore; workpiece holding means on the front end of said spindle; said motor being mounted on the side of said block of material and located forwardly of the plane of said rear end support surface whereby said entire unit can selectively be supported on said underside support surface or said rear end support surface; and drive means operatively connected to said motor and to said spindle whereby said motor drives said spindle.

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