Oct. 20, 1964 P. J. ROBISCHUNG 3,153,306

BELT ABRADER

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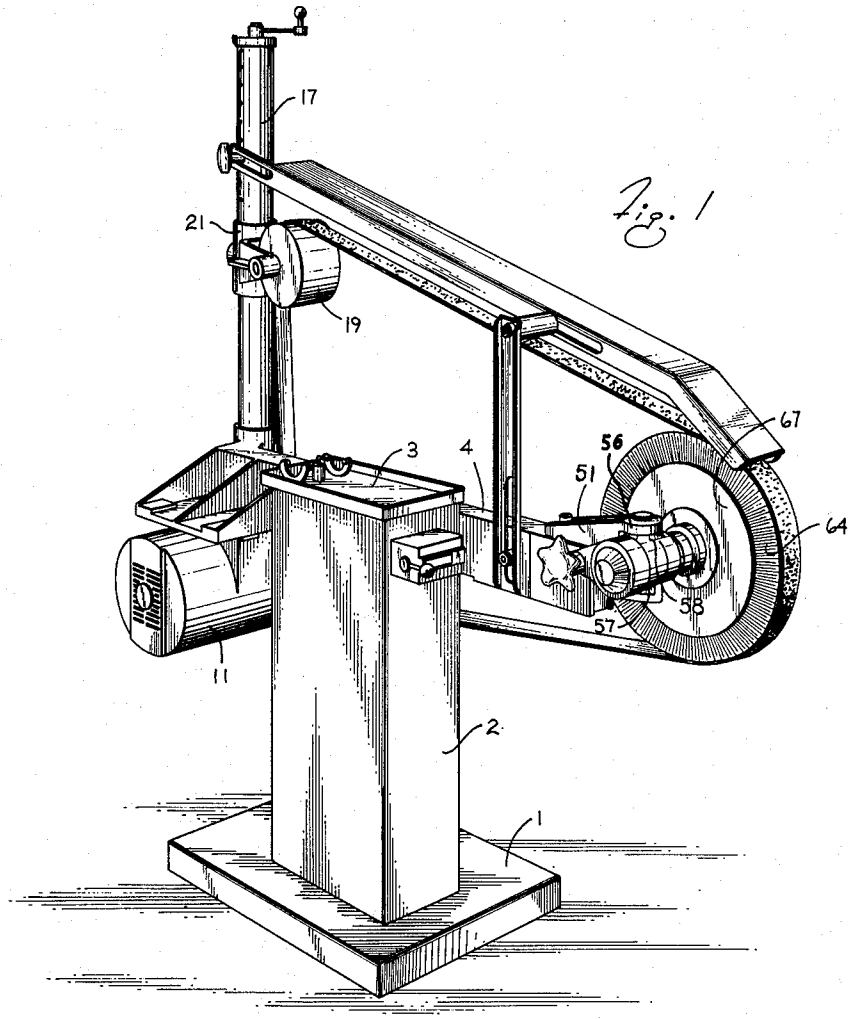


Fig. 1

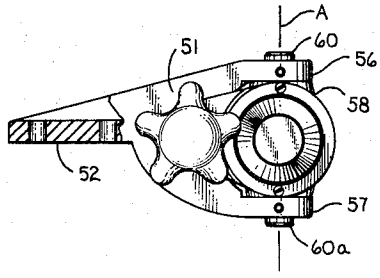


Fig. 6.

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Fig. 5

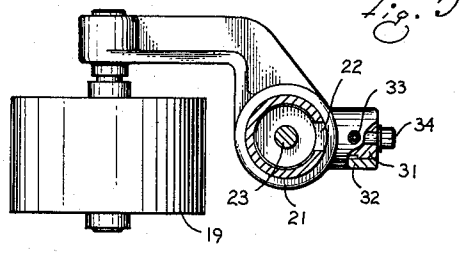


Fig. 2

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Fig. 3

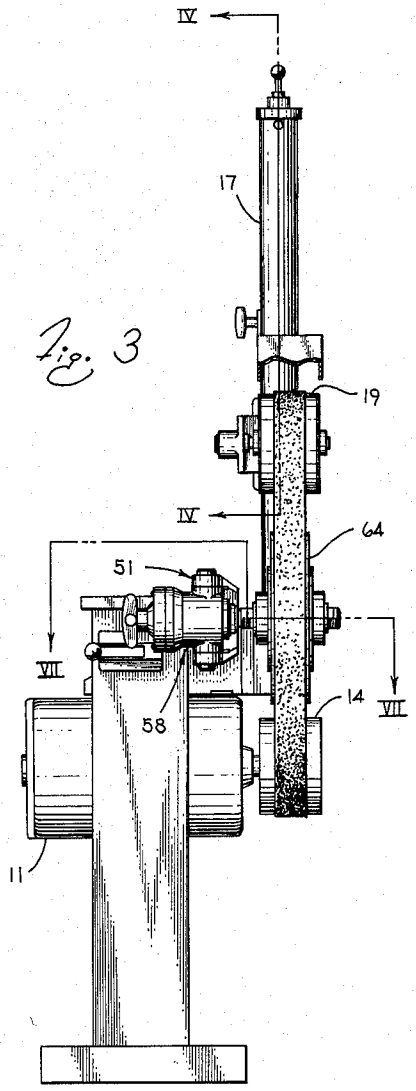
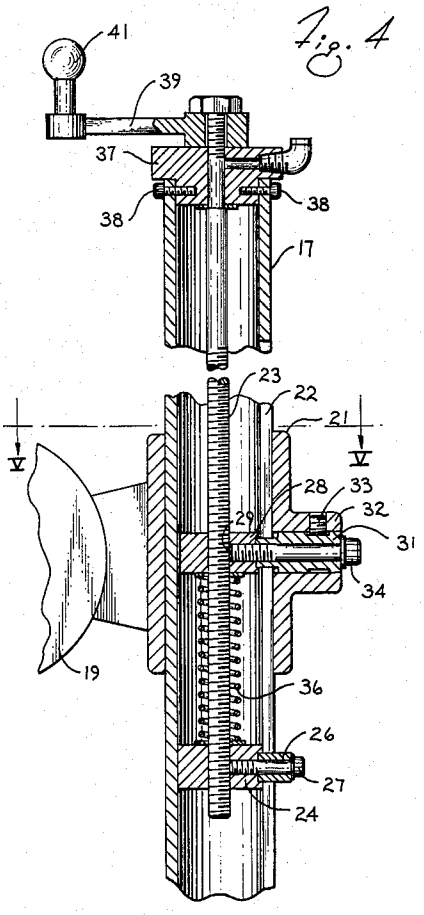


Fig. 4



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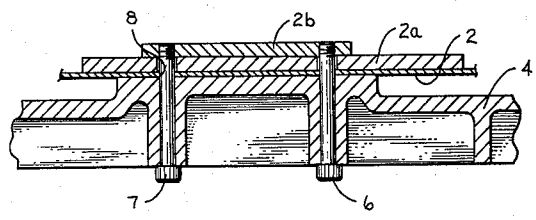


Fig. 8

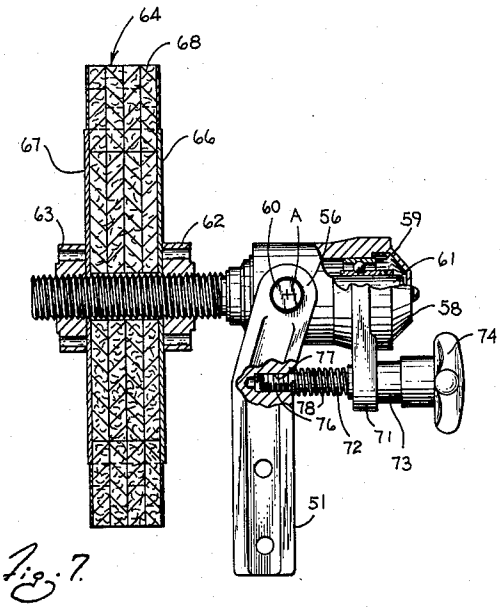


Fig. 7

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3,153,306

BELT ABRADER

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Filed Aug. 27, 1962, Ser. No. 219,397
4 Claims. (Cl. 51—135)

This invention relates to abrasive belt metalworking machines and particularly to a type thereof utilizing a belt of the order of from four inches in width to as little as one-eighth of an inch in width and readily adaptable to a wide range of specific uses.

Although the use of abrasive belt metalworking machines is not new, these machines have, insofar as I am aware, usually been confined to somewhat specialized uses, or at least any given machine has been capable of only a relatively narrow range of possible uses. Hence, there has remained a need for an abrasive belt machine, especially one adaptable for polishing the contours of irregularly shaped articles, which is extremely versatile and capable of handling a wide range of shapes and sizes of articles. However, the filling of this need creates certain problems in that the adapting of such a device to a wide variety of specific uses involves the provision of contact wheels of various diameters, widths, degrees of softness and other characteristics together with the provision of sufficient varying ways of mounting the contact wheel as to permit it to cooperate properly with workpieces of many different shapes.

Some initial attempts to meet these needs have been made in the machine illustrated in the United States patents to Bader No. 2,578,662 and No. 2,763,103, and these machines have achieved some commercial success. However, the constructions involved in these patents, and others of similar nature, have not been wholly satisfactory, particularly at the point of providing good sensitivity of belt-tracking adjustment and at the point of providing good versatility or adaptability to different types of work, and it is therefore desired to provide a machine which improves over the prior art at these and other points.

Accordingly, the objects of the invention include:

(1) To provide an abrasive belt machine having a high degree of versatility for handling irregular and contoured workpieces of a wide variety of shapes and sizes.

(2) To provide a machine, as aforesaid, which will effectively polish a number of different surfaces both concave and convex in articles of relatively small size and complex curvatures, such as golf club heads, cutlery, firearms, jet engine parts, plumbing goods, household and marine hardware, and the like.

(3) To provide a machine, as aforesaid, having a plurality of contact wheels, or heads, and in which machine said heads can be quickly and easily changed from one to another as desired to accommodate various kinds of workpieces.

(4) To provide a machine, as aforesaid, wherein one contact wheel may be freely interchanged with a variety of other contact wheels of differing diameters, widths or materials.

(5) To provide a machine, as aforesaid, wherein the belt-tracking means is extremely sensitive so that the belt may be adjusted by the workman during operation of the machine for riding at any desired point on the contact wheel including extending slightly over one edge thereof.

(6) To provide a machine, as aforesaid, wherein the direction of rotation of the drive pulley may be reversed, even while the machine is running and without throwing off the belt, in order to reverse the direction of movement of the belt as needed to accommodate it to various types, sizes and shapes of workpieces.

(7) To provide a machine, as aforesaid, wherein the tensioning means for the belt may be either mechanical or fluid pressure operated, as desired, and wherein such tensioning means can be easily interchanged.

(8) To provide a machine, as aforesaid, which will be inexpensive to manufacture and which can be maintained in good operating condition with a minimum of maintenance cost.

Other objects and purposes of the invention will be apparent to persons acquainted with apparatus of this general type upon reading the following disclosure and inspection of the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of the apparatus embodying the invention.

FIGURE 2 is a partially broken away, side view taken from the rightward side of the apparatus shown in FIGURE 1.

FIGURE 3 is a front end view of the apparatus shown in FIGURE 1.

FIGURE 4 is a sectional view taken on the line IV—IV of FIGURE 3 showing a spring belt-tensioning device.

FIGURE 5 is a partially broken away, sectional view taken along the line V—V of FIGURE 4 showing the mounting of the idler wheel.

FIGURE 6 is a partially broken away, side view of the contact wheel mounting.

FIGURE 7 is a partially broken away, sectional view taken on the line VII—VII of FIGURE 3 showing the contact wheel mounting and provisions for tracking.

FIGURE 8 is a sectional view taken along the line VIII—VIII in FIGURE 2.

Detailed Description

Referring now to the drawings and particularly to FIGURES 1 and 2, there is shown a base 1 supporting a pedestal 2, both thereof being of generally rectangular construction preferably fabricated from suitable welded sheet stock, reinforced at 2*a* (FIGURE 8) if desired, and supporting a pan 3 at the upper end thereof. A horizontal beam 4, suitably channeled to minimize weight but ribbed to provide strength, is pivoted at 6 to the pedestal 2 and clamped at 7 by any convenient clamp means anchored in a clamp plate 2*b* and extending through an arcuate opening 8 by which said beam 4 may be arranged as desired to raise or lower the hereinafter-mentioned contact wheel portion thereof to a convenient working height.

At the rightward end of the horizontal beam 4, as appearing in FIGURE 2, there is supported a motor 11 which is hung in any convenient manner by suitable means, such as bolts 12 and 13, from the lower surface of the beam 4. The motor 11 carries a pulley 14 on its shaft which pulley preferably is uncrowned.

The extreme rightward end of said beam 4 carries a vertically arranged split sleeve 16 which supports an upstanding tubular pulley support member 17. Clamping means, such as the bolt indicated at 18, is provided for holding said tubular member 17 rigidly in position. The upper idler pulley 19 is supported for free rotation on and with respect to a sleeve 21 which encircles the tubular member 17 and is vertically slidable with respect thereto. A vertically elongated slot 22 (FIGURES 4 and 5) is provided in said tubular member 17 at a suitable location thereon. A pulley tension adjusting screw 23 is coaxially arranged within said tubular member 17. Its lower end is threadedly received into a guide 24 which is vertically slidable within the tubular member 17. A rotation-preventing block 26 rides in the slot 22 and is fastened by a screw 27 to said guide 24 and prevents

rotation thereof. A collar 28 has an unthreaded opening 29 therein encircling the screw 23 and said collar is held fixed with respect to the sleeve 21 by a positioning block 31 which is received into a boss 32 on the sleeve 21 and which is fixedly secured thereto by a set screw 33. A screw 34 fastens the block 31 rigidly to the collar 28. A spring 36 extends between the collar 28 and the guide 24.

The upper end of the screw 23 extends through a bearing block 37 which is fixed to the upper end of the tubular member 17 in any convenient manner, such as by screws 38. An adjusting hand crank 39 is fixed to the upper end of the screw 23 and is provided with any convenient means for manual rotation, such as the knob 41. Thus, rotation of the hand crank 39 will raise or lower the guide 24 which acts through the spring 36 to control the vertical position of the sleeve 21 and thereby control the vertical position of the upper idler 19.

The upper idler 19 is crowned for belt-tracking purposes in a conventional manner.

Turning now to the means for mounting the contact wheel, a number of different devices are provided according to the size and type of contact wheel to be mounted. Referring first to the contact wheel shown in FIGURES 1, 2 and 3, there is provided a yoke 51 having a smoothly machined lower surface 52 (FIGURE 6 which is mounted on a correspondingly smoothly machined surface 53 (FIGURE 2) on the upper side of the leftward end of the beam 4, the same being held thereon by any convenient means such as screws of which one appears at 54. The yoke 51 is provided with upper and lower arms 56 and 57 between which is pivotally mounted a bearing housing 58. The bearing housing 58 has vertically extending pivot pins 60 and 60*a* which are pivotally supported in the arms 56 and 57, respectively, for pivotal movement about a vertical axis A. The bearing housing 58 contains conventional bearing units, of which one is partially indicated at 59 (FIGURE 7), and within which is mounted a shaft 61. The shaft 61 is threaded at its leftward end for the reception of nuts 62 and 63 between which is mounted in a known manner the contact roller or wheel 64. As shown in FIGURE 7, the wheel consists of a pair of metal plates 66 and 67 between which are retained layers of soft buffing material generally indicated at 68.

The belt-tracking adjustment means comprises a flange 71 which extends laterally from the bearing housing 58 and through which extends a shaft 72. The shaft 72 has a shoulder 73 which abuts against the flange 71, an operating knob 74 at one end thereof and a threaded end 76 at the other end thereof. Said threaded end 76 is threadedly received into the opening 77 in the yoke 51. A spring 78 encircles the shaft 72 between the yoke 51 and the flange 71 for urging said flange against the shoulder 73. Thus, rotation of the knob 74 in one direction will effect a clockwise (as seen in FIGURE 7) rotation of the housing 58 around the pivot pins 60 and 60*a* while the rotation of the knob in the opposite direction will permit the spring 78 to effect a counterclockwise rotation of said housing about said pivot pins.

Inasmuch as the location of the axis A about which the housing 58 pivots is as close as possible to the vertical diameter through the wheel 64, it will require only a very slight pivotal movement of the housing 58 to effect whatever tracking control is required. Thus, the tracking of the belt can be made extremely precise and, with the knob 74 within convenient reach of an operator seated in front of the wheel 64, the desired control over tracking is rendered convenient and effective.

Thus, there is provided and extremely versatile abrasive belt machine which is especially adapted to the finishing of a wide variety of different kinds and sizes of irregular and contoured workpieces. Particularly, the versatility of this machine is enhanced by providing the machine with the ability to receive contact wheels of many

different sizes, types, styles and means for supporting same all of which can be readily interchanged with respect to each other and wherein such interchanging either (*a*) will not upset previously established belt-tracking adjustments, or (*b*) if a new belt-tracking adjustment is required it may be readily and simply carried out by the workman without his leaving his normal position of use of the machine.

Although a particular preferred embodiment of the invention has been disclosed herein for illustrative purposes, it will be understood that variations or modifications of such disclosure, which lie within the scope of the appended claims are fully contemplated.

What is claimed is:

1. An abrasive belt machine, comprising in combination:
   - a base and a pedestal extending upwardly from the base;
   - a substantially horizontally extending beam mounted on said pedestal;
   - an upstanding post mounted at one end of said beam and a pair of rollers mounted on said beam and said post, respectively, one above the other, one of said rollers being driven;
   - a contact roller mounted for rotation at the other end of said beam, the centers of each of said three rollers lying within a common, substantially vertical plane;
   - a belt extending around said rollers;
   - a bracket means secured to said beam near said other end thereof and rotatably mounting said contact roller on said beam, said bracket means including means supporting said contact roller for pivotal movement with respect to said bracket about an axis substantially passing through the axis of rotation of said contact roller; and
   - manually manipulatable means for effecting said pivotal movement.

2. An abrasive belt machine, comprising in combination:
   - a base and a pedestal extending upwardly from the base;
   - a substantially horizontally extending beam mounted on said pedestal;
   - an upstanding post mounted at one end of said beam and a pair of rollers mounted on said beam and said post, respectively, one above the other, one of said rollers being driven;
   - a contact roller mounted for rotation at the other end of said beam, the centers of each of said three rollers lying within a common, substantially vertical plane;
   - a belt extending around said rollers;
   - a bracket detachably secured to said beam;
   - means rotatably mounting said contact roller on said bracket, said last named means including means supporting said contact roller for pivotal movement with respect to said bracket about an axis passing through the axis of rotation of said contact roller;
   - and manually manipulatable means for effecting said pivotal movement;
   - whereby said contact roller may be adjusted for tracking of the belt with a minimum of movement thereof.

3. An abrasive belt machine, comprising in combination:
   - a base and a pedestal extending upwardly from the base;
   - a substantially horizontally extending beam mounted on said pedestal;
   - an upstanding post mounted at one end of said beam and a pair of rollers mounted on said beam and said post, respectively, one above the other, one of said rollers being driven;
   - a contact roller mounted for rotation at the other end of said beam, the centers of each of said three roll-

ers lying within a common, substantially vertical plane;

a belt extending around said rollers;

a bracket detachably mounted on said beam, said bracket including a pair of vertically spaced arms;

a shaft housing pivotally mounted between said arms and rotatably receiving the shaft of said contact roller;

a flange extending from said housing substantially parallel with said arms;

manually manipulatable threaded means for varying the distance between said flange and said arms whereby to effect pivotal movement of said housing to thereby adjust and control the tracking of said belt on said contact roller with a minimum of movement thereof.

4. An abrasive belt machine, comprising:

a base and a pedestal extending upwardly from the base;

a substantially horizontally extending beam mounted on said pedestal;

a pair of vertically spaced rollers and means secured to one end of said beam for supporting said rollers;

the other end of said beam having a plurality of machined mounting surfaces thereon, one of said surfaces being substantially horizontally disposed and another of said surfaces being substantially vertically disposed;

a bracket having a machined lower surface which is disposed adjacent to said horizontally disposed machined surface on said beam and is secured thereto, said bracket projecting from said other end of said beam and being held against movement with respect to said beam;

a shaft support pivotally mounted on said bracket for pivotal movement about a substantially vertical axis;

a contact roller having a shaft rotatably supported in said shaft support for rotation about a horizontal axis transverse to said pivotal axis; and

means on said bracket for effecting pivotal movement of said shaft support with respect to said bracket.

References Cited in the file of this patent

UNITED STATES PATENTS

2,431,795	Elmes	Dec. 2, 1947
2,532,500	Jensen	Dec. 5, 1950
2,578,662	Bader	Dec. 18, 1951
2,706,367	MacCarthy	Apr. 19, 1955
2,763,103	Bader	Sept. 18, 1956
2,841,927	Barnes	July 8, 1958