United States Patent [19]

Heyek

[11] **3,800,479**

[45] **Apr. 2, 1974**

[54] **POLISHING ATTACHMENT FOR BELT ABRADING APPARATUS**

[76] Inventor: **Walter G. Heyek,** 4194 N. Elston Ave., Chicago, Ill. 60618

[22] Filed: **Sept. 28, 1971**

[21] Appl. No.: **184,438**

[52] **U.S. Cl.** ..... **51/236,** 51/145, 51/215 SF, 51/241 R

[51] **Int. Cl.** **B24b 5/38**

[58] **Field of Search** ..... 51/236, 145, 241 R, 251, 51/238 GG, 234, 94, 96, 215 SF, 103 R, 103 WH, 103 TF

[56] **References Cited**

UNITED STATES PATENTS

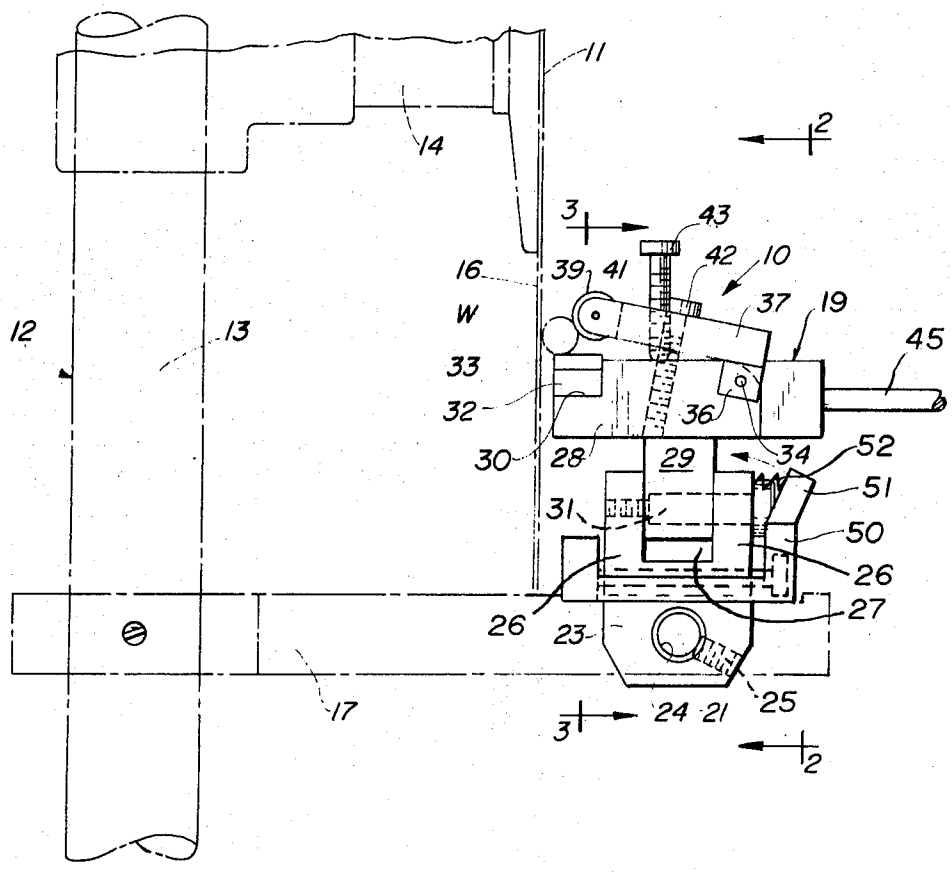
975,088	11/1910	Thompson	51/236 X
2,195,049	11/1936	Wallace	51/236 X
2,719,391	10/1955	Brown	51/236
2,754,640	9/1956	Fuller et al.	51/236 X
3,197,925	8/1965	Westberg	51/236
3,323,258	6/1967	Terp et al.	51/238 S
1,639,958	8/1925	Norton	51/79
2,422,430	6/1947	Manderscheid et al.	51/215 SF

Primary Examiner—Harold D. Whitehead
Assistant Examiner—Nicholas P. Godici

[57] **ABSTRACT**

A polishing attachment for polishing work pieces of circular cross-section and attachable to an abrading apparatus having an abrasive belt. The work piece is supported by the attachment so as to be engagable with the abrasive belt and rotated thereby for polishing. The work piece supporting structure is mounted for rocking movement to advance the work piece past the belt during polishing.

5 Claims, 4 Drawing Figures



PATENTED APR 2 1974

3,800,479

SHEET 1 OF 2

FIG-1

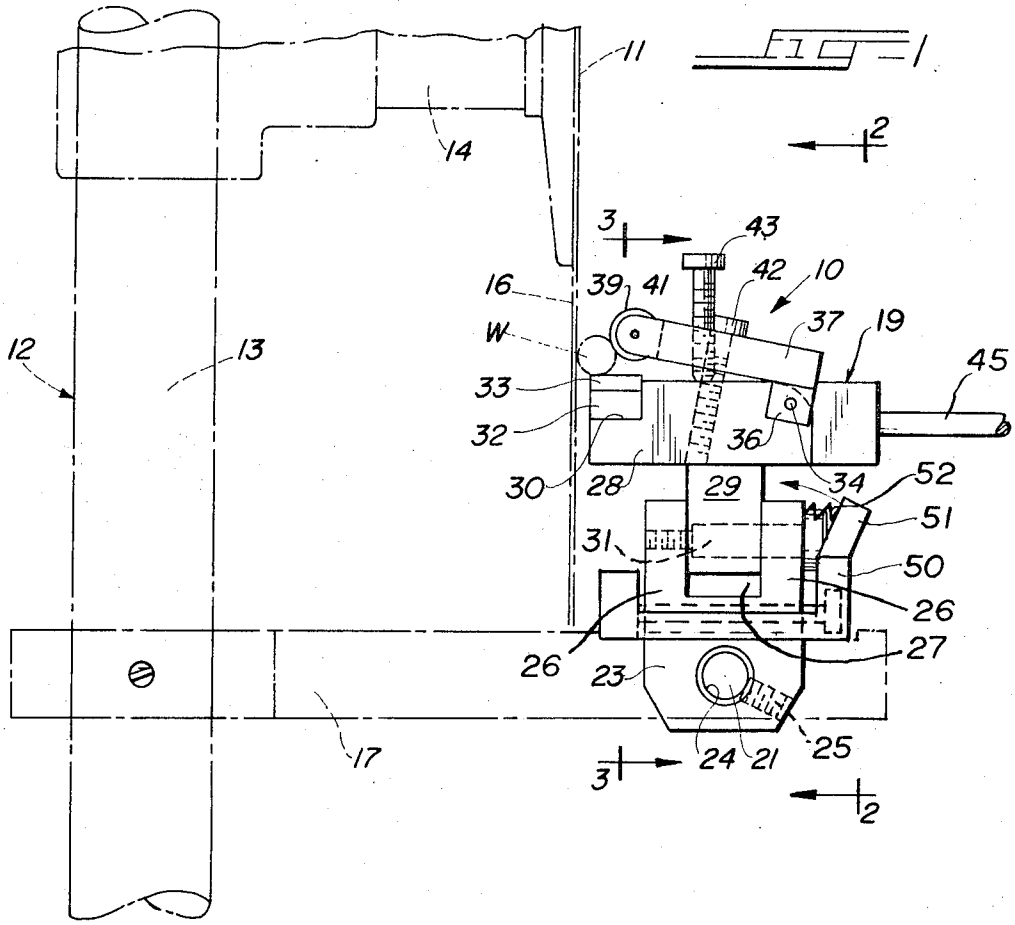
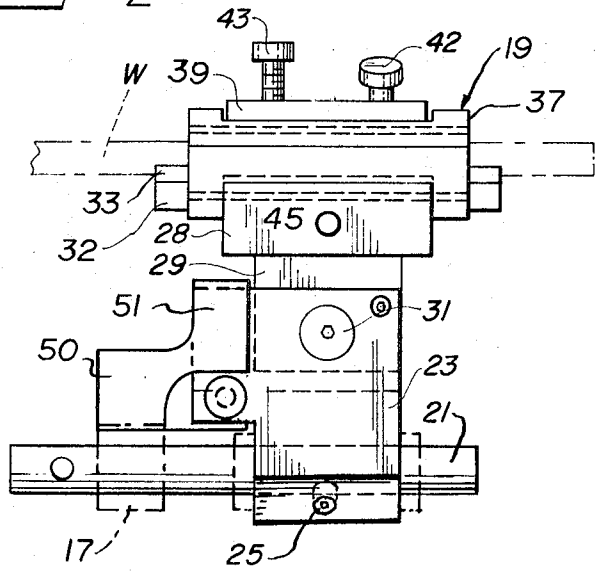


FIG-2



INVENTOR.
WALTER G. HEYEK

BY PETHERBRIDGE, O'NEILL & LINDGREN
ATTY.

FIG. 3

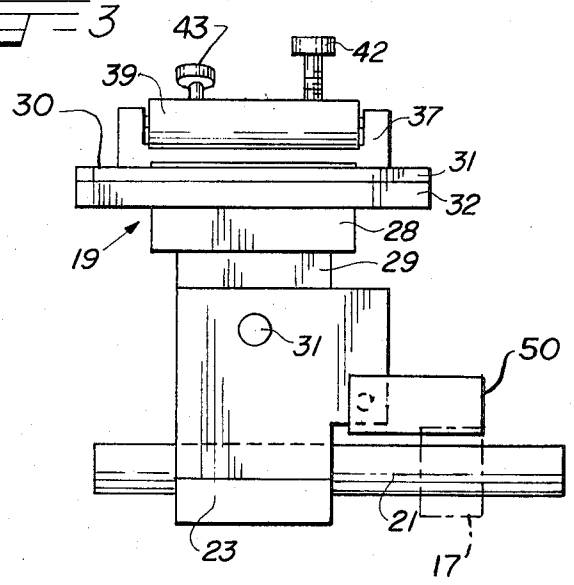
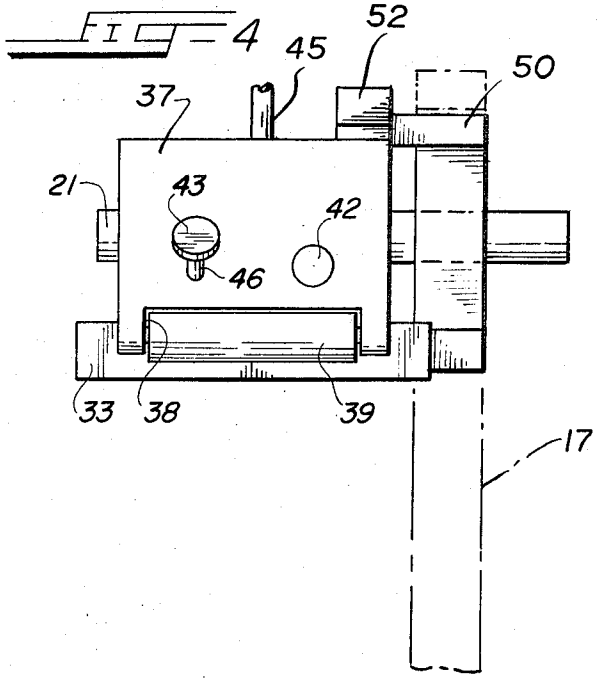


FIG. 4



INVENTOR
WALTER G. HEYEK

Rothwell, O'Neill & Lindgren

BY

Atty.

POLISHING ATTACHMENT FOR BELT ABRADING APPARATUS

The present invention relates to polishing devices for polishing cylindrical work pieces such as tubes, rods and the like and more particularly to a polishing device for polishing cylindrical work pieces on a belt abrading apparatus.

It is the primary object of the present invention to provide a polishing device attachable to a belt abrading apparatus for polishing cylindrical work pieces and which is constructed and arranged so that the work piece to be polished is automatically rotated upon engagement with the abrading belt.

It is another object to provide a polishing attachment of the foregoing type which is constructed and arranged to be operative to feed the work piece lengthwise along the abrading belt as the work piece is being rotated.

It is still another object to provide a polishing attachment of the foregoing type which is easily attachable and detachable from the abrading apparatus.

It is another object to provide a polishing attachment of the foregoing type which is constructed and arranged to accommodate a wide range of diameters of cylindrical work pieces for polishing.

It is a further object to provide a polishing attachment of the foregoing type which is constructed and arranged to control the rate at which the work piece is rotated during polishing.

It is still another object to provide a polishing attachment of the foregoing type which is of simple construction and economical to manufacture.

It is still a further object to provide a polishing device of the foregoing type having non-metallic components which engage the surface of the work piece and are operative to retain the work piece in engagement with the abrading belt so as not to mar the work piece during rotation and lengthwise feeding thereof during the polishing operation.

The foregoing and other objects of the invention which will be apparent from the following specifications and appended drawings are accomplished generally by a polishing attachment including a mounting means which is detachably mountable on the frame of the belt abrading apparatus. A work piece supporting means is mounted on the attachment bracket for rocking movement about an axis perpendicular to the face of the abrading belt. The work piece supporting means includes means for supporting the work piece parallel to the belt abrading face and in engagement therewith in a manner such that the work piece is free to rotate about its longitudinal axis. At the same time the work piece is free to advance or be fed lengthwise upon rocking movement of the work piece support means relative to the mounting means about the perpendicular axis.

In the drawings:

FIG. 1 is a side elevational view of a polishing attachment embodying the structure of the present invention and showing the attachment mounted on the belt abrading apparatus which is illustrated in phantom lines.

FIG. 2 is a front elevational view of the polishing attachment taken generally along the lines 2—2 of FIG. 1.

FIG. 3 is a rear elevational view of the polishing attachment taken generally along the lines 3—3 of FIG. 1.

FIG. 4 is a top plan view of the polishing attachment.

Referring now to the drawings the polishing attachment **10** of the present invention is shown applied to an abrading apparatus **11** of the linear movable belt type. The abrading apparatus **11** is of standard construction and includes a frame **12** having upright posts **13** on which there is mounted an abrading belt support head **14** which is engageable with the vertical run of a continuous abrading belt **16** along the inner nonabrasive face thereof. The abrading belt **16** is of the continuous type and is suitably driven in the conventional manner by a motor, (not shown). Mounted on the frame post **13** is an accessory support bracket arm **17** on which a table or other equipment for use during abrading on the abrading belt **16** may be mounted. The abrading belt **16** may have an abrasive face consisting of emery or sandpaper depending on the characteristics of the material of the work piece to be polished.

The polishing device **10** of the present invention is intended for use in polishing the exterior surface of elongate work pieces of circular cross section such as tubes, rods and the like. The polishing device **10** comprises generally an attachment sub-assembly **18** for detachably securing the device **10** to the bracket arm **17** and a work piece supporting sub-assembly **19** for supporting and holding a work piece W in engagement with the abrading belt **16.**

The attachment sub-assembly **18** includes a support shaft **21** of which one end is fastened to the attachment bracket arm **17** as by means of a set screw **22.** In this position the shaft **21** is substantially parallel to and spaced from the abrading belt **16.** Supported on the shaft **21** is a support bracket **23** having an opening **24** through which the shaft **21** extends. The opening **24** may be provided with bushings. For selectively positioning the bracket **23** on the shaft **21** there is provided a thumb screw **25.** The upper end of the bracket **23** is substantially U-shaped having a pair of lengthwise extending and transversely spaced upstanding flanges **26-26** which define an open ended slot **27.**

The work piece support sub-assembly **19** includes a base plate **28** having a downwardly depending lug **29** extending from the underside thereof and accommodated within the slot **27.** A stud **31** extends through the flanges **26-26** and the depending lug **29** so that the work piece support sub-assembly **19** is rockable about an axis substantially perpendicular to the face of the abrading belt **16.**

Fixed as by means of screws in an inner recessed upper edge **30** of the support plate **28** is rectangular bar **32** to the upper face of which there is fastened, as by means of recessed screws, a plastic sheet **33** against which the work piece W is held as more fully to be explained hereinafter. The plastic sheet may be of any wear resistant and smooth surface characteristic plastic such as nylon, polyethelene, polypropelene or the like.

A work piece retaining plate **37** is pivotally connected adjacent the outer end of the support plate **28** by means of pivot pins **34** extending through a pair of depending ears **36.** The work piece retaining plate **37** at the inner side thereof is formed with an elongated notch **38** in which there is disposed a roller **39.**

The roller **39** includes shafts **41** at each end thereof which are journaled for free rotation in the work piece retaining plate **37.** The roller **39** is made from a hard rubber which may be either natural or synthetic.

For selectively positioning the line of contact of the roller **39** with the work piece W there is provided an adjusting screw **42** and a stop screw **43.** The adjusting screw **42** is inclined and accommodated adjacent the head **44** thereof in an elongated slot **46** formed in the retaining plate **37.** At the other end the adjusting screw **42** is threaded into the base plate **28.** The stop screw **43** is substantially vertical and at the inner and abutts against the upper surface of the base plate **28.**

In operation prior to inserting a work piece for polishing the adjusting screw **43** is retracted to permit the retaining plate to be freely hinged about the pins **34.**

Thereafter the initial work piece is placed on the plastic sheet **33** and the work piece retaining plate **28** is tilted downwardly so that the roller **39** is also engageable therewith along a line angularly displaced from the plastic sheet **33.** Preferably the longitudinal center line of the roller **39** is maintained above the longitudinal axis of the work piece W. In this connection it should be mentioned that the greater the distance the center line of the roller **39** is displaced from the axis of the work piece, the slower the rate of rotation and feed of the workpiece, as more fully to be explained hereinafter. Conversely, the rate of rotation may be increased by decreasing the distance or aligning the work piece axis and roller center line.

When the desired work piece axis and roller center line displacement is achieved the adjustment screw **42** is threaded inwardly to hold the retaining plate fixed against upward tilting. The stop screw **43** is also threaded inwardly so that the end abuts the support plate and thereby prevents downward tilting of the retaining plate **28.** In this manner a uniform force is exerted on each of the work pieces W which are to be polished.

With the work piece W thus retained in the work piece sub-assembly **19,** the work piece W is held in firm engagement with the abrasive face of the linearly movable abrading belt **16.** The abrasive on abrading belt **16** causes the work piece W to rotate about its longitudinal axis. Such rotational movement is possible because of the freely turnable roller **39** and the neglible or relatively low coefficient of friction at the plastic sheet **33.** Moreover the plastic sheet **33** also serves as a polishing element.

To advance the work piece along its length in the sub-assembly **19** is grasped and the work piece tilted in a direction opposite to the direction in which it is desired to advance or feed the work piece W. Upon such rocking the abrasive belt **16** is operative to apply a force in a direction opposite to the rocking movement. This resisting force is greater than that being applied by the roller **39** and plastic sheet **33** because of the low coefficient of friction of these members. The rate at which the work piece is advanced will be influenced by the rate of rotation of the work piece W and the rate at which the work piece support sub-assembly is rocked. When the work piece W is completely polished along the length thereof and fed as described above it maybe grasped or deposited in a suitable storage container or the like.

Mounted on the top surface of bracket arm **17** is a U-shaped bracket **50** having an angularly extending vertical arm **51.** A conventional compression spring **52** is interposed between the inner surface of arm **51** and the side of support bracket **23** to establish a biasing force therebetween.

Since bracket **23** is pivotally supported on shaft **21,** the bracket **23** may be rocked away from the grinding apparatus against the biasing force of the spring. A handle **45** is attached to support plate **28** to manually effect the desired movement of the bracket **23.** Under normal circumstances, the spring, when the operator is not pressing handle **45** downward, establishes a predetermined biasing force of the bracket **23** and roller **39** against the workpiece W. During operation the bracket **23** may also be moved against spring **52** by an operator grasping handle **45.** By so pivoting the bracket, the lead angle of workpiece W is adjusted to control feed rate and polishing.

To polish additional work pieces of the same diameter, the work piece support assembly **19** is returned by rocking about the pivot stud **31** to the position shown in FIG. **1.** Thereafter one end of another work piece is introduced into the end opposite the one from which the prior polished work piece has been ejected. The subassembly **19** may then be rocked to advance the work piece as heretofore described.

What is claimed is:

1. A polishing attachment for polishing work pieces of circular cross-section and attachable to the frame of an abrading apparatus having an abrasive belt, said polishing attachment comprising mounting means attachable to the frame of said abrading apparatus, and a work piece support means mounted on said mounting means for rocking movement about an axis perpendicular to the abrasive belt, said work piece support means including means engageable with the work piece along angularly spaced lines to maintain said work piece parallel to and in engagement with said abrasive belt so that the linear movement of the belt is operative to rotate said work piece about the longitudinal axis thereof and whereby rocking movement of said work piece support means about said perpendicular axis is operative to advance said work piece in said support means in a direction opposing the direction of rocking movement, said angularly spaced means includes a freely rotatable roller disposed adjacent a base plate having a flat surface with a diverse layer of low friction material contacting the work piece to each engage a work piece situated therebetween, said roller is mounted on means selectively positionable relative to said base plate, and said selectively positionable means includes a plate hingedly attached to said base plate at location parallel to and remote from the work piece, an adjustment screw extends through an opening in said plate and is threaded into said base plate and a stop screw is threaded into said plate and abuts said base plate whereby adjustment of said stop screw determines the line of engagement of said roller with said work piece.

2. The invention as defined in claim **1** wherein said roller is made from a resilient material.

3. The invention as defined in claim **2** wherein said resilient material is a hard rubber and wherein said low friction material is nylon.

4. The invention as defined in claim **1** wherein said mounting means comprises a bracket, and a shaft on which said bracket is supported, said shaft being attachable to the abrading apparatus frame.

5. The invention as defined in claim **4** wherein said perpendicular axis is defined by a pivot stud extending through said bracket and said base plate is turnable on said stud.

* * * * *