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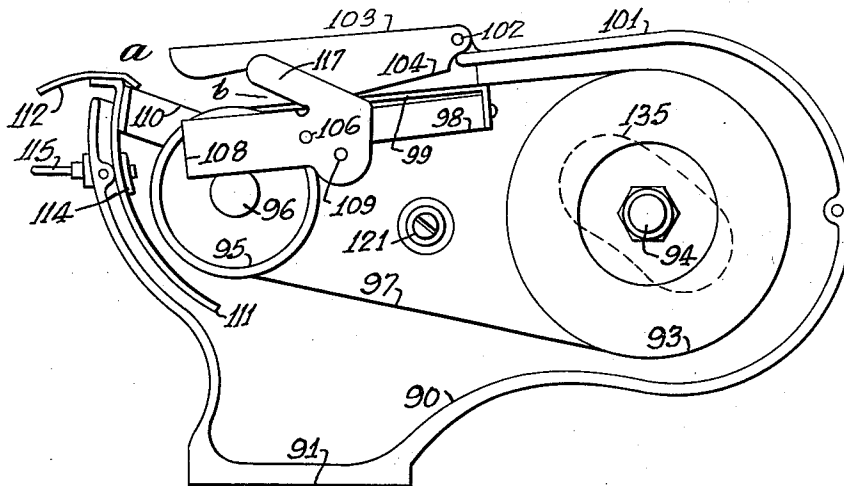
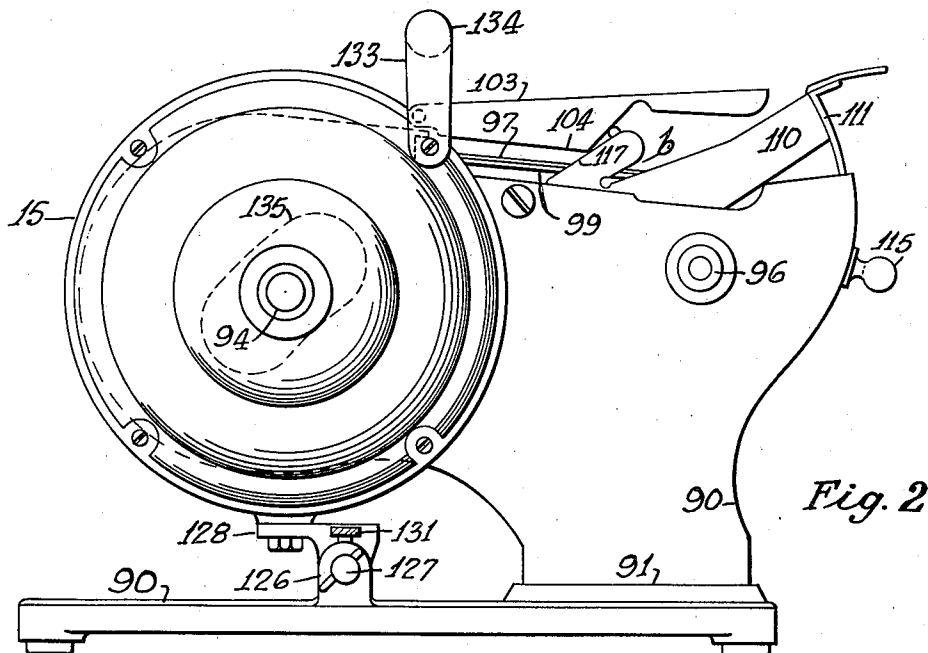
C. R. WILLIAMS

2,222,966

GRINDING MACHINE

Filed Dec. 16, 1938

3 Sheets-Sheet 1



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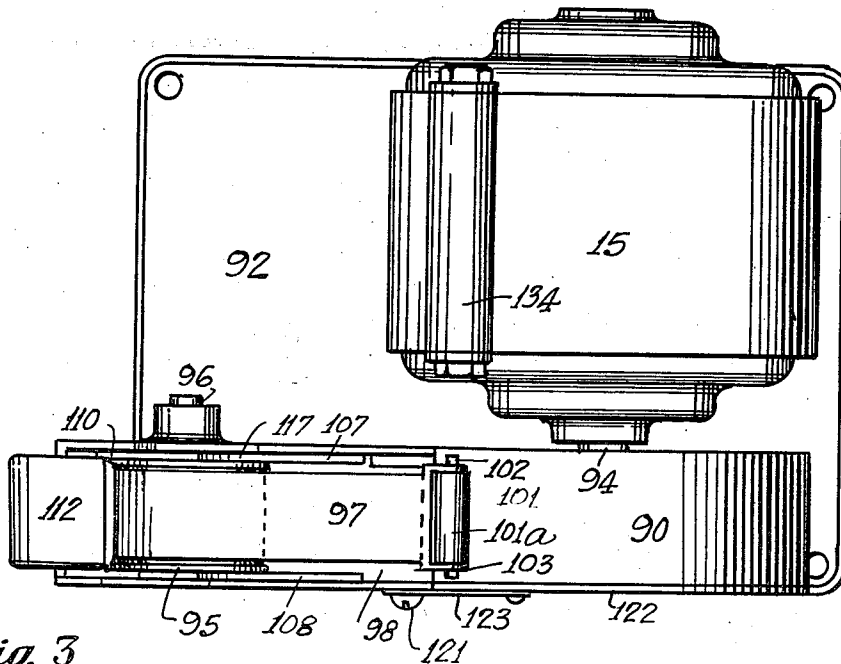
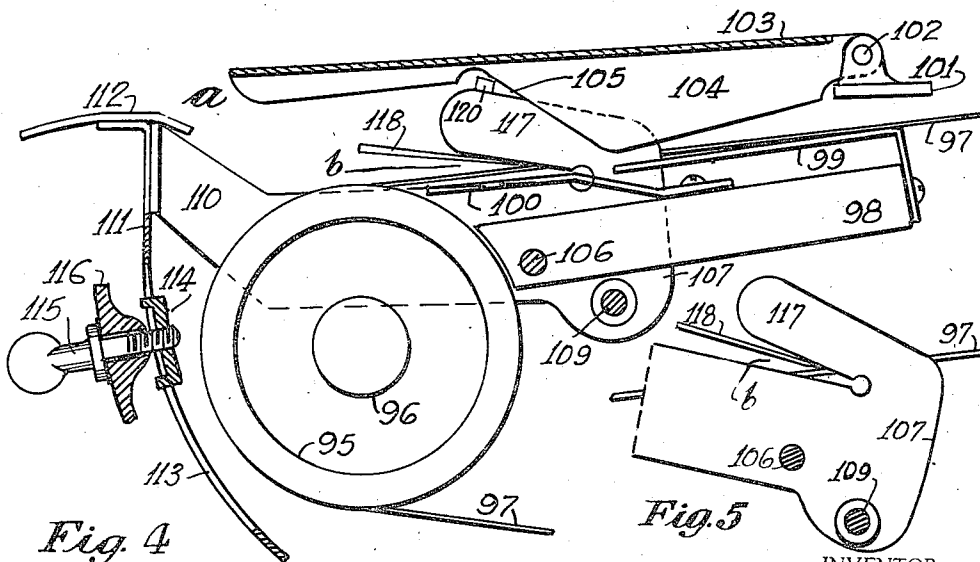
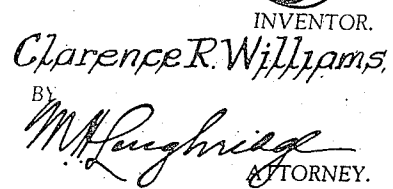
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3 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,222,966

GRINDING MACHINE

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Application December 16, 1933, Serial No. 246,027

6 Claims. (Cl. 51-135)

This invention relates to grinding machines for sharpening tools of the abrasive belt type and it relates to a method of aligning and maintaining a belt taut on a pair of pulleys. An object of the invention is to provide a portable motor driven knife grinder in which the grinding mechanism is enclosed except for the exposed portion of the grinding belt which engages the tool; another object is to provide an abrasive belt grinder in which the belt is provided with a spring support below the point where the tool engages it; another object of the invention is to provide a pivoted tool holder or guide which adjustably holds the tool in the desired position with relation to the abrasive belt; another object of the invention is to provide a cover for the grinding portion of the belt which is adjusted by the tool holder; another object of the invention is to drive an abrasive by a motor driven pulley in which the motor is pivotally mounted in an unbalanced condition and the unbalanced weight is used to maintain the belt taut and another object of the invention is to provide for the alignment of a pair of pulleys upon which a belt is mounted, one of the pulleys being driven by a motor and the motor being mounted on an eccentric shaft. Other objects of the invention will be more particularly understood from the following specification and the accompanying drawings, in which:

Fig. 1 is a side elevation of the grinding mechanism with the cover of the housing removed;

Fig. 2 is a side elevation, opposite to Fig. 1 showing the motor in place;

Fig. 3 is a top plan view of the grinding mechanism and motor mounted on the base or frame;

Fig. 4 shows the internal mechanism, partly sectioned, of the abrasive belt, the tool holder, the pivoted cover and the driving belt wheel;

Fig. 5 is a side view of the tool holder adjusted to a different position from that shown in Fig. 4;

Fig. 6 is an elevation showing the mounting of the motor pivoted to the frame or stand and its relation to the abrasive belt;

Fig. 7 is a top plan view of the arrangement shown in Fig. 6 with the frame sectioned;

Fig. 8 is a plan view of an offset, pivoted table for supporting the motor;

Fig. 9 is an eccentric shaft used for mounting the motor table on the base, and

Fig. 10 is an end view of the eccentric shaft shown in Fig. 9.

This machine is intended for use in sharpening knives and the like by an abrasive belt. The belt is mounted on a pair of belt wheels enclosed in a housing, one of these wheels being free of the

housing and mounted on the motor shaft to provide the drive. A portion of the housing is removed at the top to expose the belt and enable the tool to be moved transversely across the belt. A holder or guide is provided for the tool in the form of a pair of plates located one on each side of the belt and partially projecting below the belt where these plates are pivoted to the housing. One of the plates has an arm extending to the end of the housing and a slotted depending member which is clamped to the housing to secure the tool holder in the angular position to which it has been adjusted. The tool holder is provided with a jaw in alignment with the belt which determines the angular position of the tool and the type of edge desired. A pivoted cover is provided for the exposed portion of the belt which engages the tool holder and moves therewith.

The lower side of the belt runs over a flat spring member which acts as a yielding support for the belt opposite the grinding position and insures a smoother edge on the tool.

Abrasive belts, such as are used on machines of this type are usually made up from strip stock and they have considerable width. In practice these belts are not always the same length on the opposite edges and this condition sometimes develops in the use of the machine. It is necessary not only to maintain the belt taut under these conditions but it is also necessary to maintain the belt wheels in such alignment that irregularities in the shape of the belt can be compensated for. These conditions are secured by mounting one of the belt wheels on a fixed bearing in the frame of the machine and by mounting the motor carrying the driving belt wheel pivotally on the frame of the machine and off-centered with reference to its center of gravity so that it has a tendency by the unbalanced weight to turn on its pivot and the direction in which it turns moves the centers of the belt pulleys further apart, that is, the overbalanced weight of the motor applies tension to the belt in accordance with the overbalanced weight.

The motor is pivotally mounted on the base, or frame, by a shaft mounted in a pair of spaced lugs on the frame. In one of these lugs the shaft has an eccentric bearing. This shaft is parallel with the armature shaft of the motor so that any deflection applied to the shaft applies a corresponding deflection to the armature shaft. The motor can therefore be adjusted by rotating this shaft to deflect the armature shaft in the manner necessary to secure complete engagement between the belt and the driving pulley.

In the drawings, the housing 90 is mounted on the pad 91 of the base 92, the housing and the base comprising the frame of the machine. The belt wheel 93, mounted on shaft 94, drives the belt 97, engaging the idler pulley 95, mounted on the fixed bearing 96 in the frame 90. Below the belt 97 the bar 98 is mounted and secured to the housing. A flat spring 99 is secured to bar 98, located below belt 97 before the belt reaches the grinding position and a second flat spring 100 is secured to bar 98 and is located below the belt at the grinding position. Normally the belt moves free of these springs but when the grinding pressure is applied to the belt the spring provides a support therefor and prevents undue deflection of the belt.

On the top of the housing 101 a lug 101a is provided to which the cover 103 is pivoted at 102. This cover, Fig. 4, is provided with a side flange 104 terminating in the incline 105 which is engaged by the lug 120 of the tool holder 117. The cover 103 rests by gravity on the lug 120 and as 117 is raised and lowered, the cover 103 is correspondingly raised and lowered.

The tool holder comprises a pair of plates 107 and 108 which are pivoted by bar 106 to the frame and these plates are coupled to move together by the rod 109. One of these plates is extended in the arm 110 and supports the guard 112 at the end of the machine and it is connected to the dependent arcuate member 111 which moves inside the casing as the guard moves on the pivot 106. The member 111 is slotted as indicated at 113 and is provided with a clamp 114 by which it is clamped by screw 115 to the frame 116 when the tool holder is adjusted to the desired position. This adjustment is made outside the housing and away from the grinding belt and adds to the safety in using the device.

An angular groove is formed at b between the member 117 and the member 107 of the plates 107 and 108. This groove aligns with the edge of the belt 97 and forms a guide for the tool 118 and the angular position of the tool relative to the belt is determined by the adjustment provided at 113, 114. Fig. 4 shows the tool holder in a lowered position for grinding a long edge on the tool and Fig. 5 shows the tool holder in a raised position for grinding a short edge on the tool. It will be observed that when the tool holder is raised the cover 103 is also raised at the same time and the opening at a is correspondingly increased to make the grinding position of the tool readily accessible.

The cover 122 for the housing is secured by the screw 121 engaging the latch 123 secured to the cover.

The abrasive belt is driven by the motor 15, mounted on the base 92, through the armature shaft 94 on which the large belt wheel 93 is mounted. The motor may be provided with a handle 134, connected to the frame by links 133 whereby the entire machine is made readily portable.

The motor is mounted on the frame as indicated in Figs. 6, 7, 8, and 9. The frame is provided with upstanding lugs 125 and 126, forming bearings for the shaft 127. The table 123 is mounted on shaft 127 and is provided with apertures at 129 and 130 for attaching to the motor by screws 132. It will be noted from Figs. 6 and 8 that the center of the motor 15 is off centered from the shaft 127 upon which it is pivotally mounted and the balance tends to move the motor towards the left. The motor is restrained

from moving in this direction by the belt 97 engaging the pulley 95 on the fixed bearing 96. The pulley 93 on the armature shaft 94 is free to move independent of frame 90 by reason of opening 135 in the frame, through which shaft 94 projects. The unbalanced weight of the motor thus maintains the belt taut upon the driving pulley 93.

It is desirable to be able to adjust the alignment of the shaft of pulley 93 with reference to the pulley 95. This is indicated in Fig. 7 where the position e represents the parallel alignment between shafts 94 and 96, while the alignment f indicates a deflection to the right and the alignment g indicates a deflection to the left. This adjustment is obtained by providing an eccentric 135 at the end of shaft 127 which eccentric is mounted in the bearing 125. The shaft 127 is parallel with the armature shaft and any deflection given to this shaft provides a corresponding deflection in the armature shaft. It is apparent that shaft 127 may be rotated in its bearings 125 and 126 to secure the desired deflection for pulley 93. A set screw 131 may be provided for locking shaft 127 in the adjusted position.

The invention may be constructed in a variety of forms in addition to those illustrated in the drawings and the method of adjusting the alignment of a pair of belt wheels may be used for other purposes as well as in connection with grinding machines.

Having thus described my invention, I claim:

1. A grinding machine comprising a housing, a pair of belt wheels in said housing, a motor for driving one of said wheels, an abrasive belt mounted on said wheels, a tool holder comprising a pair of opposing plates pivoted to said housing and partly extending below said belt, one plate on each side of the belt and formed in a jaw aligning with the belt to receive the tool and support it in a predetermined position relative to the belt and being adjustable on said pivot, part of the belt being exposed where it engages the tool, and a cover for said exposed part of the belt, pivoted to said housing independent of said tool holder and engaging said tool holder and moving therewith.

2. A grinding machine comprising a housing, a pair of belt wheels in said housing, a motor for driving one of said wheels, an abrasive belt mounted on said wheels, a tool holder comprising a pair of opposing plates pivoted to said housing and partly extending below said belt, one plate on each side of the belt and formed in a jaw aligning with the belt to receive the tool and support it in a predetermined position relative to the belt and being adjustable on said pivot, a slotted arm extending from one of said plates inside the housing and means on the outside of said housing for clamping said arm to said housing to hold said tool holder in the adjusted position.

3. A grinding machine comprising a housing with a pair of belt wheels therein, one of which is pivotally mounted in said housing and the other is free of said housing, an abrasive belt mounted on said wheels, means for aligning the tool to be sharpened with said belt, a motor, a shaft having eccentric bearings parallel with the shaft of the motor and offset from the centre of the motor for pivotally mounting said motor on said housing and the free wheel of said belt mounted on the motor shaft for driving the belt so that the belt is maintained taut in the grinding position by the unbalanced weight of the motor and is aligned by the eccentric bearings of said shaft.

4. A grinding machine comprising a housing with a pair of belt wheels therein, one of which is pivotally mounted in said housing and the other is free of said housing, an abrasive belt mounted
 5 on said wheels, means for aligning the tool to be sharpened with said belt, a motor, a table for mounting said motor, a shaft having eccentric bearings parallel with the shaft of the motor and offset from the centre of said motor for pivotally
 10 mounting said table on said housing and the free wheel of the abrasive belt mounted on the armature shaft of said motor for driving the belt so that the belt is maintained taut in the grinding position by the unbalanced weight of the motor
 15 and is aligned by the eccentric bearings of said shaft.

5. A grinding machine comprising a housing with a pair of belt wheels therein, one of which is pivotally mounted in said housing and the other
 20 is free of said housing, an abrasive belt mounted on said wheels, means for aligning the tool to be sharpened with said belt, a motor having an armature shaft with the free belt wheel mounted

thereon, a pair of spaced lugs on said housing, a shaft passing through said lugs parallel with the motor armature and supporting said motor, the bearing of said shaft in one of said lugs being eccentric to said shaft, for aligning the belt wheel
 5 free of the housing with the belt wheel mounted in the housing.

6. A grinding machine comprising a housing with a pair of belt wheels therein, one of which is pivotally mounted in said housing and the other
 10 is free of said housing, an abrasive belt mounted on said wheels, means for aligning the tool to be sharpened with said belt, a motor having the free belt wheel mounted on its shaft, a pair of spaced
 15 lugs on said housing, a table for mounting said motor, a shaft parallel with the shaft of the motor passing through said lugs and pivotally supporting said table, said motor being mounted off
 20 centre on said table with reference to said shaft and the bearing of said shaft in one of said lugs being eccentric to said shaft.

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