May 19, 1964 M. LIARD 3,133,384

WORKING HEAD STRUCTURE FOR SANDING MACHINE

Filed July 18, 1963 3 Sheets-Sheet 1

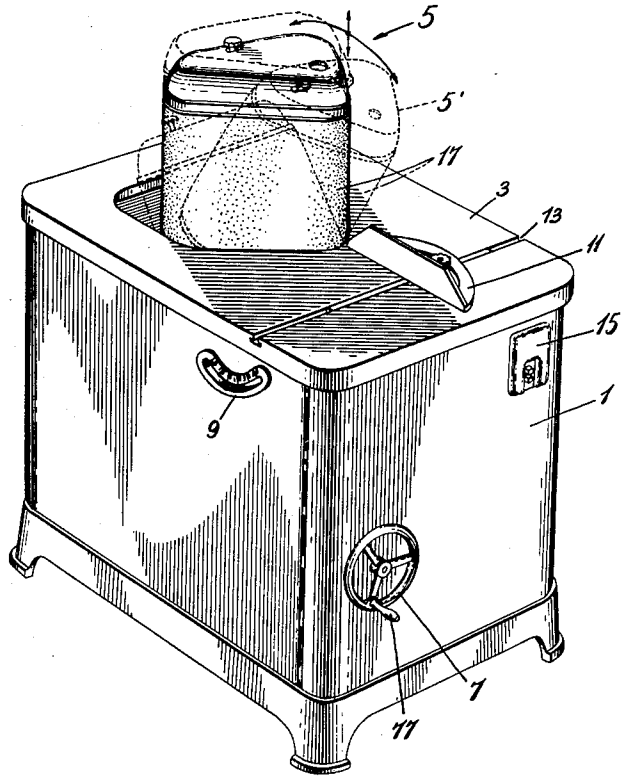


Fig. 1

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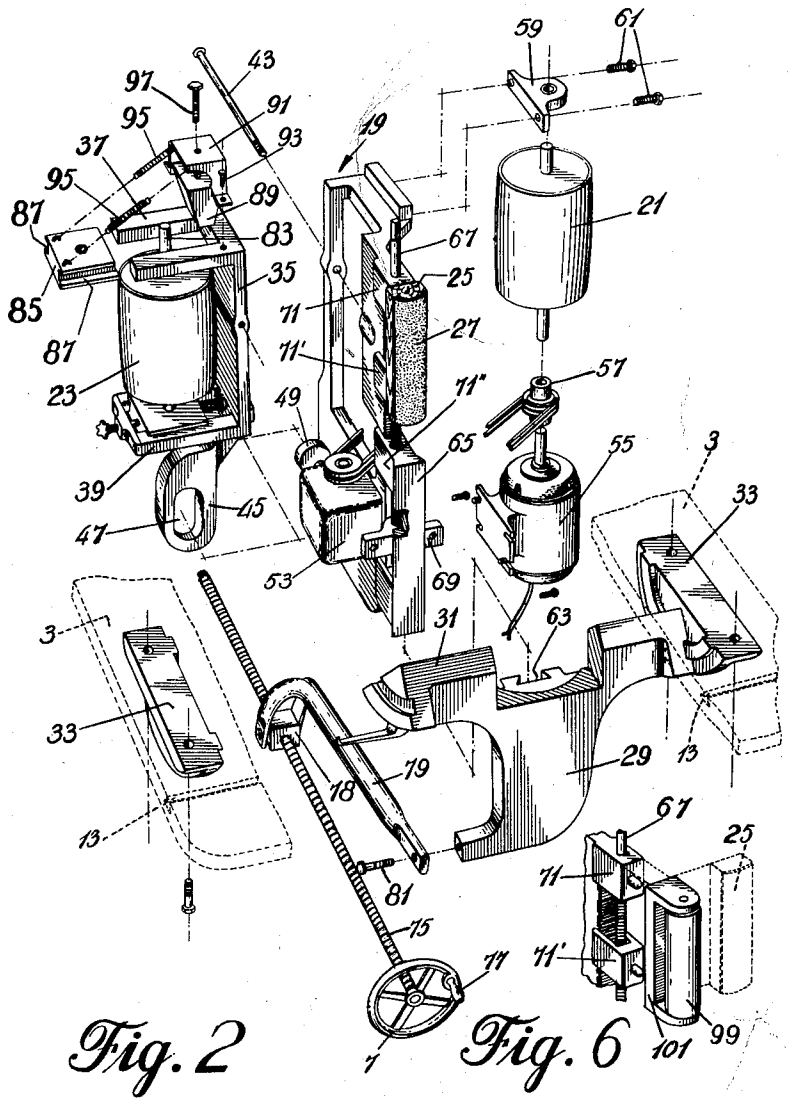


Fig. 2 Fig. 6

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Fig. 3

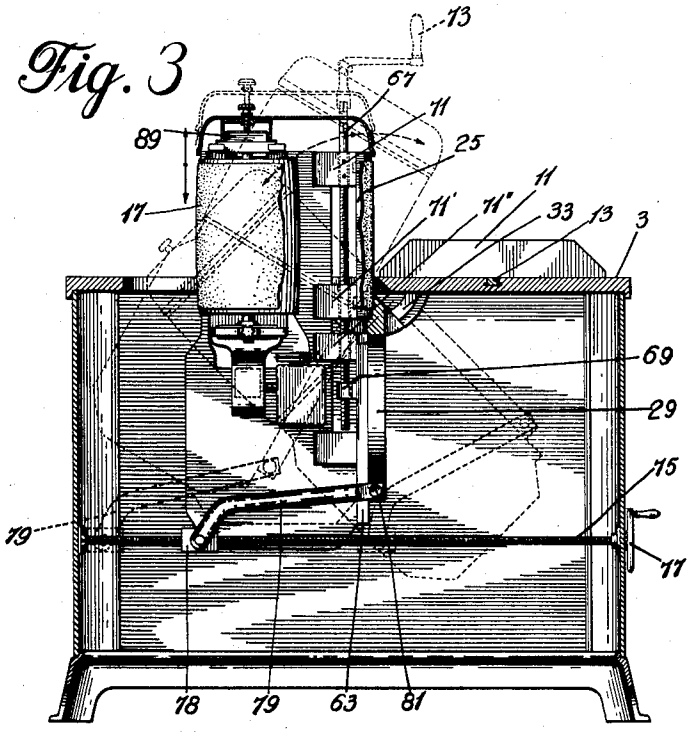


Fig. 5

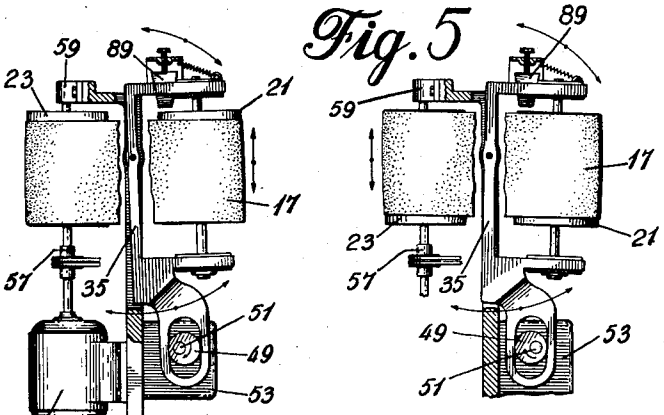


Fig. 4

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WORKING HEAD STRUCTURE FOR SANDING MACHINE

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8 Claims. (Cl. 51—142)

This application relates to a sanding machine and is an improvement of the sanding machine described in my previous U.S. application No. 187,416 filed on April 13, 1962.

The sanding machine disclosed in the said United States application is of the type comprising a substantially horizontal work supporting table at the top of a base structure through which extends a working head pivotally mounted on said base structure for rocking movement in a path substantially normal to said work supporting surface.

The major feature of this type of sanding machine described in the above-mentioned United States patent application resides in the fact that the abrasive belt used travels in a somewhat triangular path, normal to the rocking path of the head and the rounded apex of which serves as the working area. This particular arrangement of the working head and of the abrasive belt makes it particularly suitable for handling large wooden members of irregular shape. This is due to the fact that although the effective working area available on the working head is relatively narrow, the abrasive belt used is quite large, having to travel in a triangular path which increases the travelling distance. Thus, the abrasive belt wears out much less rapidly. As mentioned in this prior United States application, for working certain members which have bends of substantial radii, it is necessary, in known machines, to use a small diameter vertical roller, which means that such belts would have to be changed quite frequently.

In the operation of the sanding machine of the prior U.S. application, it was found that the wearing life of the abrasive belt could still be increased by the addition of minor adjustments.

Also, the rocking movement of the working head as disclosed in the said prior United States application, was rather stiff on account of the angularity of the operating levers.

It is therefore a primary object of the present invention to increase the wearing life of the abrasive belt of such sanding machines. This is obtained in two ways: first, by providing for continuous limited vertical oscillation of the abrasive belt and, secondly, by allowing vertical shift of the working head.

Another feature of the invention consists in the provision of a special mechanism which will render operation of the rocking mechanism of the working head smoother.

As a secondary feature of the invention, means is provided for shifting the driven roller laterally in relation to its vertical axis whereby to tighten or loosen the abrasive belt, for insertion and removal purposes.

For the purpose of this description and claims, the rocking path of the head and the triangular path of the abrasive belt are defined, in each case, as the plurality of parallel planes containing the path of travel of each point of the working head and of the abrasive belt, respectively.

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This definition will also extend to the oscillating path of the driven roller, referred to hereinafter.

The above-mentioned objects may be obtained in a sanding machine made according to the invention which has a base structure including a work supporting surface, the invention residing in the provision of a generally triangular working head structure for such a sanding machine comprising: a support which has an elongated belt guiding member along a forward edge thereof and generally at an apex of said triangular structure; this support being pivotally mounted on the base structure for rocking movement in a path substantially normal to the work supporting surface; the head structure further including a belt guiding roller on each side of the central support and rearwardly thereof for rotation about axes parallel to the longitudinal axis of the belt guiding member with one of the rollers being a driven roller while the other is a driving roller; driving means provided for the driving roller; means for oscillating the driven roller in a path substantially normal to said path of rocking movement and an endless abrasive belt trained around said rollers and said forward guiding member whereby said belt may travel in a substantially triangular path normal to said path of rocking movement.

In the preferred form of the invention, the means for oscillating the driven roller in a path substantially normal to the plane of rocking movement includes a bracket on which the driven roller is rotatably mounted; a cooperating axle means on the bracket and on the central support to allow oscillation of the bracket about an axis normal to the rotation axis of said driven roller and transmission means operatively connected to the driving means for causing oscillation of the bracket and of the driven roller. Actually, the bracket is made up of a side web normally parallel to the path of rocking movement, an upper flange normal to the web and having a bearing block for the driven roller slidable in the plane of said flange; resilient means forcing said block in the direction of the web; a wedging block slidably mounted between the bearing block and the web and adjustable means for moving the wedging block and causing displacement of the bearing block and of the driven roller to thus vary the tension in the abrasive belt.

Further objects and other advantages of the invention will become apparent as the following description proceeds having regard to the annexed drawings, wherein:

FIG. 1 is a perspective view of a sanding machine made according to the invention;

FIG. 2 is an exploded view of a sanding machine incorporating the inventive features;

FIG. 3 is a vertical cross-sectional view through the base structure with the working head shown in perspective elevation, part of it being broken away to show the internal structure;

FIGS. 4 and 5 are elevation views of the working head proper, intended to illustrate the oscillating mechanism for the driven roller;

FIG. 6 is a perspective view of two different frontal belt guiding members.

As shown in FIG. 1, the sanding machine of the invention generally comprises a base structure 1 over which sits a work supporting table or surface 3 through which extends the working head 5. An operating wheel 7, for-

wardly of the base structure 1, is provided for rocking the working head 5 back and forth in a path (as defined hereinabove) generally normal to the work supporting surface 3. Another position of the working head 5 is shown in dotted line at 5'. The angle which the working head makes with the plane of the work supporting surface 3 is indicated by the angle indicator 9 generally located on the side of the machine.

For angularly guiding the piece being worked, a mitre guide 11 is provided on the work supporting table 3, slidable in a suitable groove 13.

Finally, the usual switch 15 is shown on the front end panel of the base structure for starting and stopping the motor driving the abrasive belt 17.

The various mechanisms which make up the novelty of the invention are more particularly illustrated in the exploded view of FIG. 2.

It is seen that the working head of the invention is made up generally of a central plate-like support 19 on each side of which are to be mounted a belt guiding driving roller 21 and a belt guiding driven or idler roller 23. Along the forward edge of the central support 19 is a further belt guiding elongated member 25, preferably provided with a graphite covered surface for easing the sliding action of the travelling abrasive belt 17.

Forwardly fixed to the central support 19, transversely thereof, is a rocking plate 29 adapted to rock about a transverse axis coinciding with the upper edge 31 of plate 29 as by being mounted, laterally thereof, on side blocks 33 secured to the work supporting table 3 in a manner described in the aforesaid United States application.

Thus, it will be seen that rocking of rocking plate 29 will cause movement of the central support 19 in a path (as defined above) substantially normal to the work supporting surface 3. As said previously, means is provided for oscillating the driven roller 23 in a path substantially normal to the said plane of rocking movement. This is achieved by having the driven roller 23 mounted on a channel shaped bracket having a side web 35 at each end of which are connected the upper flange 37 and the lower flange 39. Cooperating axle means is provided on both the bracket and the central support to allow oscillation of the bracket about an axis generally normal to the rotation axis of the driven roller and parallel to the path of rocking movement of the support. In the instance shown, the bracket, and more specifically the side web 35, is received into a suitable aperture 41 through the central support 19 and an axle, such as a pin 43, is made to freely extend through both the web 35 and the side members of aperture 41 so as to allow pivoting of the bracket about the said pin 43.

The means for causing oscillation of the bracket comprises a downwardly projecting lobe 45 depending from the lower flange 39 and having a generally rectangular or oblong hole 47 therethrough. This hole 47 is for the reception of a cam 49 mounted on the rotatable shaft 51 (FIGS. 4 and 5) of a speed reducing device 53 secured to the central support 19 and operatively connected to a motor 55 secured on the other side of the central support 19 and serving to drive the driving roller 21 into rotation. A coupler 57 serves as one end bearing for the driving roller 21 while a bearing block 59 serves for the other end of the driving roller 21; the latter being secured to the central support 19 by means of screws 61.

A study of FIGS. 2, 4 and 5 will readily show the operation of the means for oscillating the driven roller 23. When motor 55 is energized, it brings shaft 51 into rotation through the speed reducing device 53 thus allowing cam 49 travelling in hole or slot 47 to cause oscillation of the bracket through its axle 43. As can be seen from FIGS. 4 and 5, this will cause the abrasive belt 17 to move rapidly up and down thus constantly offering a wider working bend for the wooden member to be worked.

In order to further increase the wearing possibilities of the abrasive belt 17, cooperating tongue and groove

means are provided on the rocking plate 29 and the forward edge of the central support. This means is particularly illustrated in FIGS. 2 and 3 wherein it is seen that the forward edge of the central support 19 is provided with a dovetail 65 adapted to be snugly received into a dovetail groove 63 provided on one side of the rocking plate 29. Adjustment of the verticality of the working head is achieved by an adjustable screw means, best illustrated in FIG. 3, on said central support 19 and the rocking plate 29 allowing predetermined vertical displacement of the central support. The adjustable screw means consists of an operating screw 67 threaded on most of its length and received in a threaded block 69 free from support 19, but fastened to the rocking plate 29 and more particularly on each side of groove 63, as best seen in FIG. 3. This screw freely extends through a series of guiding elements 71, 71' and 71'' to finally thread into the aforementioned threaded block 69. Screw 67 is mounted for rotation only in these guiding elements and is not displaceable axially therein. Thus, as operating lever 73 is rotated, the working head moves up and down according to the direction of rotation of the said lever.

Another feature of the invention resides in the provision of a novel operating means for rocking the rocking plate 29. This is provided by a rotatable threaded rod 75 mounted on the base structure 3 for rotation only and extending parallel to the central support as illustrated in FIGS. 2 and 3 particularly. Rotation of threaded rod 75 is produced by wheel 7 projecting out of the forward face of base structure 3. A block 78 having a threaded bore so as to be threadedly mounted on rod 75 has, pivotally connected thereto, the forked end of an L-shaped lever 79 the other end of which is pivotally secured to the lower end of the rocking plate as by screw 81.

As illustrated in FIG. 3, when wheel 7 is rotated, block 78 moves along the threaded rod 75 causing rocking of plate 29 about the upper edge 31, as aforesaid.

In order to allow the insertion or removal of the abrasive belt 17 from the working head, the upper axle 83 of driven roller 23 is made to rotate in a bearing block 85 slidable in the plane of upper flange 37 in any known manner such as by providing longitudinal grooves 87 on either side of the bearing block 85 into which are received the lateral edges of upper flange 37. Axial displacement of bearing block 85 is produced by the provision of a wedge block 89 slidable into a housing 91 fastened to the top of web 35 by screws 93 or the like. The bearing block 85 is resiliently held against the wedge block 89 by means of two springs 95 connected to the upper end of housing 91 and the outward end of the bearing block 85. An adjusting screw 97 extends through a threaded aperture in the top of the housing 91 and abuts the bearing block 89.

It will thus be understood that movement of screw 97 downwardly will push block 89 downwardly and force the bearing block 85 outwardly whereas the reverse operation of the adjusting screw will produce reverse movement and loosen the abrasive belt 17.

Finally as said previously, the abrasive sleeve guiding element 25 at the forward end of the central support 19 can be replaced by a roller 99 as illustrated in FIG. 6. This roller is supported in a channel-shaped bracket 101, the web of which has, for instance, two cylindrical grooves (not shown) for the snuggle reception of two holding pins 103 fixed to screw guiding elements 71' and 71''.

Although a preferred embodiment of the invention has just been described, it will be understood that many modifications may be made thereto within the spirit of the invention, the scope of which is only limited by the appended claims.

I claim:

1. In a sanding machine having a base structure including a work supporting surface, a generally triangular working head structure therefor comprising;

(a) a support having an elongated belt guiding mem-

ber along a forward sanding edge thereof and generally at an apex of said triangular structure;

(*b*) means pivotally mounting said support and belt guiding member on said base structure for rocking movement in a path substantially normal to said work supporting surface;

(*c*) a belt guiding roller mounted on each side of said support, rearwardly thereof, for rotation about axes parallel to the longitudinal axis of said belt guiding member; one of said rollers being a driving roller, the other a driven roller;

(*d*) driving means for said driving roller;

(*e*) means for oscillating said driven roller in a path substantially normal to said path of rocking movement, and

(*f*) an endless abrasive belt trained around said rollers and said forward guiding member whereby said belt may travel in a substantially triangular path normal to said path of rocking movement.

2. In a sanding machine having a base structure including a work supporting surface, a generally triangular working head structure therefor comprising;

(*a*) a support having an elongated belt guiding member along a forward sanding edge thereof and generally at an apex of said triangular structure;

(*b*) means pivotally mounting said support and belt guiding member on said base structure for rocking movement in a path substantially normal to said work supporting surface;

(*c*) a belt guiding roller mounted on each side of said support, rearwardly thereof, for rotation about axes parallel to the longitudinal axis of said belt guiding member; one of said rollers being a driving roller, the other a driven roller;

(*d*) driving means, on said support, for rotating said driving roller;

(*e*) means for oscillating said driven roller in a path substantially normal to said path of rocking movement, including

a bracket on which said driven roller is rotatably mounted;

cooperating axle means on said bracket and on said central support to allow oscillation of said bracket about an axis normal to the rotation axis of said driven roller, and

transmission means operatively connected to said driving means for causing oscillation of said bracket and of said driven roller;

(*f*) an endless abrasive belt trained around said rollers and said forward guiding member whereby said belt may travel in a substantially triangular path normal to said path of rocking movement.

3. A working head structure as claimed in claim 2, wherein said bracket has an upper bearing block, for said driven roller; means for sliding said block in a direction normal to said plane of rocking movement to cause tightening and loosening of said belt.

4. A working head structure as claimed in claim 2, wherein said bracket comprises:

a side web normally parallel to said plane of rocking movement;

an upper flange normal to said web, and having a bearing block, for said driven roller, slidable in the plane of said flange;

resilient means forcing said block in the direction of said web;

a wedging block slidably mounted between said bearing block and said web;

adjustable means for moving said wedging block and causing displacement of said bearing block and of said driven roller to thus tighten said abrasive belt.

5. A working head as claimed in claim 2, wherein said bracket is provided with a lobe projecting from one end thereof and having an aperture therethrough; a cam means is mounted for rotation on said central support and has a cam engaged in said lobe aperture to cause said lobe and bracket to oscillate about said bracket axis normal to the axis of rotation of said driven roller; said lobe and cam means are parts of said transmission means operatively connected to said driving means.

6. In a sanding machine having a base structure including a work supporting surface, a generally triangular working head structure therefor comprising:

(*a*) a central support having an elongated belt guiding member along a forward edge sanding thereof and generally at an apex of said triangular structure;

(*b*) a rocking plate connected transversely on the forward edge of said central support and pivotally connected, along the upper edge thereof to said base structure, whereby said support may rock in a path normal to said work supporting surface;

(*c*) a rotatable threaded rod mounted on said base structure and parallel to said central support;

(*d*) a threaded block displaceable on said rod;

(*e*) a lever pivotally connected at one end to said block and at the other end to said rocking plate away from said upper edge whereby rotation of said rod causes displacement of said threaded block along said rod and rocking of said rocking plate about its upper edge;

(*f*) a belt guiding roller mounted on each side of said central support, rearwardly thereof, for rotation about axes parallel to the longitudinal axis of said belt guiding member; one of said rollers being a driving roller, the other a driven roller;

(*g*) driving means for said driving roller;

(*h*) means for oscillating said driven roller in a path substantially normal to said path of rocking movement, and

(*i*) an endless abrasive belt trained around said rollers and said forward guiding member whereby said belt may travel in a horizontal substantially triangular path normal to said path of rocking movement.

7. In a sanding machine having a base structure including a work supporting surface, a generally triangular working head structure therefor comprising:

(*a*) a central support having an elongated belt guiding member along a forward edge thereof;

(*b*) a rocking plate connected transversely on the forward edge of said central support and pivotally mounted, along the upper edge thereof to said base structure, whereby said support may rock in a path normal to said work supporting surface;

(*c*) cooperating tongue and groove means on said rocking plate and forward edge of said central support to afford vertical displacement of said support in relation to said rocking plate;

(*d*) adjustable screw means, on said central support and rocking plate, causing vertical displacement of the central support;

(*e*) means pivotally mounting said support and belt guiding member on said base structure for rocking movement in a path substantially normal to said work supporting surface;

(*f*) a belt guiding roller mounted on each side of said central support, rearwardly thereof, for rotation about axes parallel to the longitudinal axis of said belt guiding member; one of said rollers being a driving roller, the other a driven roller;

(*g*) driving means for said driving roller;

(*h*) means for oscillating said driven roller in a path substantially normal to said path of rocking movement, and

(*i*) an endless abrasive belt trained around said rollers and said forward guiding member whereby said belt may travel in a horizontal substantially triangular path normal to said path of rocking movement.

8. A working head as claimed in claim 1, wherein said belt guiding member is a roller.

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