Jan. 21, 1941. C. L. MATTISON 2,229,466

SANDING MACHINE

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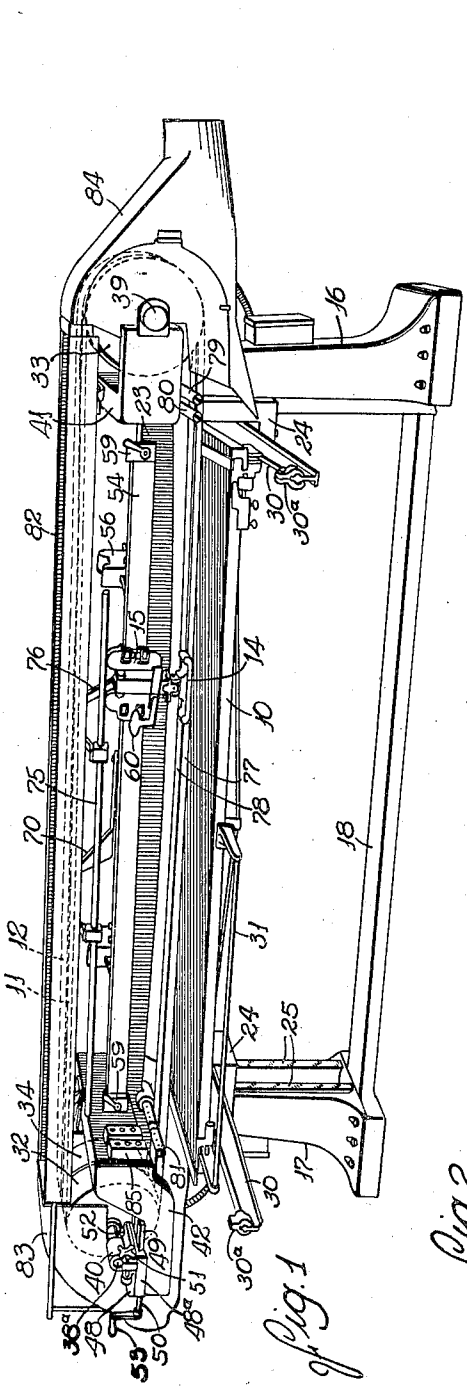


Fig. 1

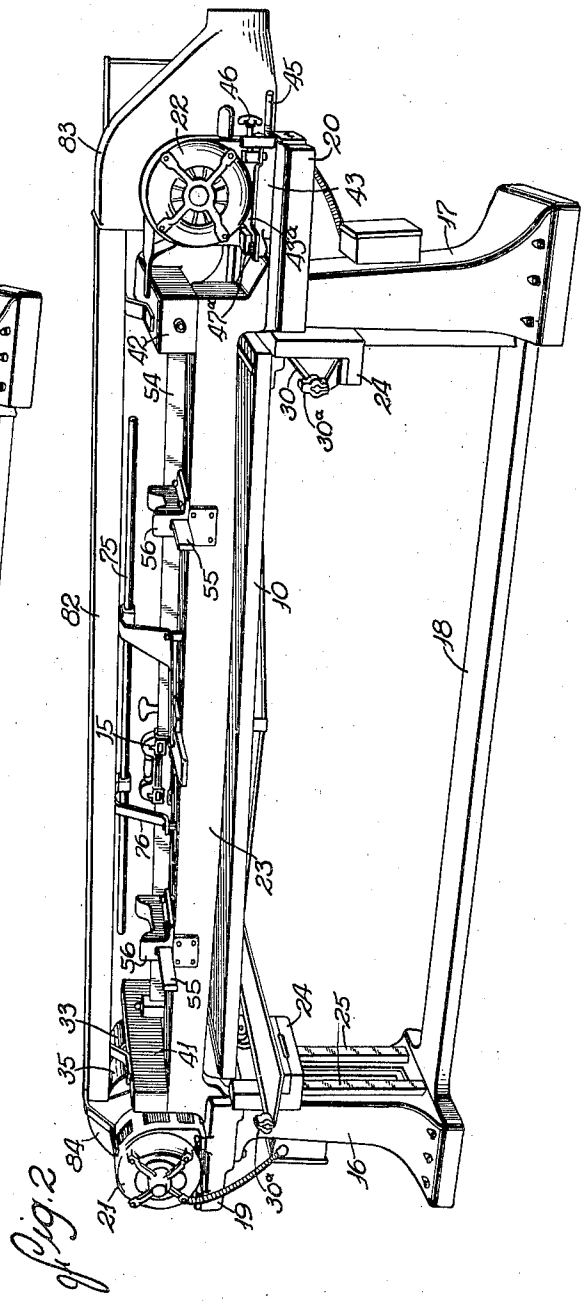


Fig. 2

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Fig. 3

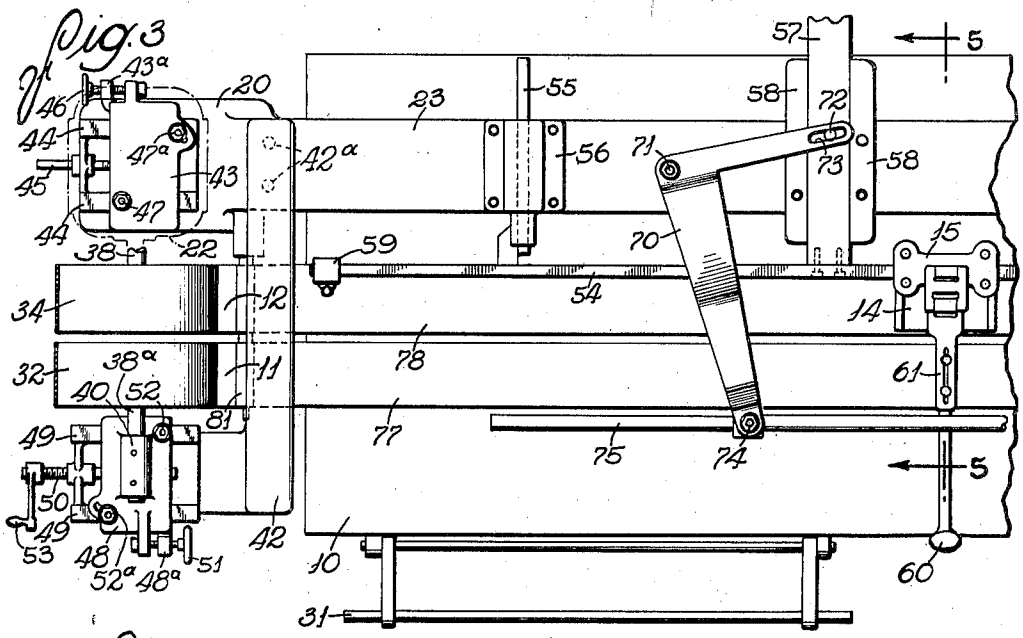


Fig. 5

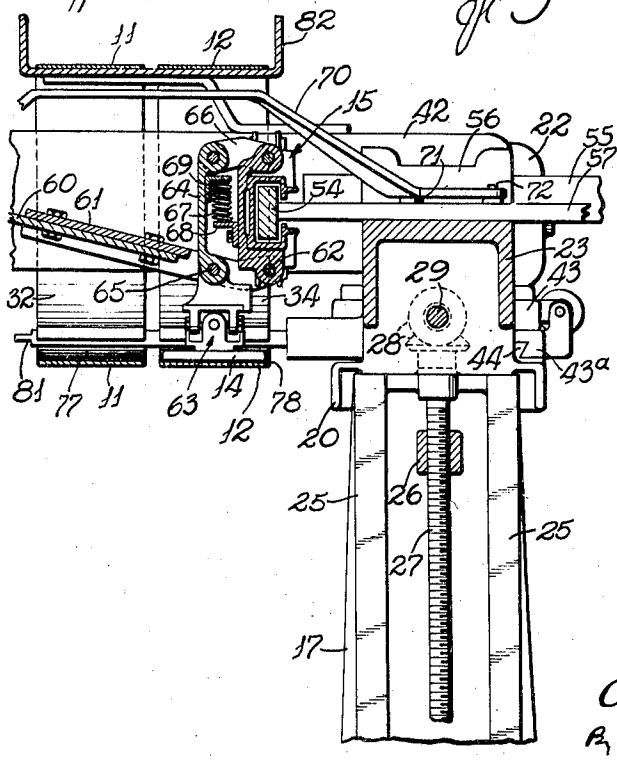
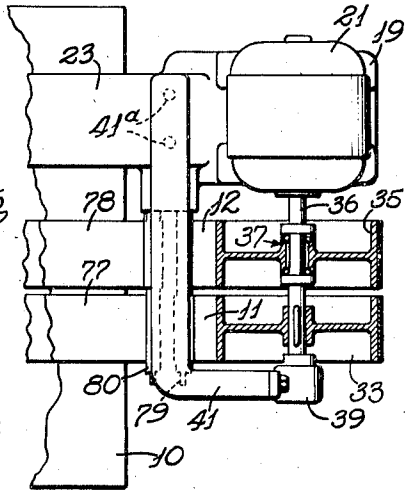


Fig. 4



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SANDING MACHINE

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4 Claims. (Cl. 51—135)

The invention relates to sanding machines and more particularly to those utilizing endless abrasive belts.

One object of the invention is to provide a sander of the above character in which the belt supporting pulleys are supported in a novel manner permitting of ready removal and replacement of the belt or belts.

Another object of the invention is to provide a sander of the character described embodying an improved supporting structure for the stroking shoe which overlies the belt or belts, such that the shoe may be shifted by readily manipulable means in a direction transversely of the belts while being retained in position on a strong rigid support that has no tendency to buckle or twist.

A further object of the invention is to provide in a machine of the character described a novel form of actuator for adjusting the position of the stroking shoe, transversely of the sanding belt, or belts, such that the operator can readily actuate the same from any point along the machine.

Still another object of the invention is to provide a stroke sander which, through the provision of various structural improvements and simplifications, is rendered economical to build as well as rugged in construction and effective in operation.

Further objects and advantages of the invention will become apparent as the following description proceeds, taken in connection with the accompanying drawings in which—

Figures 1 and 2 are respectively front and rear perspective views of a stroke sander embodying the invention.

Figs. 3 and 4 are fragmentary plan views of opposite end portions of the machine shown in Fig. 1, the guard structure at the top of the machine being broken away and portions of the machine being shown in section.

Fig. 5 is a vertical sectional view along the line 5—5 in Fig. 3.

For purposes of illustration and explanation of its various novel features, the invention has been shown herein (see Fig. 1) as embodied in a stroke sander adapted for finishing all manner of wooden composition or metallic flat work such, for example, as veneered panels, table tops, doors, fixtures and other similar parts. In brief, this sander embodies a horizontal work table 10 across the top of which extend the lower reaches of a pair of endless sanding belts 11 and 12 respectively supported by pairs of pulleys 32—33 and 34—35 and driven in the same or opposite directions. The work pieces are placed on the table 10 and the power driven sanding belts 11 and 12 are selectively pressed into engagement with the exposed top surface of the work by a stroking shoe 14. This shoe is mounted on a horizontally slidable carriage 15 as will hereinafter appear in greater detail so that the shoe may be stroked horizontally along the belts to sand the work pieces throughout their lengths.

Proceeding now to a more detailed consideration, the particular machine illustrated embodies a supporting structure (Figs. 1 and 2) made up of a pair of upright pedestals 16 and 17 bolted to a horizontal base frame 18. Fixed to the upper ends of the pedestals 16 and 17 are pads or brackets 19 and 20, respectively, which carry the sanding belt electric driving motors 21 and 22. These brackets 19 and 20 are formed as extensions on the opposite ends of a horizontal beam or bridge 23, which joins the upper ends of the pedestals 16 and 17. The motor 21 is fixed in position on its pad 20, while the other motor 22 is adjustably mounted in a manner and for a purpose which will hereinafter be explained.

In order to accommodate vertical adjustment of the work table 10, it is carried by a pair of saddles 24 (Figs 1 and 2), which are vertically slidable on ways 25, fashioned on the opposed inner faces of the base pedestals 16 and 17. A traveling nut 26 (Fig. 5) is fixed to each of these saddles and is threaded on a corresponding lead screw 27 housed within the hollow pedestals. Upon rotation of the lead screws 27 by a suitable hand crank or the like (not shown), which is connected thereto through bevel gears 28 and an interconnecting horizontal shaft 29, the table 10 is raised or lowered to adjust its position with respect to the lower reaches of the sanding belts 11 and 12.

Provision is also made for horizontal sliding movement of the work table 10. For this purpose the table is mounted on suitable ball bearing rollers for sliding movement along horizontal tracks 30 (Figs. 1 and 2) carried by the saddles 24. Stops 30a at the ends of the tracks 30 limit the outward and inward movement of the table. An elongated handle or bar 31 (Fig. 1) is secured to the forward edge of the table adjacent its left end (as viewed from the front) which may be readily grasped by the operator to push or pull the table horizontally into the desired position. In this connection it should be noted that all of the controls for the machine are grouped at the left end of the machine and so that they are readily accessible without walking back and forth from one end of the machine to the other.

In accordance with one aspect of the invention, a novel arrangement has been provided for supporting the belt pulleys 32 to 35 so that the belts can be quickly and conveniently replaced without interference by the pulley supports or the necessity of shifting or removing any of the parts. To this end, the belt pulleys are carried by shafts which are journaled in bearings disposed on opposite sides of the two belts and the bearings on the side opposite the motors are mounted on the ends by outboard supports projecting through the belts so that the entire bearings and their supporting structures are disposed within the paths of travel of the belts. In the particular construction shown, the pulley 33 for the front belt 11 is fast on the shaft 36 (Fig. 4) of the motor 21 which shaft projects through the rear belt 12 and through the medium of an antifriction bearing 37 loosely supports the pulley 35 of the rear belt. The outer end of the shaft 36 is journaled in an outboard bearing 39 on the short leg of an L-shaped bracket 41 disposed horizontally with its long leg extending through the reaches of the two belts. At its rear end, the bracket is fastened as by bolts 41a to the bridge member 23.

At the left hand end of the machine (Fig. 3), the pulley 34 of the rear belt is fast on the short shaft 38 of the motor 22. Alined with the shaft is a shaft 38a journaled in a single bearing 40 and supporting the idler pulley 32. The bearing is mounted on an L-shaped bracket 42 projecting through the belts alongside the pulleys 32 and 34 with its rear end secured as by bolts 42a to the bridge 23. By mounting the pulleys 32 and 34 on the separate shafts 38 and 38a, the belts may be tensioned individually and the angular position of the shafts adjusted to obtain correct alinement of the individual belts.

By placing the brackets 41 and 42 between the upper and lower reaches of the belts 11 and 12, the outboard bearings of the pulley shafts 36 and 38a are mounted in such manner that the belts may be removed and replaced without disassembly of the supporting structure. For example, if it is desired to remove one or both of the belts 11 or 12, it is only necessary to relieve the tension therein by a suitable mechanism hereinafter described, and by then pulling the belts forwardly off of the pulleys. This ease of belt replacement is an important factor since the time required for replacement of belts represents idle time for the machine and unproductive time for the workmen.

In order to tension the sanding belt 12, the motor 22 is carried by an adjustable support so that the pulley 34 can be shifted toward or away from the belt loops which embrace them. In particular, the motor 22 is fixed to a supporting plate 43 (Fig. 3) which is carried on an underlying plate 43a (Fig. 5) that is slidable upon a pair of ways 44 fashioned on the bracket 20. A screw 45 journaled in the bracket 20 and threaded in a fixed nut (not shown) fast on the lower base plate 43a serves to shift the latter along the ways 44 in a direction longitudinally of the belt 12. To permit of adjustment of the belt 11, the bearing 40 of the shaft 38a is similarly mounted through the medium of a plate 48. The latter is supported on an underlying plate 48a which is slidable along ways 49 on the short leg of the L-shaped bracket 42 the adjustment being effected by turning a screw 50. A single removable handle 53 may be utilized to rotate either of the lead screws 45 and 50.

Sometimes it is necessary to cock the pulley supporting shafts 38 and 38a at an angle in the event the belts 11—12 are not quite true. For this purpose the upper supporting plates 43 and 48 are swingable horizontally about upright studs 47 and 52 on their respective underlying plates 43a and 48a. Screws 46 and 51 threaded in brackets fast on the underlying plates 43a and 48a are loosely connected to the respective plates 43 and 48 and serve to swivel them about the studs 47 and 52 as required. Locking bolts 47a and 52a lock the plates 43 and 48 in position. When the sanding belts 13—11 are under tension, it is merely necessary to revolve the lead screws 45 and 50 by the crank 53 to relieve the tension in the belts for removal of the latter in the manner previously described.

Maximum rigidity of support for the stroking shoe 14 is insured by retaining a fixed fulcrum point for it on the carriage 15. It is, of course, necessary to shift the stroking shoe 14 transversely of the sanding belts so that it overlies one belt or the other but in the present improved arrangement the entire supporting structure for the shoe including the carriage 15 and trackway for the carriage is also shifted simultaneously with the shoe during this adjustment. As a consequence, it is unnecessary to project the shoe forwardly from the carriage on a long and relatively unstable support. The trackway for the carriage 15 has been shown herein (Figs. 1, 2 and 3) as embodying a horizontal bar 54 fixed to the forward ends of a pair of projectible arms 55 and an intermediate projectible arm 57 (Figs. 3 and 5) which are respectively confined for longitudinal movement by overlying brackets 56 and guide plates 58 bolted to the top of the bridge 23. By the use of the arms 55 and 57 the track bar 54 is always rigidly supported, even when in its fully projected or extreme forward position.

The carriage 15 embraces the trackway bar 54 (Fig. 5) being generally C-shaped in cross section. The carriage is slidably supported on the trackway by rollers having suitable ball bearings to insure smooth, easy movement. Stop blocks 59 (Fig. 1) are releasably clamped on the trackway bar 54 to limit the path of travel of the stroking shoe carriage 15. These stop blocks may be adjusted to any desired point along the trackway bar so that the path of travel of the carriage will conform to the length of the work piece.

Depression of the stroking shoe 14 into working position is accomplished by a forwardly projecting hand lever 60 (Figs. 1, 3 and 5) which is fashioned in the form of an extension bolted to the outer end of a channel shaped lever 61 pivoted or fulcrumed by a pin 62 (Fig. 5) to the lower side of the carriage 15. The fulcrum or pivot point 62 for the lever 61 is located on the carriage 15 directly below the trackway bar 54, while the shoe 14 is connected by universal joint 63 to the depending end of a vertical link 64 pivoted to an intermediate portion of the lever 61 by a pin 65. By virtue of this arrangement the reaction thrust on the pivot 62, incident to a depression of the shoe 14, is transmitted directly upward to the trackway bar 54. Consequently, there is no tendency for this force to cause any skewing or turning of the carriage 15 about the longitudinal axis of the trackway bar 54. Furthermore this same solid supporting arrangement for the shoe 14 is maintained, no matter what the transverse position of the shoe 14 may be, since changes in the transverse position of the shoe are accomplished by shifting the track-

way bar 54 itself, rather than by shifting the shoe with respect to the trackway bar.

In order to maintain the stroking shoe 14 in an elevated position while it is idle, the upper end of the vertical link 64 is connected by a pivoted cross link 66 with the top of the carriage 15, so as to complete a parallelogram linkage (Fig. 5). A helical compression spring 67 is interposed between L-shaped brackets 68 and 69, which are fixed respectively to the carriage 15 and to the vertical link 64. Consequently the spring 67 urges the link 64 and attached shoe 14 upwardly to an elevated position.

In order to shift the trackway bar 54 transversely of the sanding belts 11 and 12, and thereby correspondingly adjust the position of the stroking shoe 14, a suitable actuating mechanism is provided for projecting or retracting the track bar supporting arms 55 and 57. As shown herein (Figs. 3 and 5), this actuating mechanism includes a bell crank lever 70 pivoted at 71 on the bridge 23 and having a lost motion connection with the trackway supporting arm 57. This lost motion connection is formed by a pin 72 fixed on the arm 57 and projecting through a longitudinal slot 73 in one arm of the bell crank 70. The other arm of the bell crank projects forwardly and is bent upwardly to clear the track bar 54 and carriage 15. The forward end of this second bell crank arm is connected by a pivot pin 74 with a handle or bar 75 which extends along the front of the machine. The opposite end portion of this bar 75 is supported by a link 76 (Fig. 2) pivotally connected to the bridge 23 and to the bar. Accordingly, when the operator wishes to shift the trackway bar 54 forwardly he has but to push the actuator bar 75 to the left (as viewed in Fig. 3) and similarly to thrust the bar 75 to the right to retract the trackway bar 54. Since the actuating mechanism includes a long actuator handle or bar 75 extending throughout a major portion of the length of the machine the operator can readily alter the position of the trackway bar 54 when he is standing at almost any point in front of the apparatus.

Elimination of any tendency of the sanding belts 11 and 12 to draw the stroking shoe forward, when stroking in the direction of belt travel, is insured by the use of stationary flexible guard strips 77 and 78 (Figs. 1 and 3) made of canvas or the like and stretched over the top of the lower reaches of the belts 11 and 12, respectively. The right hand ends of the guard strips 77—78 (as viewed from the front of the machine) are fixed to pins 79 and 80, respectively, while at the opposite end of the machine the strips are secured to a rotatable tension roller 81. The lower sides of the guard strips 77—78, which contact the sanding belts 11 and 12, are preferably given a coating of anti-friction material such as graphite. With the strip arrangement described the stroking shoe 14 presses on the strips 77 or 78 rather than directly on the belts, with the result that the same operating control is achieved when stroking in either direction.

The upper reaches of the sanding belts 11 and 12 are received within a channel shaped sheet metal guard 82 (Figs. 1, 2 and 5). This guard receives the dust carried from the work by the belts and also prevents the belts from flying out and striking the workman in the event of breakage. The opposite ends of the guard 82 communicate with sheet metal hoods 83 and 84 which may be connected to suitable exhaust fans (not shown).

Preferably, though not necessarily, the electric driving motors 21 and 22 are reversible and may be started in either direction or stopped by suitable push button switches 85 (Fig. 1) provided at the left end of the machine. By utilizing two sanding belts driven by independent reversible motors the machine may be adapted for various applications. For example, one sanding belt may be provided with coarse grit and the other with fine grit for finishing. With such an arrangement tape, glue and the like may be removed from veneered stock by the coarse belt and the fine belt then used to finish the job without removing the work from the machine or changing the belts. On the other hand, in some types of wood the grain has a tendency to raise when polished, rendering it desirable to sand the piece in opposite directions. This can be accomplished by properly controlling the direction of the sanding belts 11 and 12. When constant running of the belts in one direction dulls the abrasive grit to the point of inefficiency the belts can be run in the opposite direction by reversing the motors, thus exposing additional sharp edges in the grit so as to achieve greater belt life.

In the operation of the machine described above the operator grasps the work table handle 31 and pulls the table out so that it is exposed to receive the work. The work piece is then laid on top of the table and the height of the table adjusted to accommodate the thickness of the particular work piece, whereupon the table is thrust back into operating position with the work piece located below the sanding belts 11 and 12. The electric driving motors 21 and 22 are started to drive the belts in the desired directions by the push button switches 85, the direction of the belt travel selected being dependent upon the character of the work to be performed, as outlined above. The stroking shoe 14 may then be located over one or the other of the belts 11 or 12 by shifting the actuator bar 75. The stop blocks 59 are set for the length of stroke desired. Then, finally, the operator pushes down on the shoe hand lever 60 to depress the shoe into contact with the guard strips 77 or 78 and the shoe is stroked back and forth by pulling and pushing on the lever 60 in a horizontal direction so as to stroke the shoe back and forth across the top of the work piece in the usual manner.

Changing or replacing the sanding belts 11 and 12 is readily accomplished by simply opening doors on the dust guards 83 and 84, and then slacking off the belts by turning the lead screws 45 or 50 (Fig. 3) so as to shift the motor shaft 38 or the shaft 38a toward the body of the machine. Thereafter the sanding belts can be readily pulled forward off of their supporting pulleys and without any interference from the supporting structure of the pulleys since the brackets 41 and 42 extend between, rather than around, the upper and lower reaches of the belts.

Although a particular embodiment of the invention has been shown and described, in some detail for purposes of illustration and explanation there is no intention to thereby limit the invention to such embodiment but on the other hand the appended claims are intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention.

I claim as my invention:

1. A dual belt sander comprising, in combination, a horizontal work table, a pair of endless sanding belts disposed side by side with their lower reaches overlying said table and with their upper reaches substantially paralleling the lower reaches in spaced relation above the same, each of said belts being provided with two supporting pulleys over which they are led with the pulleys disposed in the loops at the opposite ends of the belt reaches and with the pulleys at each end of the belts arranged coaxially, independent means disposed on the same side of said belts and arranged to drive the pulleys of the respective belts, a first shaft driven by one of said driving means and projecting through the pulleys of one pair, said shaft loosely supporting the pulley adjacent the driving means and being coupled to the remote pulley, second and third shafts alined with each other and respectively supporting the pulleys of the other pair, one of said latter shafts being driven by one of said driving means, a bracket rigidly supported on the same side of said belts as said driving means and projecting between the upper and lower reaches of the belts, and a bearing on the free end of said bracket supporting the end remote from said driving means of the outermost one of said second and third shafts.

2. A double belt sander having, in combination, a pair of endless abrasive belts disposed side by side, two pairs of drive and idler pulleys supporting opposite ends of said belts, a shaft supporting one pair of said pulleys and coupled to the driving pulley of said pair, an electric motor at one end of said belts driving said shaft, two shafts supporting the other driving and idler pulleys and individually mounted for movement longitudinally of the associated belt and also to swivel about an axis extending transversely of the pulley axis, an electric motor at the other ends of the said belts disposed on the same side of the belts as said first motor and driving the shaft of said other driving pulley, and bearing supports for the outer end of said first shaft and for said other idler pulley comprising brackets extending through said belts and supported adjacent said motors.

3. A sander comprising, in combination, a horizontal work table, a sanding belt having a reach overlying said table, a horizontal trackway extending along and above said belt reach, means supporting said trackway for bodily adjustment transversely of said belt reach, a stroking shoe, means including a carriage traversable along said trackway for supporting said stroking shoe above said belt reach, and means including an elongated and endwise shiftable actuator lying along the front of the sander for adjusting the position of said trackway bar transversely of said belt reach.

4. A sander comprising, in combination, a horizontal work table, a sanding belt having a reach overlying said table, a horizontal trackway extending along and above said belt reach, means supporting said trackway for bodily adjustment transversely of said belt reach, a stroking shoe, means including a carriage traversable along said trackway for supporting said stroking shoe above said belt reach, an elongated and endwise shiftable actuator bar lying along the front of the sander, and means including a bell crank lever pivotally connected at its opposite ends to said trackway and to said bar for operatively connecting the same to effect transverse adjustment of said trackway in response to endwise movement of said actuator bar.

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