

[54] TRACKING MECHANISM FOR BELT SANDERS

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[58] Field of Search 51/135 R, 135 BT, 170 EB; 198/202; 74/241

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Primary Examiner—Harold D. Whitehead

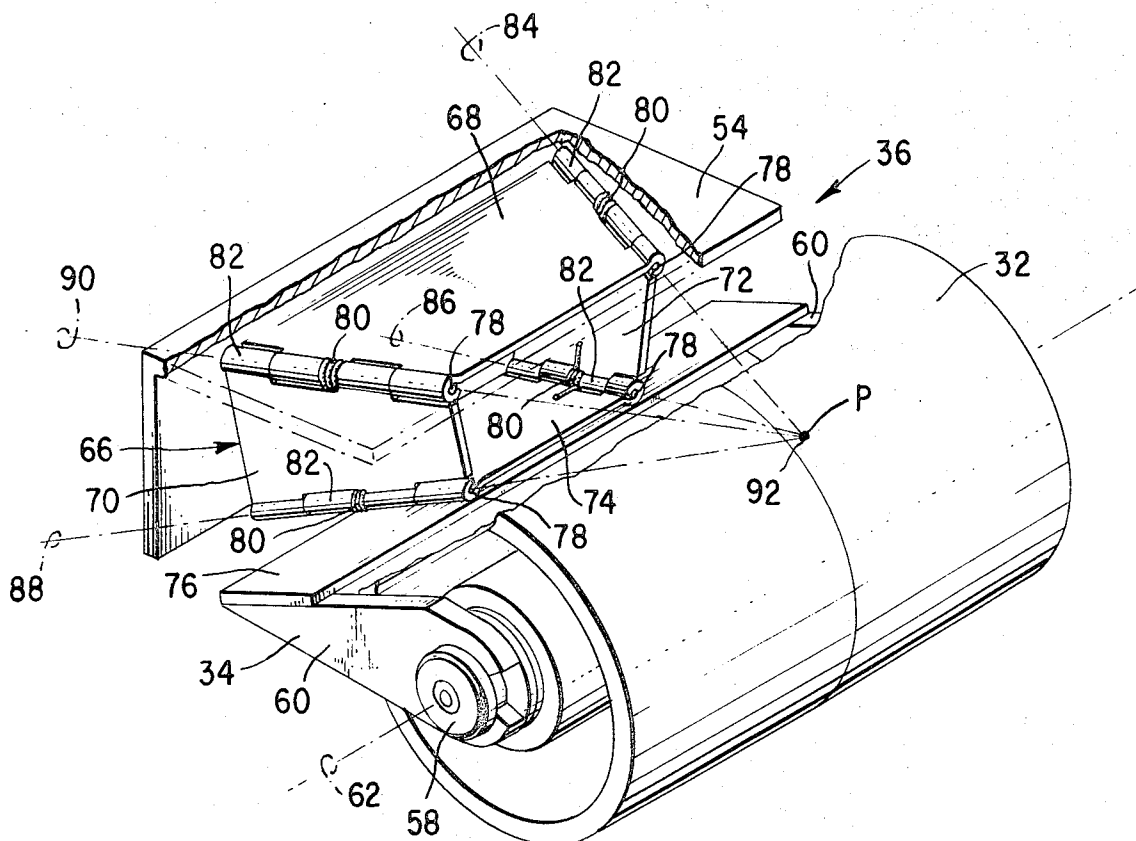
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[57] ABSTRACT

A tracking mechanism for centering a sanding belt of a belt sander, wherein a linkage means is connected to the frame of the sander. The linkage means carries a mounting bracket to which an idler pulley is rotatively connected. The linkage means has a plurality of links pivotally interconnected to each other to form a frusto-polyhedron whose vertex defines a pivot point disposed forwardly of the idler pulley, so that when unbalanced forces act on one side of the idler pulley, the linkage means will be caused to rotate about the pivot point to produce a turning movement thereabout, and cause the opposite side of the idler pulley to counteract the initial forces by shifting and restoring the idler pulley to a balanced position. The pivot center line intersects a plane passing through the center line of the sanding belt, which plane is substantially perpendicular to the axis of the pulley. This location of the pivot point also will serve to aid tracking of, and limit runoff of the sanding belt from the pulley.

9 Claims, 6 Drawing Figures



2 Sheets-Sheet 1

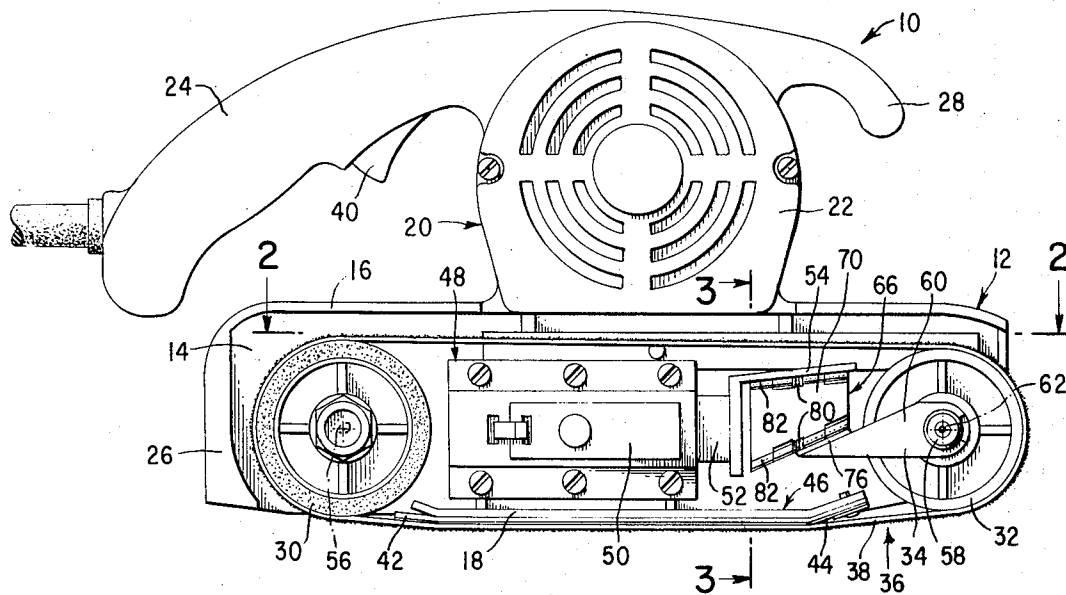


Fig. 1

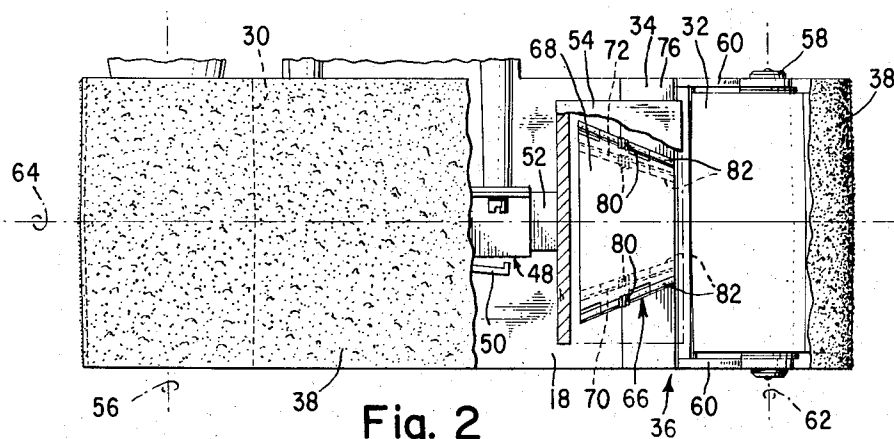


Fig. 2

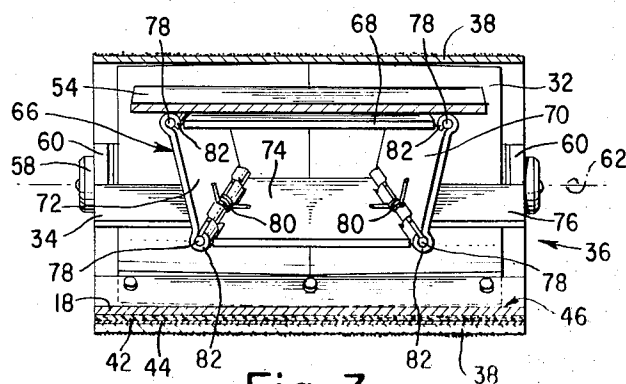
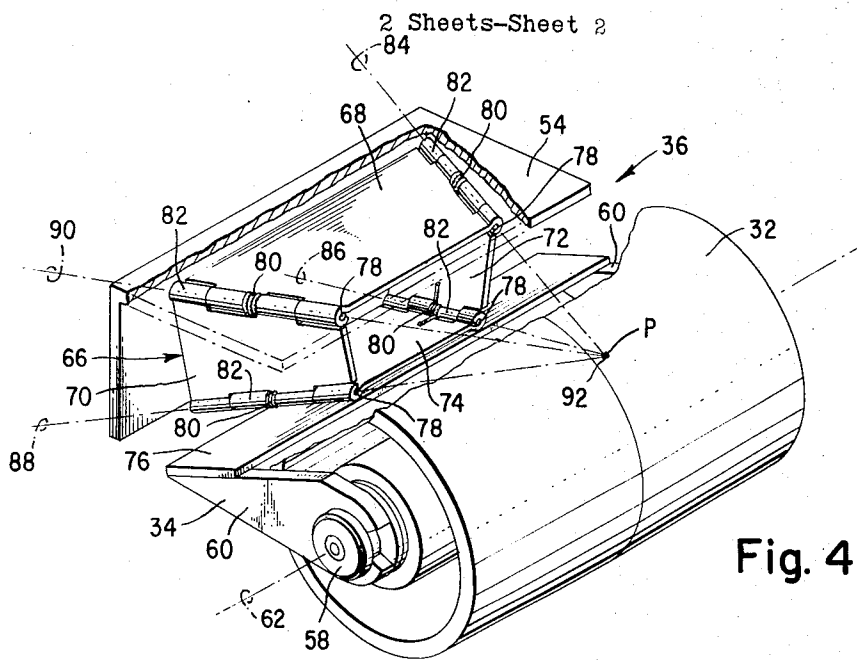
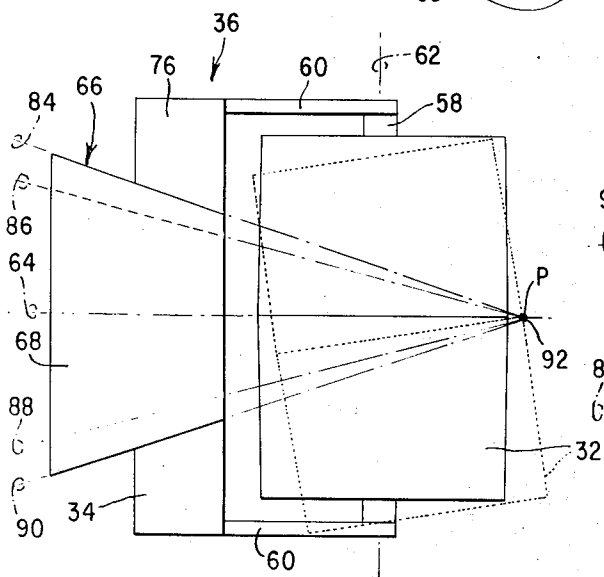
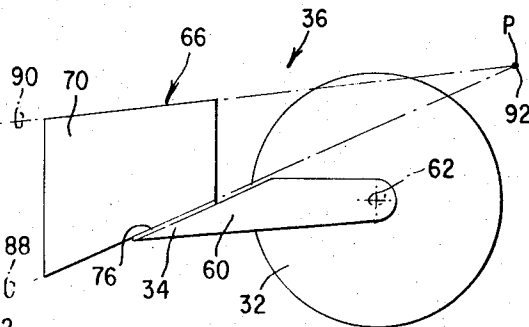


Fig. 3



TRACKING MECHANISM FOR BELT SANDERS

BACKGROUND OF THE INVENTION

In the prior art, various devices have been tried to improve tracking of the sanding belt and to prevent runoff thereof. However, though some prior art devices have been more successful than others, the problem still remains.

SUMMARY OF THE INVENTION

It is therefore an object of the invention to provide an improved tracking mechanism for belt sanders which overcomes the prior art deficiencies; which is simple, economical and reliable; which uses an improved tracking mechanism including a linkage means having intersecting revolute axes with a common vertex serving as a pivot point for the linkage means; the pivot point is disposed forwardly of the idler pulley; the linkage means defining a frusto-polyhedron whose vertex lies forwardly of the axis of the idler pulley; and the linkage means having a vertex point lying in a plane passing through the longitudinal center line of the sanding belt.

Other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features will be particularly pointed out hereinafter in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention is illustrated in the accompanying drawings in which:

FIG. 1 is a side elevational view of a belt sander embodying the present invention.

FIG. 2 is a top plan view, partly broken away, taken along line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken along line 3—3 of FIG. 1.

FIG. 4 is a perspective view, partly broken away, showing the improved tracking mechanism of the present invention.

FIG. 5 is a diagrammatic representation of a top plan view of the improved tracking mechanism showing the vertex of the revolute axes of the linkage means of the present invention.

FIG. 6 is a diagrammatic representation of a side elevational view, showing the relative position of the vertex of the improved tracking mechanism.

DESCRIPTION OF THE INVENTION

In the illustrated embodiment of the invention a belt sander, designated generally as 10, is shown in FIG. 1. The belt sander 10 has an integral frame 12 formed with a side wall 14, a top wall 16 and a bottom wall 18. A motor housing 20 is formed integrally with the top wall 16 and is closed by a cover plate 22. A motor (not shown) is mounted within the motor housing 20, and is connected to power the belt sander 10. A handle 24 illustrated in FIG. 1 extends from the upper end of the motor housing 20 outwardly over the top wall 16 and terminates adjacent to, but spaced from, the end wall 26 of the frame 12. An auxiliary handle 28 extends a short distance outwardly at the front of the motor housing 20.

A driving pulley 30 is journaled in the frame 12 at the rear end adjacent the end wall 26, and an idler pulley 32 located at the forward end, is journaled on a mounting bracket or yoke 34, which bracket is carried by the

improved tracking mechanism 36 as more fully set forth hereinafter. An endless abrasive belt 38 is trained over the pulleys 30 and 32, as shown in FIGS. 1 and 2. Actuation of a trigger switch 40 mounted within the handle 24 will operate the motor to drive the drive pulley 30, which results in rotation of the sanding belt 38.

The bottom wall 18 depicted in FIG. 1 has secured thereto a resilient pad 42 made of cork or rubber or the like, and a polished sheet of steel ply 44, which combined with the pad forms a pressure plate 46 that serves as a smooth platen for holding the bottom run of the sanding belt 38 against the work to be sanded.

A belt tensioning mechanism 48 shown in FIG. 1 is connected to the frame 12 intermediate the drive pulley 30 and the idler pulley 32 and located within the sanding belt 38. The belt tensioning mechanism 48 is spring loaded in its extended position to provide the required loading upon the idler pulley 32 when the sanding belt 38 is operatively mounted over the drive pulley 30 and idler pulley 32. The belt tensioning mechanism 48 also has a retracted position (not shown) which permits the sanding belt 38 to be removed or replaced. A lever 50 is operator actuated to place the belt tensioning mechanism 48 in the extended or retracted position. The belt tension mechanism 48 is connected to the belt tracking mechanism 36 through a stem 52 which fixedly carries an inverted "L" plate member 54. The belt tracking mechanism 36, mounting bracket 34 and idler pulley 32 move as a unit into the extended or retracted positions responsive to the movement of the stem 52 and member 54 of the belt tension mechanism 48.

The drive pulley 30 rotates about a fixed axis 56, while the idler pulley 32 has a shaft journaled between the end pieces 60 of the yoke 34. The idler pulley 32 rotates about an axis 62 of the shaft 58, which though generally parallel to the fixed axis 56, may be shifted somewhat responsive to any unbalancing or restoring forces as will be explained more fully hereinafter. As viewed in FIG. 1, the drive pulley 30 and the idler pulley 32 will rotate in a clockwise direction. A plane passing perpendicularly through the axes 56 and 62 at midpoint of the pulleys 30 and 32 defines a longitudinal center line 64 illustrated in FIG. 2 along the top and bottom horizontal portions of the sanding belt 38.

The belt tracking mechanism 36 includes a linkage means 66 having a plurality of links which could also be termed either members or bars. In the preferred embodiment, the linkage means 66 is in the form of a polyhedron having a top link 68 suitably affixed to the plate member 54, and hinge-connected at its opposite ends to side links 70 and 72. A bottom link 74 has either end pivotally connected to the bottom of the side links 70 and 72. The bottom link 74 is affixed to a strap member 76 which extends between the end pieces 60 of the yoke 34. Each of the links 68, 70, 72 and 74, have extension fingers which are bent to interconnect upon a rod 78. A biasing spring 80 is disposed about the rod 78 at an intermediate position to separate adjacent links. The bent or extension fingers enclose the rod 78 to define a hinge 82 at each of the four corners where the links interconnect to each other. Each of the hinges 82 defines an axis which may be considered to be coincident to the axis of each of the rods 78. Accordingly, an axis 84 is formed at the intersection of links 68 and 72; and axis 86 is formed at the intersection of links 72

and 74; an axis 88 is formed at the intersection of the links 74 and 70; and an axis 90 is formed at the intersection of links 70 and of the axes 84, 86, 88 and 90 of the linkage means 66 intersects point "P" which defines the vertex 92 of the frusto-polyhedron formed by the linkage means 66. In the preferred embodiment, the point P is intersected by the longitudinal center line 64, and therefore, lies in the plane passing through said center line 64. The point P or vertex 92 exists in space at a predetermined position which is forwardly of and above the axis 62 of the idler pulley 32. The belt tracking mechanism 36, through its linkage means 66 will counteract any shifting of the idler pulley 32 by the revolute axes 84, 86, 88 and 90, rotating about the vertex 92 to counteract such movement. An example of this is seen in the dotted line representation of the idler pulley 32 in FIG. 5, wherein the top portion of the idler pulley has been exposed to a force which shifts said top portion leftwardly, resulting in the bottom portion shifting in the opposite direction, or rightwardly, tending to tighten the sanding belt 38 on the side opposite from where the force is applied. Thus, a balance will be restored without causing runoff of the sanding belt 38.

The plate member 54 and stem 52 in extended position will not rotate, but are urged outwardly along the center line 64 to keep the sanding belt 38 in tension upon the idler pulley 32. The yoke 34 having end pieces 60 connected by strap 76, is rigid, so that any shifting of the idler pulley 32 will be transmitted directly to the bottom link 74 to which the strap 76 is suitably connected. Since the top link 68 is affixed to the rigid plate member 54, the top link 68 also will be rigid. This will permit the linkage means 66 to turn about the vertex 92. The linkage means 66 with its four intersecting revolute axes 84, 86, 88 and 90, prevent belt runoff of the sanding belt 38 by providing a pivot point at P which is forwardly of the axis 62 of the idler pulley 32, so that any unbalanced tensions in the sanding belt 38 will produce moments acting about the pivot point P which tend to restore the sanding belt 38 to a position of centralized tracking. An additional aid in preventing the sanding belt 38 from a tendency to run off the idler pulley 32, is the location of the pivot point P on the center line 64 of the sanding belt 38, since experience has shown that the center line of the sanding belt as it approaches a pulley, must lie in a plane perpendicular to the axis of that pulley so as to delimit runoff of the belt from said pulley. In the present instance, location of the pivot point P along the center line 64 satisfies the empirical approach to delimiting belt runoff, since the center line 64 lies in a plane perpendicular to the axis 62 of the idler pulley 32.

The top link 68 will be suitably connected to the plate member 54, and the bottom link 74 will be suitably connected to the strap 76 with the connecting means in any conventional form such as rivets, bolts, or welding, it being understood that the said connection will not interfere with the pivotal movement of the hinges 82. Alternatively, the top link 68 and the bottom link 74 may be formed integrally with the plate member 54 and the strap 76, respectively, with suitable provision being made to pivotally connect the side links 70 and 72 therebetween. Whether the linkage means 66 remains a subassembly or is partially formed integrally with the plate member 54 and the strap 76, the mode of operation will be the same and the revolute axes 84,

86, 88 and 90, would be definition intersect pivot point P to form the vertex 92 of the frusto-polyhedron, as set forth hereinbefore.

It will be understood that various changes in the details, materials, arrangements of parts and operating conditions which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principles and scope of the invention.

Having thus set forth the nature of the invention what is claimed is:

1. A tracking mechanism for centering a sanding belt of a belt sander comprising:

- a. a frame,
- b. a bar linkage means connected to the frame and having a plurality of bars,
- c. a mounting bracket connected to the linkage means,
- d. an idler pulley rotatively connected to the mounting bracket and having an axis of rotation; and
- e. the bars pivotally connected to one another along revolute axes which axes intersect at a vertex disposed forwardly of the axis of rotation of the idler pulley.

2. The combination claimed in claim 1 wherein:

- a. the sanding belt has a longitudinal center line, and

- b. the vertex lies in a plane passing through the longitudinal center line.

3. The combination claimed in claim 1 wherein:

- a. one of the bars formed integrally with the frame,

- b. another of the bars formed integrally with the mounting bracket, and

- c. a pair of spaced bars pivotally interconnected between the frame and the mounting bracket.

4. The combination claimed in claim 3 wherein:

- a. spring means connected to the bar linkage means yieldably to separate the bars from one another.

5. The combination claimed in claim 4 wherein:

- a. the vertex located in a plane which intersects the centerline of the sanding belt as said centerline approaches the idler pulley,

- b. the axis of rotation of the idler pulley is disposed transversely of said centerline in a normally perpendicular position to a plane passing through said centerline, and

- c. the bar linkage means to rotate about the vertex responsive to shifting of said axis of rotation to restore the perpendicular position thereof and to prevent runoff of said sanding belt.

6. The combination claimed in claim 1 wherein:

- a. the bar linkage means including four bars defining a frusto-polyhedron having its vertex at said vertex point whereby shifting of the idler pulley will cause said bar linkage means to pivot about said vertex point to create a turning movement thereabout to urge the idler pulley to return to its original position.

7. A belt sander comprising:

- a. a frame,
- b. a power driven pulley mounted in the frame,
- c. an idler pulley disposed in the frame in spaced relation to the driven pulley,
- d. a sanding belt connected to rotate about the driven pulley and the idler pulley,

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- e. a mounting means for the idler pulley connected to the frame to maintain the axis of the idler pulley perpendicular to the plane of the centerline of the sandpaper, and
 - f. the mounting means including a bar linkage means having a plurality of bars pivotally connected to one another to form at said connections revolute axes intersecting at a point lying in the plane of the centerline of the sanding belt and forwardly of the axis of the idler pulley.
8. The combination claimed in claim 7 wherein:
- a. a plate member defined by each of the bars,
 - b. the plate members hinged-connected to one an-

other to form a polyhedron having a vertex at said point whereby the sides of the plate members converge toward one another in the direction of said vertex.

9. The combination claimed in claim 8 wherein:
- a. spring means connected in the hinge connections, and
 - b. the bar linkage means to pivot about said vertex responsive unbalanced tensions on said sanding belt to create movements thereabout tending to restore said sanding belt to a balanced position.

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