Sept. 1, 1959 I. E. ZIRBEL 2,901,870

FLAT BED FINISHING MACHINE

Filed July 10, 1957 3 Sheets-Sheet 1

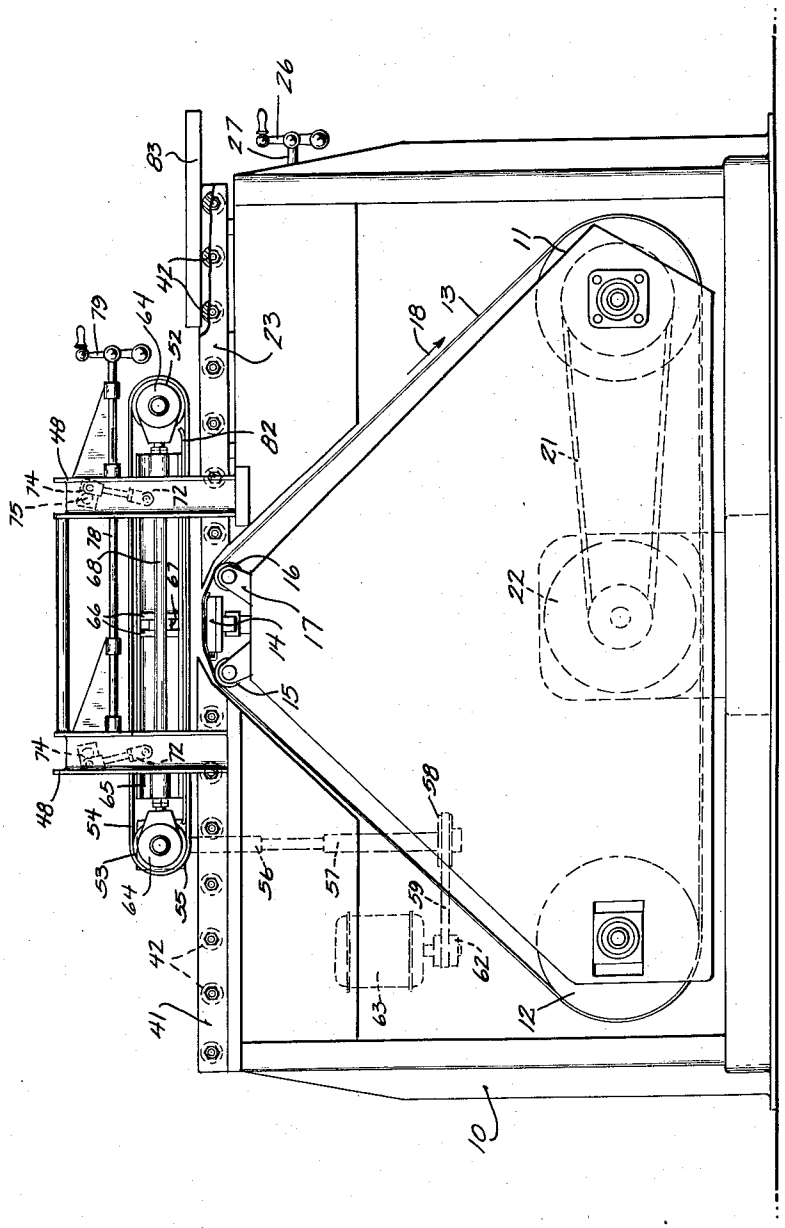


Fig. 1

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Filed July 10, 1957 3 Sheets-Sheet 2

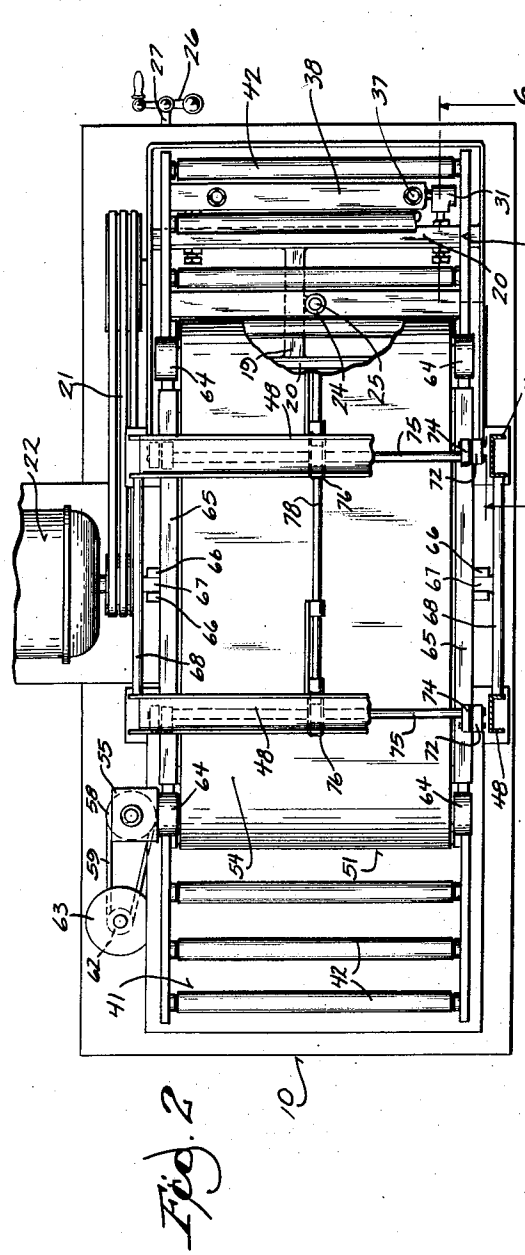


Fig. 2

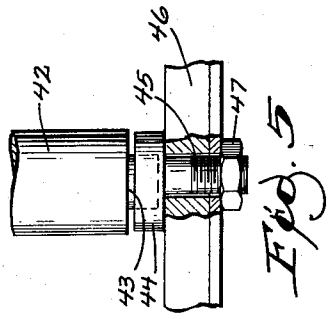


Fig. 5

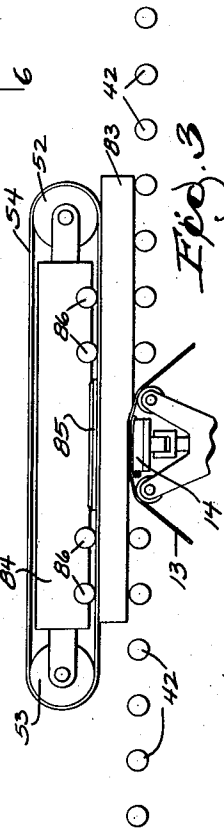


Fig. 3

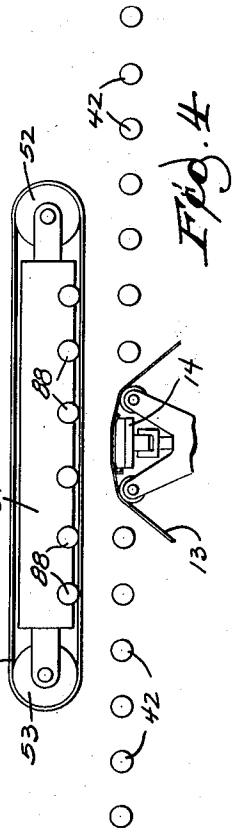


Fig. 4

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Sept. 1, 1959 I. E. ZIRBEL 2,901,870

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Filed July 10, 1957 3 Sheets-Sheet 3

Fig. 6

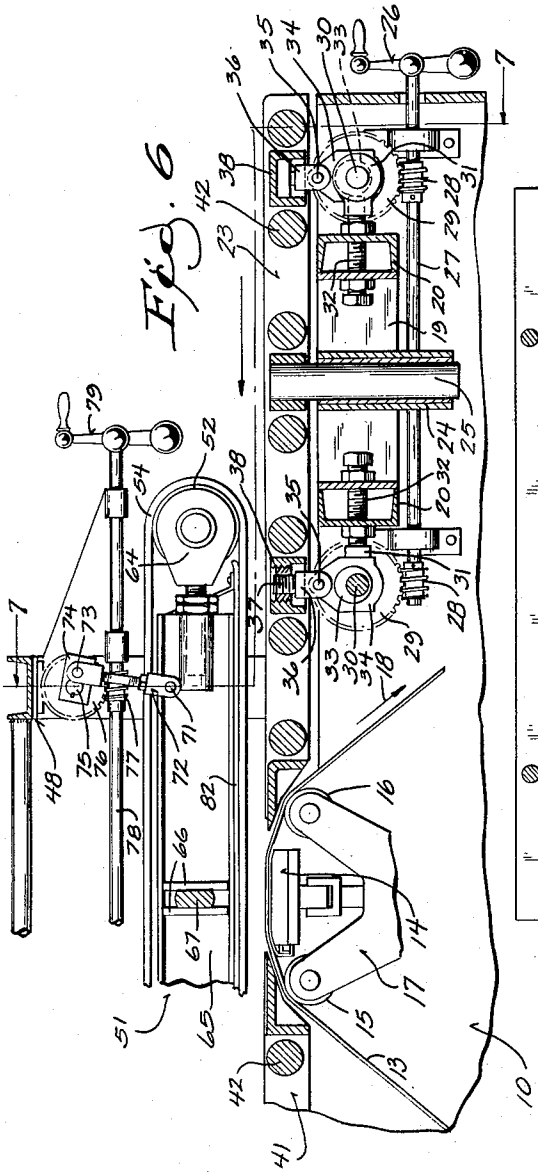
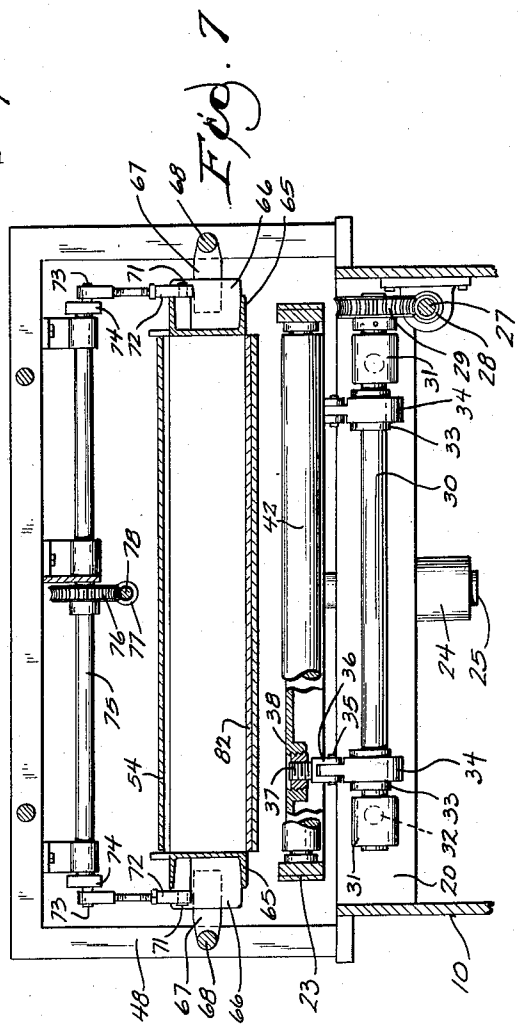


Fig. 7



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FLAT BED FINISHING MACHINE

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9 Claims. (Cl. 51—137)

This invention relates to a flat bed finishing machine.

Flat bed finishing machines such as sanders heretofore known commercially are subject to the defect of marking the work. Such commercially known sanders typically rely simply upon a single roller above the sanding head to back up the flat workpiece traveling through the machine. It is believed that the single roller which characterizes the prior art machines does not provide sufficient backing for the workpiece, thus permitting the workpiece to vibrate as it passes through the machine and cause "bounce" marks on the otherwise finished flat surface of the workpiece.

In the device of the present invention the workpiece is provided with backing which extends both to the front and the rear of the finishing zone as well as over the finishing zone for very firm backing support for the workpiece. In the device of the present invention the workpiece is effectively immobilized against movement transverse to the direction in which it is fed. Accordingly, workpieces processed on the machine of the present invention are not subject to vibration and do not exhibit "bounce" marks on their finished surfaces but on the contrary have perfectly smooth, unmarked finished surfaces.

Other advantages and objects of the invention will be more apparent upon examination of the following disclosure in which:

Fig. 1 is a side elevation of a machine embodying the present invention, portions being broken away to expose structural details.

Fig. 2 is a plan view of the device of Fig. 1.

Fig. 3 is a diagrammatic fragmentary view showing a modification in the structure of the workpiece back-up apparatus.

Fig. 4 is a diagrammatic fragmentary view of a further modification in the workpiece back-up apparatus.

Fig. 5 is a greatly enlarged detailed view, partly in cross section, showing the adjustable mounting of the rollers on the front and rear work support tables.

Fig. 6 is a fragmentary cross sectional view taken along the line 6—6 of Fig. 2 and showing the details of the mechanism for adjusting the height of the front roller table.

Fig. 7 is a fragmentary cross sectional view taken along the line 7—7 of Fig. 6.

In general the machine comprises a main support frame 10 upon which are mounted driving drum 11 and idler drum 12 for the finishing tool which in the embodiment illustrated is a sanding belt 13. The sanding belt 13 is trained over a conventional sanding head 14 and over the idler guide rollers 15, 16 which are supported on the respective arms of a Y-shaped bracket 17. The sanding belt 13 is driven by drum 11 in the direction of arrow 18. Driving drum 11 receives power through belt 21 from motor 22.

At the front or workpiece input side of the machine an adjustable roller frame or table 23 is provided. The table 23 is guided for vertical movement on the hollow post 24, the table being provided with a pin 25 telescopically receivable within the post. Hollow post 24 is welded in upright position to the side face of cross member 19 which has its ends welded to the box section cross beams 20. The ends of cross beams 20 are anchored to the stationary frame elements 10. The vertical position of table 23 is determined by the adjustment of crank 26 at the end of shaft 27 having worms 28 meshing with worm wheels 29 respectively provided with cross shafts 30 provided with eccentric cams 33 about which cam straps 34 are disposed. Shafts 30 are adjustably carried on journals 31 supported laterally from the cross beams 20 on threaded bolts 32. The cam straps are pinned at 35 to links 36 having threaded connections at 37 to cross members 38 mounted on the table 23. Accordingly, the elevation of table 23 is readily adjusted by turning crank 26 to oscillate the respective eccentric cams 33. This adjustment determines the depth of cut of the sanding belt.

The rear workpiece support table 41 is fixed with respect to the frame 10.

Both front and rear workpiece support tables 23, 41 are provided with cross rollers 42 individually adjustably mounted in the respective frames as illustrated in Fig. 5. Each roller 42 has a shaft 43 rotatably mounted at each end in bearing blocks 44. The bearing blocks 44 have extending threaded studs 45 which are eccentric to the axis of roller rotation. The bearing blocks 44 are clamped to the sides 46 of the respective frames by nuts 47. Accordingly, the position of each roller is individually adjustable by rotating the bearing blocks 44 and clamping the nuts 47. In this manner the individual rollers 42 may be mutually leveled to provide an absolutely flat surface on which the flat workpiece is supported.

The machine is further provided with upright fixed standards or masts 48 upon which a workpiece drive conveyor and back-up mechanism indicated generally by reference character 51 is adjustably mounted. The conveyor consists of end rollers 52, 53 about which workpiece drive belt 54 is trained. Roller 53 is driven through a gear box 55 which receives power through flexible coupling 56, from shaft 57, pulley 58 and belt 59 which is reeved about the pulley 62 of electric motor 63.

The respective rollers 52, 53 are supported on end journals 64 attached to the respective ends of laterally spaced side plates 65 which span between the journals 64. Each side plate is provided with vertically elongated guide ribs 66 between which is received a guide lug 67 mounted on a cross member 68 fixed to the standards 48.

Accordingly, the respective plates 65 are free to move vertically as guided by the engagement of lug 67 between the guide ribs 66 thereon. The plates 65 are further pivotally connected on pins 71 to adjustable length, link arms 72 having their other ends pivotally connected on pins 73 to crank arms 74 mounted on cross shafts 75. At their midpoints shafts 75 are provided with worm wheels 76 meshing with the worms 77 on shaft 78 on the end of which is provided a crank 79.

Accordingly, by rotating the crank 79, the links 72 can be raised and lowered to correspondingly raise and lower the side plates and the conveyor belt 54 trained over drums 52, 53.

In the embodiment of the invention shown in Fig. 1, the lower edges of the side plates 65 are cross connected by a flat smoothly finished guide plate, apron, or shoe 82. The side plates 65 and shoe 82 overlap materially both the front and rear workpiece support tables 23, 41. Accordingly, a workpiece 83 traveling through the machine will be firmly backed both in the sanding area in the vicinity of sanding head 14 and to the front and rear thereof. In practice the shoe 82 extends at least about

eighteen inches to the front and rear of the sanding head **14**.

In effect the workpiece is clamped against vibration throughout its area beneath the shoe **82**. The rigid backing thus provided completely immobilizes the workpiece against vibration. Accordingly, such stresses as are induced in the workpiece by the action of the sanding belt are absorbed by the clamping parts aforesaid and there are no unbraced portions of the workpiece close enough to the sanding head to vibrate thereagainst. Accordingly, bounce marks are completely eliminated in the device of the present invention.

As shown in Fig. 1 it is desirable to feed the workpiece **83** under drive of the belt **54** against the direction in which the sanding belt **13** is driven. The adjustment of table **23** as aforesaid will accurately gauge the thickness of the material removed from the workpiece by action of the sanding belt **13**, the workpiece being firmly clamped against vibration as aforesaid.

In Figs. 3 and 4 alternative embodiments of back-up mechanism are illustrated. In Fig. 3 the side plates **84** which span between the rollers **52**, **53** about which the driving belt **54** is trained are provided above the sanding head **14** with a back-up plate or shoe **85** having a smooth undersurface across which the drive belt **54** travels. However, to the front and rear of the shoe **85** the drive belt **54** is supported at spaced intervals against rollers **86**. Accordingly, a workpiece **83** traveling through the machine is clamped between oppositely disposed rollers **42** and **86** except above the sanding head **14** where the workpiece is supported by the plate **85**.

In Fig. 4 the side plates **87** are provided solely with back-up rollers **88** even above the sanding head **14**. The devices shown in Figs. 3 and 4 offer less friction to the travel of the drive belt **54** and in many instances provide sufficient backing for the workpiece to immobilize it against vibration.

The sanding belt **13** shown herein is merely illustrative of finishing tools which the machine is adapted to employ. Abrading, rubbing, polishing, buffing etc. tools in web or belt form may be substituted for the sanding belt, at the option of the operator.

I claim:

1. A finishing machine for flat workpieces comprising front and rear work support tables, a finishing head intermediate said tables and means spaced laterally from said tables and finishing head for immobilizing a workpiece against vibration transverse to its direction of travel through the machine, said means including workpiece supports overlapping materially both said tables for concurrently firmly supporting said workpiece in the finishing zone and to the front and rear thereof.

2. The device of claim 1 in which said front work support table is provided with means for supporting it adjustably with respect to the finishing head.

3. The device of claim 1 in which said front and rear work support tables are provided with rollers and means for individually adjusting said rollers for mutual alignment thereof.

4. The device of claim 1 in which said means further includes a power driven belt conveyor for advancing the workpiece over said table and against the finishing head.

5. The device of claim 4 in which said means further includes a shoe having a smooth undersurface over which said conveyor belt travels.

6. The device of claim 4 in which said means further includes a series of supporting rollers over which the conveyor belt travels.

7. A finishing machine for flat workpieces comprising separate front and rear work support tables having rollers thereon, a finishing head intermediate said tables and a workpiece conveyor adjustably spaced above the level of said tables and said finishing head and comprising a conveyor belt materially overlapping both of said tables and including belt support means for backing said belt in the finishing zone and to the front and rear thereof and substantially immobilize a flat workpiece against vibration transverse to its direction of travel through the machine.

8. The device of claim 7 in which said conveyor is provided with means for adjusting its elevation with respect to said tables and finishing head.

9. The device of claim 8 in which said front table is provided with means for adjusting its elevation with respect to said finishing head.

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