Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

Filed April 11, 1947 8 Sheets-Sheet 1

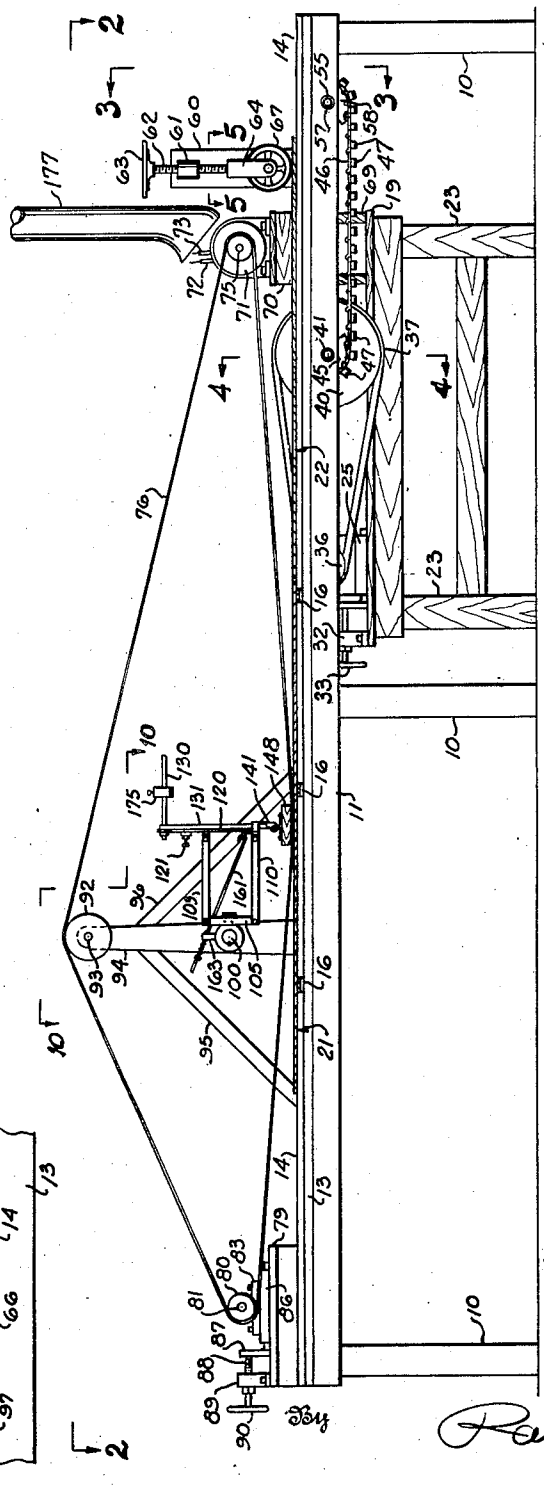


FIG-1

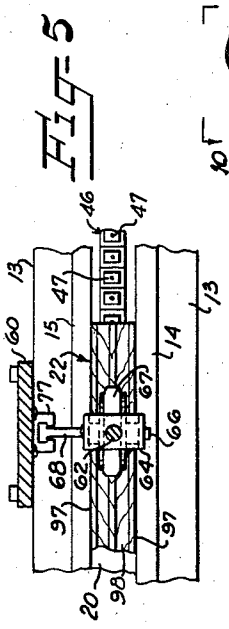


FIG-5

LINVILLE L. ROTHROCK,
Inventor.

Roy Eaton

Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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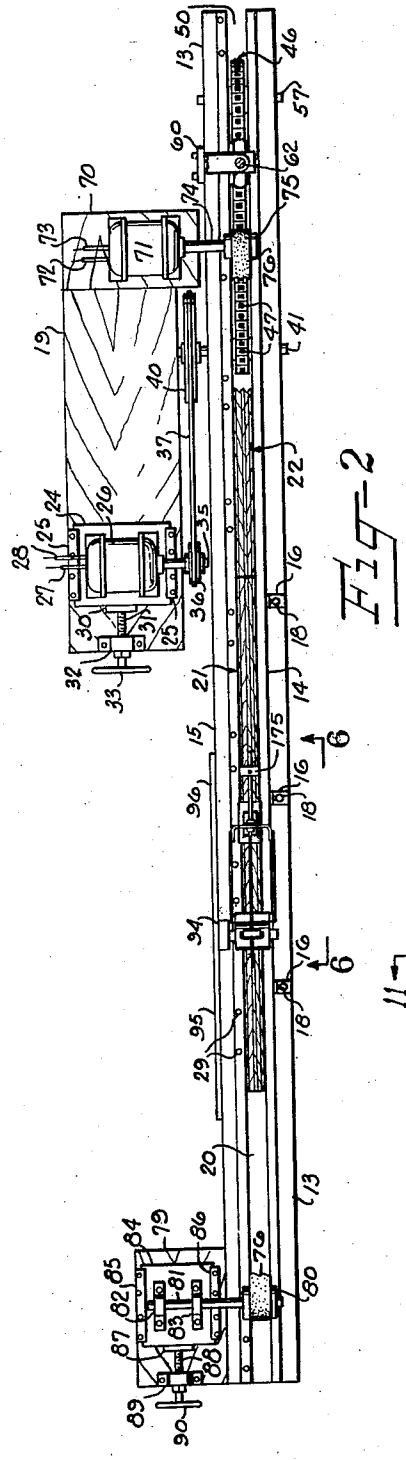


FIG-2

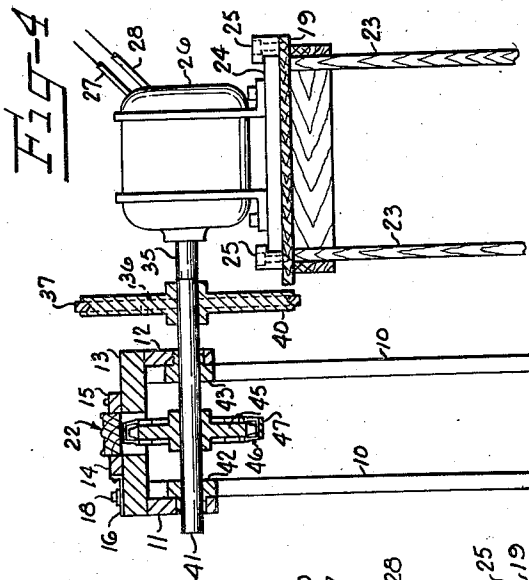


FIG-4

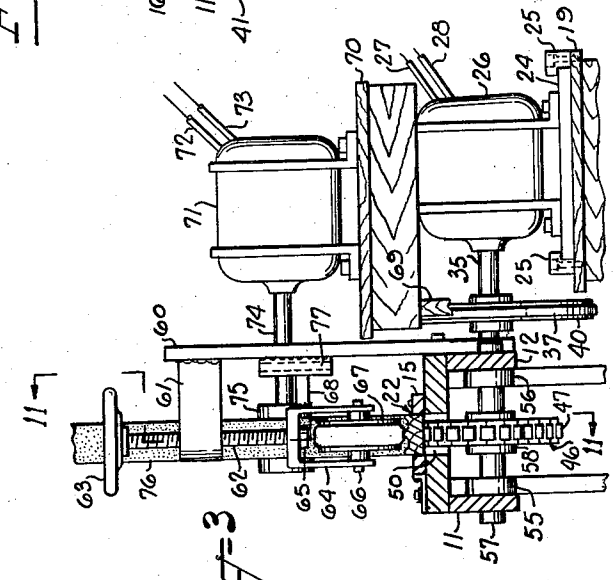


FIG-3

LINVILLE L. ROTHROCK,
Inventor.

By Paul B. Eaton

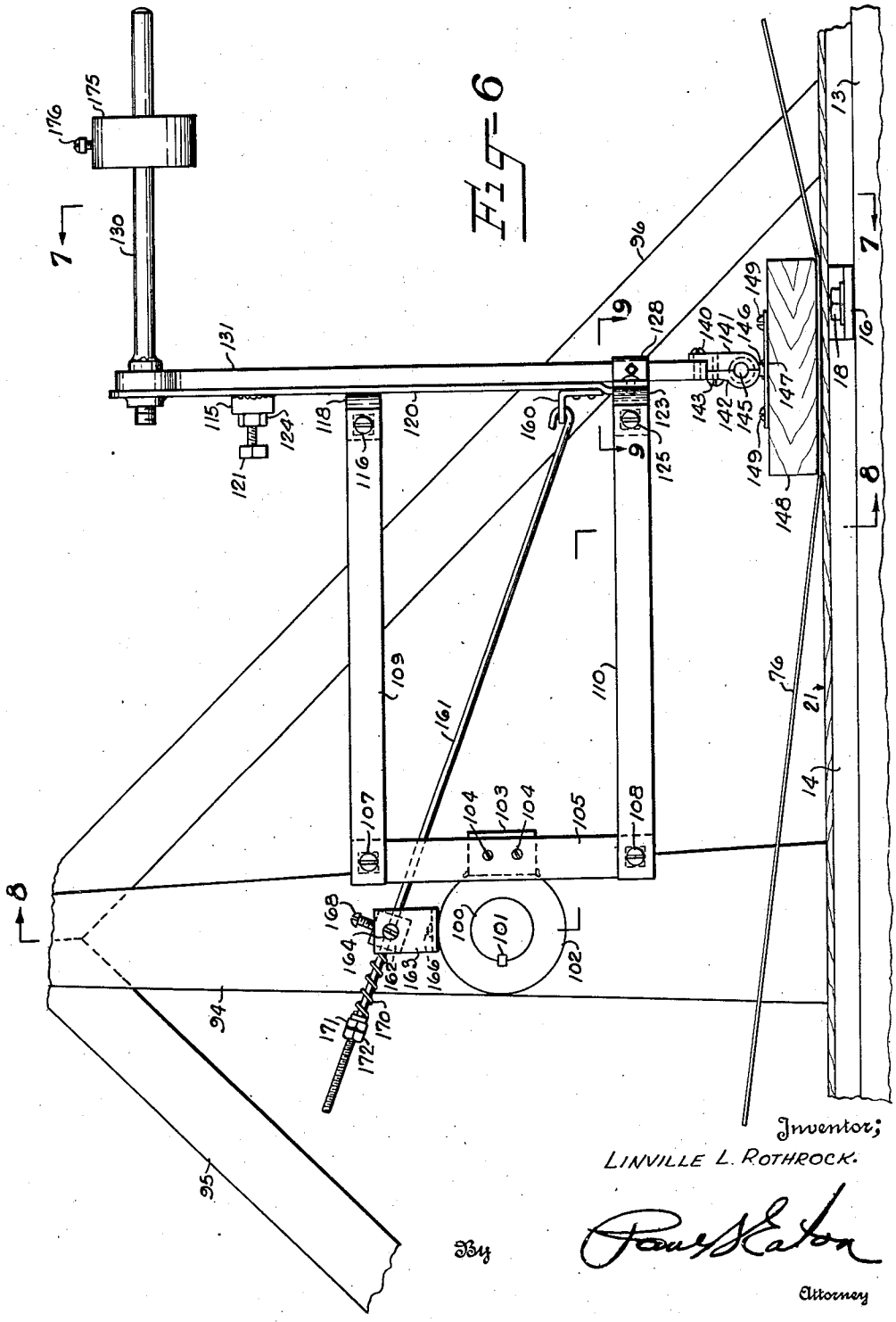
Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

Filed April 11, 1947 8 Sheets-Sheet 3

Fig. 6



Inventor;
LINVILLE L. ROTHROCK.

By Paul Eaton

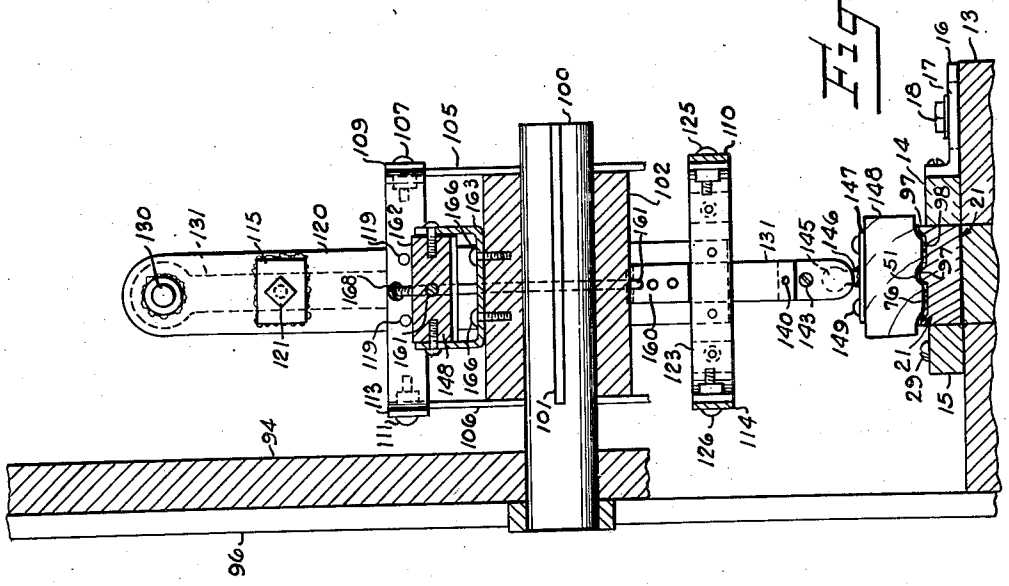
Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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FIG-8



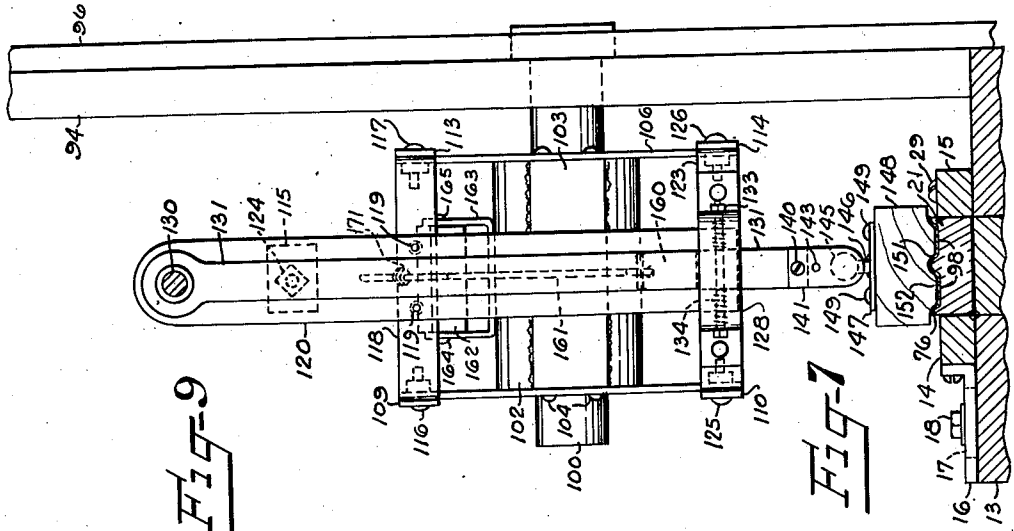
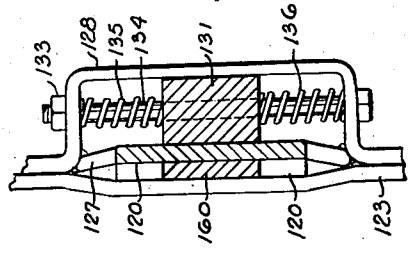


FIG-7

FIG-9



LINVILLE L. ROTHROCK,
Inventor.

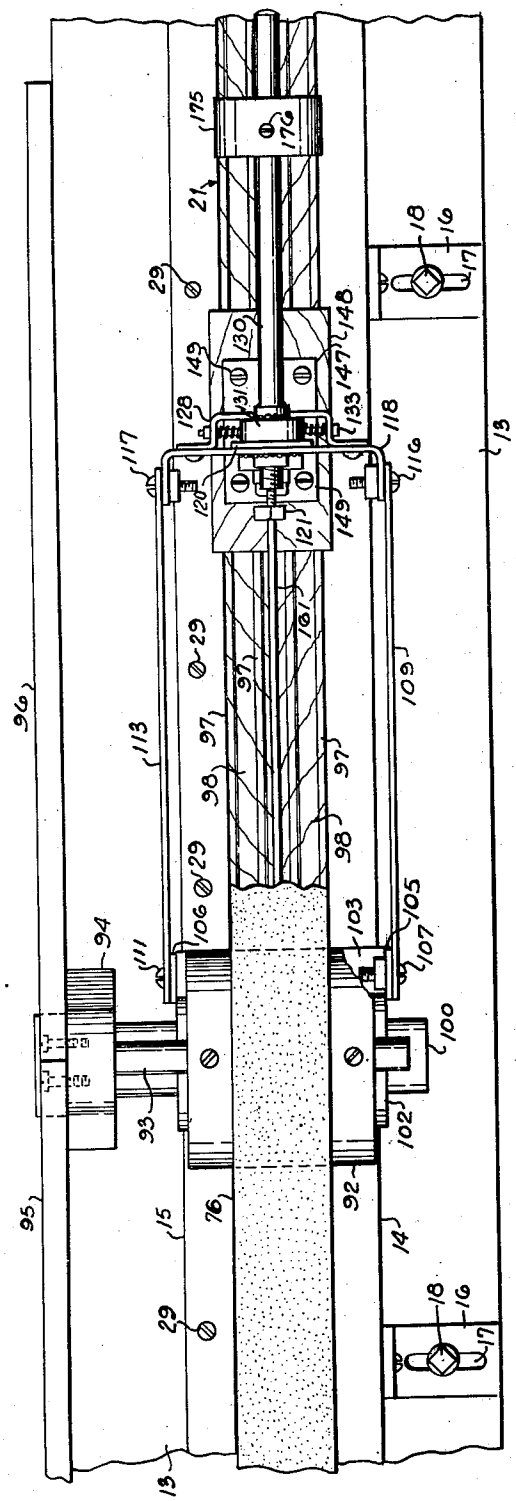
By

Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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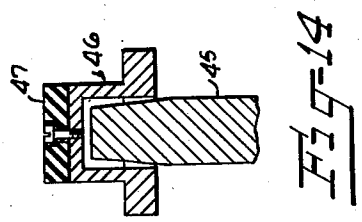


FIG-14

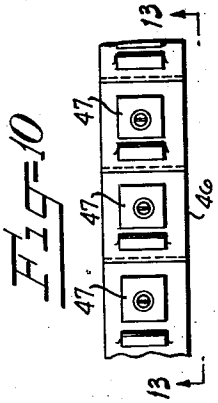


FIG-10

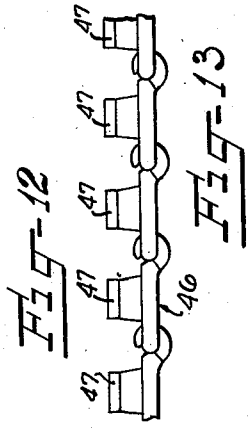


FIG-12

FIG-13

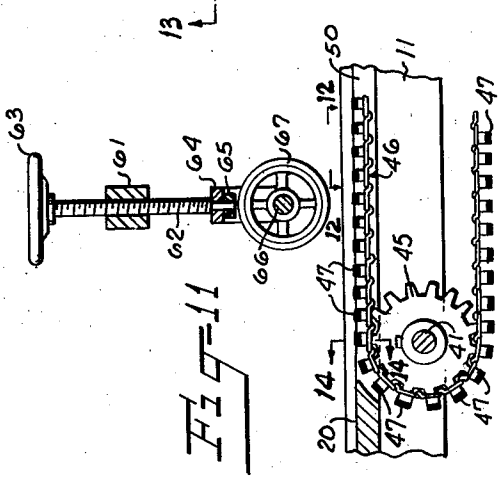


FIG-11

Inventor:
LINVILLE L. ROTHROCK.

By

Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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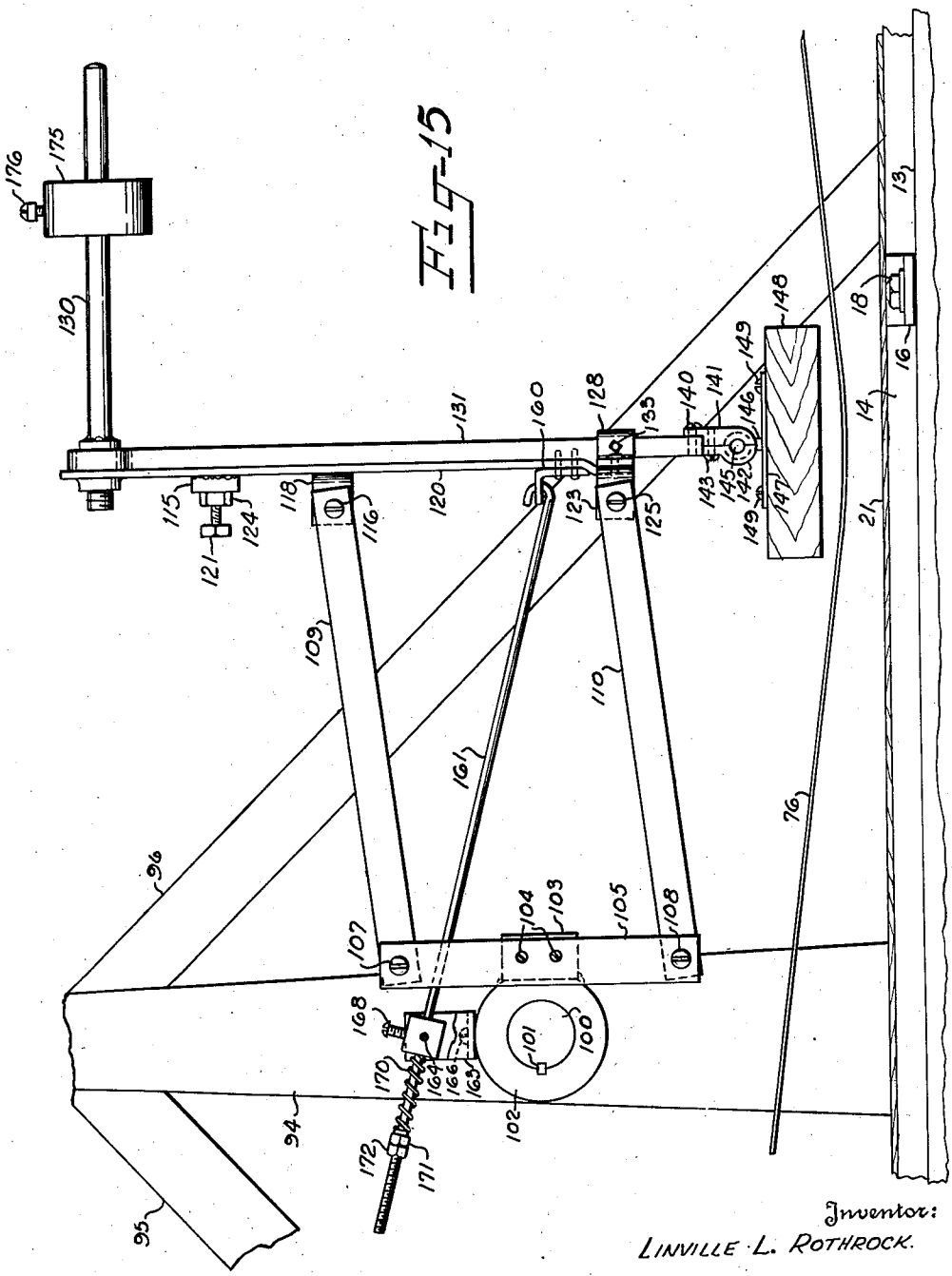


Fig-15

Inventor:
LINVILLE L. ROTHROCK.

By Paul Eaton

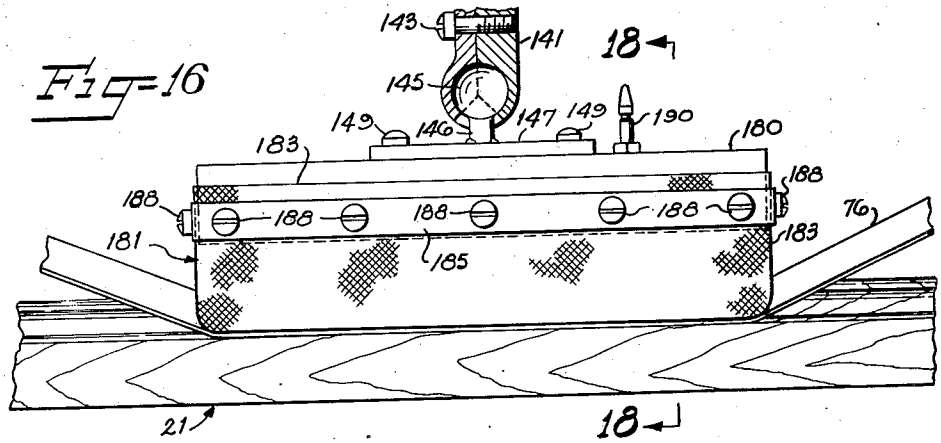
Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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Fig-16



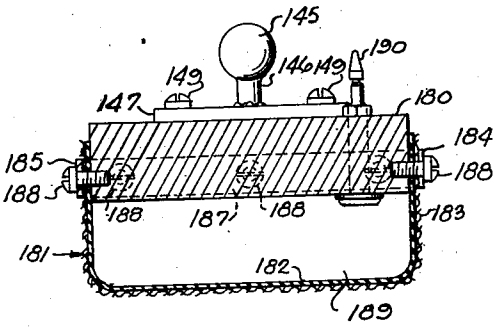


Fig-17

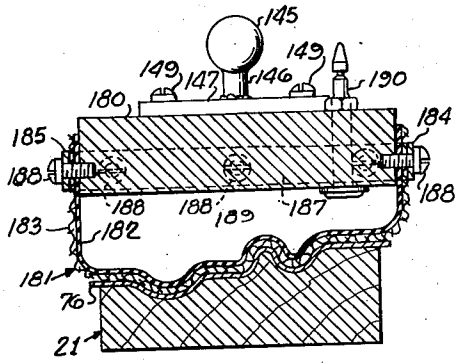


Fig-18

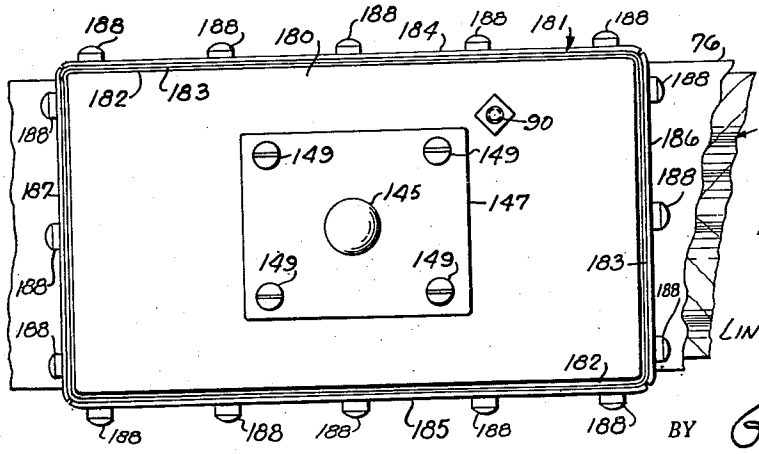


Fig-19

LINVILLE L. ROTHROCK,
INVENTOR.

BY Raul Eaton

Attorney

Dec. 14, 1948. L. L. ROTHROCK 2,456,217

SANDING MACHINE

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Fig-20

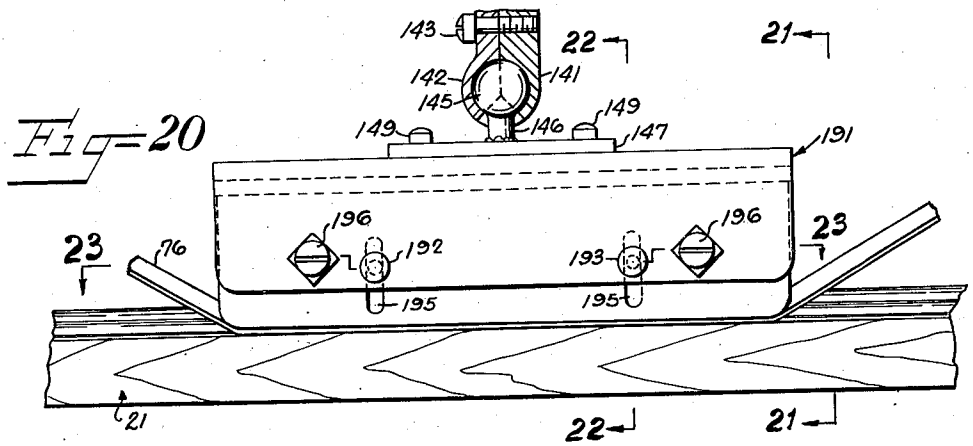


Fig-21

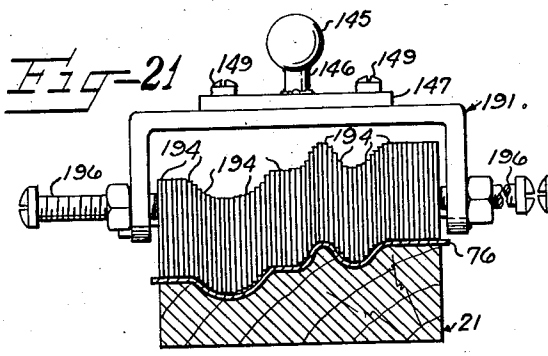
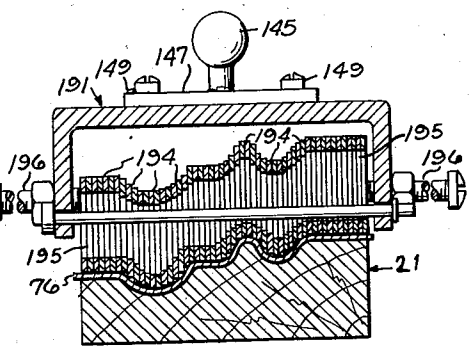


Fig-22



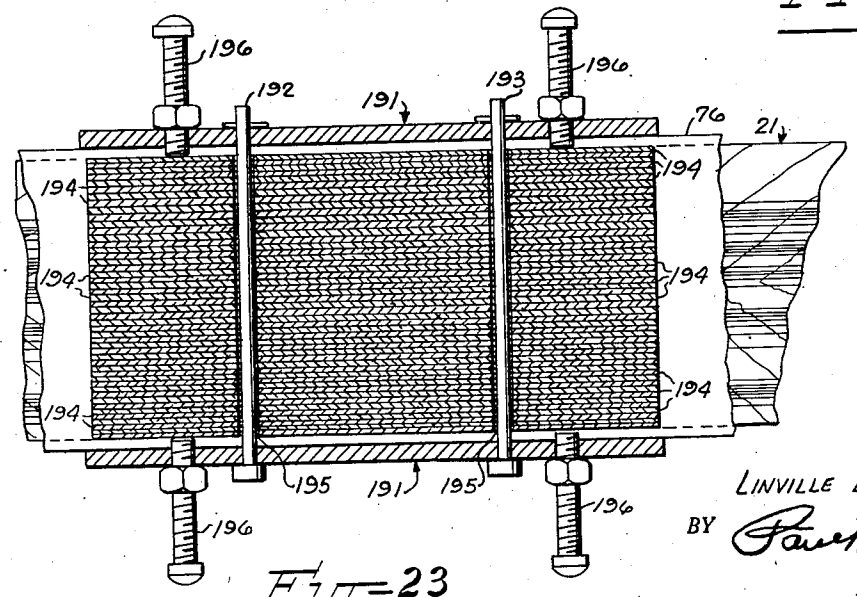


Fig-23

INVENTOR:
LINVILLE L. ROTHROCK.
BY Paul Eaton
Attorney

Patented Dec. 14, 1948

2,456,217

UNITED STATES PATENT OFFICE

2,456,217

SANDING MACHINE

Linville L. Rothrock, Thomasville, N. C.

Application April 11, 1947, Serial No. 740,924

5 Claims. (Cl. 51—138)

1

This invention relates to a sanding machine and more especially to a sanding machine capable of sanding uneven surfaces such as moldings, corrugated strips of material, and in fact, any type of material having an uneven surface and which has heretofore been very difficult to sand or polish the surface thereof.

It is an object of this invention to provide a machine equipped with an elongated endless belt of flexible abrasive material and having a guide way disposed below the belt for guiding a strip of material with pressure means for pressing the belt during its rotation into engagement with the surface to be sanded together with feeding means for feeding members beneath the belt to be sanded in a continuous operation.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which

Figure 1 is a side elevation of the machine;

Figure 2 is a top plan view of the machine taken along the line 2—2 in Figure 1 and omitting the suction tube;

Figure 3 is a vertical sectional view taken along the line 3—3 in Figure 1;

Figure 4 is a vertical sectional view taken along the line 4—4 in Figure 1;

Figure 5 is a sectional plan view taken along the line 5—5 in Figure 1;

Figure 6 is an elevation of the left-hand central portion of Figures 1 and 2 and being taken along the line 6—6 in Figure 2;

Figure 7 is an elevation with portions in section, and taken along the line 7—7 in Figure 6;

Figure 8 is a vertical sectional view taken along the line 8—8 in Figure 6;

Figure 9 is a sectional plan view taken along the line 9—9 in Figure 6;

Figure 10 is a top plan view taken along the line 10—10 in Figure 1;

Figure 11 is a vertical sectional view taken along the line 11—11 in Figure 3, with parts removed;

Figure 12 is a top plan view on an enlarged scale, and taken along the line 12—12 in Figure 11;

Figure 13 is an elevation looking from the lower side or along the line 13—13 in Figure 12;

Figure 14 is a vertical sectional view taken along the line 14—14 in Figure 11;

Figure 15 is an enlarged detail elevation similar to Figure 6, but showing the parts in raised position;

Figure 16 is a side elevation of the modified form of pressure applying means for engaging the abrasive belt;

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Figure 17 is a vertical, transverse sectional view through the apparatus shown in Figure 16 before it is placed in engagement with the abrasive belt;

Figure 18 is a vertical sectional view taken along the line 18—18 in Figure 16, and showing the pressure applying member pressing the abrasive belt into engagement with the workpiece;

Figure 19 is a top plan view of Figure 16;

Figure 20 is a side elevation of still another modified form of the pressure applying member;

Figure 21 is a view partly in elevation and partly in section and taken along the line 21—21 in Figure 20;

Figure 22 is a vertical sectional view taken along the line 22—22 in Figure 20;

Figure 23 is a sectional plan view taken along the line 23—23 in Figure 20.

Referring more specifically to the drawings, the numeral 10 indicates the legs of a suitable framework having side panels 11 and 12 extending from one end to the other thereof and supported on top of these side panels 11 and 12 is an elongated bedplate 13. This bedplate 13 has a pair of guide strips 14 and 15. The guide strip 14 is adjustably secured on the top surface of bedplate 13 by means of suitable brackets 16 being secured to the outer wall of the guide strip 14. The guide strip 15 is mounted on bedplate 13 by a plurality of screws 29. Each of the brackets in its horizontal leg has an elongated slot 17 penetrated by a screw 18 imbedded in the bedplate 13, whereby the strip 14 can be adjusted towards and away from strip 15 to provide a channel 20 to suit the width of workpieces such as 21, 22 and the like, which are being fed through the apparatus.

Adjacent the legs 10 and the bedplate 13 and to one side thereof is a table 19 supported by suitable legs 23 and on which is slidably mounted a plate 24 by guide ways 25 and on which plate an electric motor 26 is mounted, said motor having extending therefrom wires 27 and 28 to a suitable source of electrical energy, not shown. The bedplate 24 has a projection 30 extending from one side thereof in which one end of a threaded rod 31 is rotatably mounted, said threaded rod 31 being threadably mounted in a bearing 32 and having a hand wheel 33 thereon for adjusting the motor 26 along with its bed plate 24 back-and-forth along the top of table 19.

The motor 26 has extending therefrom a motor shaft 35 on which is mounted a V-pulley 36 which has mounted thereon a V-belt 37, which V-belt 37 is mounted on a V-pulley 40 secured on a shaft 41 which is rotatably mounted in bearing blocks 42 and 43 secured on the exterior surfaces of side members 11 and 12. This shaft 41 has fixedly mounted thereon a sprocket wheel 45 on which is

mounted a sprocket chain 46 having rubber cleats or rubber blocks 47 on the outside surface thereof for engaging the workpieces and feeding them through the apparatus. The sprocket wheel 45 projects upwardly into an elongated slot 50 in the bed plate 13, and also the upper portion of the sprocket chain 46 has movement in this slot 50.

Rotatably mounted in bearing blocks 55 and 56, secured on the exterior surfaces of side members 11 and 12, is a shaft 57 on which is fixedly mounted a sprocket wheel 58 and on which the sprocket chain 46 is also mounted. The sprocket wheels 45 and 58 are of the same size so as to cause the upper portion of the sprocket chain to occupy a horizontal position in the groove 50.

Secured to one edge of the bed plate 13 and to the side plate 12 and rising upwardly therefrom is a bracket 60 having a laterally projecting portion 61 which has a vertical threaded hole therethrough in which is threadably mounted a shaft 62 having a hand wheel 63 on its upper end. The lower end of this shaft 62 is shouldered (Figure 11) and penetrates an inverted U-shaped bracket 64 and a collar 65 rotatably confines the bracket 64 on the lower end of the shaft 62. The free ends of the inverted U-shaped bracket 64 have fixedly mounted therein a shaft 66 on which is rotatably mounted a rubber-rimmed pressure wheel 67 which is adapted to press against the upper surfaces of the workpieces such as 21 and 22 which are being fed into the machine. Welded to the inverted U-shaped member 64 is a T-shaped arm 68 which is mounted for vertical sliding movement in a dove-tailed member 77 welded to the bracket 60.

Suitable legs 69 project upwardly from the table 22 and support a platform 70 on which is mounted an electric motor 71 having wires 72 and 73 extending therefrom to any suitable source of electrical energy, not shown. The motor 71 has a shaft 74 extending therefrom on which is fixedly mounted a pulley 75 and which has mounted thereon an endless abrasive belt 76. This abrasive belt 76 has abrasive on the exterior surface thereof and is usually sand paper or cloth or emery paper or cloth and the like.

Secured to one edge of the bed plate 13 and to the side plate 12 is a platform 79 having bearings 82 and 83 in which is rotatably mounted a shaft 81 having a pulley 80 thereon on which the abrasive belt 76 is also mounted. The platform 79 has slidably mounted on its upper surface a plate 84 on which the bearings 82 and 83 are mounted, and one edge of this plate 84 has a block 87 affixed thereto in which is rotatably mounted one end of a threaded shaft 88 which is also threaded in a bearing 89 extending upwardly from the platform 79. The threaded shaft 88 has a hand wheel on one end thereof whereby the position of the pulley 80 can be adjusted longitudinally of the machine to take up any slack in the endless belt 76.

There is also provided an idler pulley 92 rotatably mounted on a shaft 93 which projects from one side of a vertically disposed bar 94 which is affixed to one edge of the bed plate 13. Suitable braces 95 and 96 are also secured to the vertically disposed bar 94 and to the edge of bed plate 13 and to the side member 12 for supporting the bar 94.

In order to apply the abrasive belt to the uneven surfaces of a workpiece, certain pressure applying means are provided. It might be pointed out that the workpieces are usually of irregularly shaped molding having projecting ribs 97 and depressions 98 between the ribs and a flexible endless belt is necessary and also suitable pressure applying means are necessary to apply the belt to the surface to be sanded while the belt is moving and also while the workpiece is moving at a much slower speed than the belt. It is of course evident that the sprocket chain 46 is travelling at a constant rate of speed and from right-to-left in Figures 1 and 2 and the lower surface of the sanding belt 76 is also travelling in a clockwise direction in Figure 1.

Projecting laterally from bar 94 is a shaft 100 which has keyed thereon by a suitable key 101 a hub member 102. The hub 102 has projecting from one side thereof a portion 103 to which is secured by screws 104 vertically disposed bars 105 and 106. Pivoted on bar 105 by means of bolts 107 and 108 are links 109 and 110. The vertically disposed bar 106 has pivoted on screws 111 and 112, links 113 and 114, respectively. The free ends of the links 109 and 113 are pivoted by means of screws 116 and 117 to a bar 118 which is secured by any suitable means such as screws 119 to a vertically disposed bar 120. The lower end of this bar 120 has likewise affixed thereto by means of screws 122 a similar bar 123 having its ends turned rearwardly towards the shaft 100 to which the free ends of links 110 and 114 are pivoted by means of screws 125 and 126. On the forward surface of bar 120 near the lower end thereof is welded a plate 127 as shown in Figure 9, and also riveted to bar 123 is a flattened U-shaped member 128. In the upper end of bar 120 is slidably secured one end of a shaft 130 on which is pivotally mounted a bar 131 which projects downwardly and passes between the flattened U-shaped bar 128 and the plate 127. Disposed halfway between the shaft 130 and the U-shaped bar 128 and welded to the vertically disposed bar 120 is a lug 115. An adjustment screw 121, having a lock nut 124 thereon threadably penetrates the lug 115 and the bar 120 and the end of the screw 121 presses against the bar 131 for adjusting the same forwardly to raise the forward end of block 148. The U-shaped bar 128 has passing therethrough a pin 134 which penetrates a bolt 133 which slidably penetrates the bar 128 and disposed on this bolt 123 are compression springs 135 and 136 which tend to center the vertically disposed bar 131. The lower end of bar 131 has secured thereon by means of a bolt 140 one-half of a socket 141 and secured to this half socket 141 by means of a screw 143 is another half socket 142. The two sockets confine a ball 145 on the upper end of a stem 146 which has a platelike portion 147 which is secured to a block 148 by means of screws 149.

The block 148 is preferably made of wood to prevent its heating up under the friction of the belt. The lower surface of this block has grooves 151 therein and projections 152 therebetween which are the male portion coinciding with the female portion which is the workpiece 21 or 22 being operated upon. This universal joint is preferable to allow the front end of the block 148 to move upwardly or downwardly to conform to the configuration of the workpiece. The tension springs 135 and 136 tend to hold the workpiece in the right position, but allow it to move laterally to conform to any uneven configuration of the projections or grooves of the workpiece.

The bar 120 has a lug 160 secured thereto and pivotally secured to this lug is a bar 161 which penetrates a block 162 oscillatably mounted in a U-shaped member 163 by means of bolts or pivot pins 164 and 165. The U-shaped member 163

is secured to the hub 102 by any suitable means such as screws 166. The oscillatable member 162 has a set screw 168 therein for engaging the link 161 when it is desired to hold the block 148 in elevated position as shown in Figure 15 when not in operation. The link 161 has mounted around the left-hand portion thereof the armed block 162 a compression spring 170 which is confined by a nut 171 and a jamb nut 172 for adjusting the tension thereon. The spring 170 can be of any desired strength and when light pressure is desired to be applied to the workpiece, the weight 175 can be removed and nuts 171 and 172 can be adjusted to place the desired compression on the spring 170 to thus prevent too much pressure from being applied to the abrasive belt from the weight of the pivoted frame.

The threaded shaft or rod 130 has slidably mounted thereon a weight 175 which can be adjusted along the rod 130 by a set screw 176 to exert the proper amount of leverage or pressure on the block 148 during a sanding operation.

A vertically disposed suction pipe 77 is shown in Figure 1 for drawing particles of abrasion dust away from the abrasive belt 76.

Instead of having a solid pressure applying member such as shown in the assembled drawings, if desired, I may provide a block 180 which has the bracket 147 secured thereto by the screws 149 and having the ball 145 adapted to be engaged by the clamping members 141 and 142 as shown in the assembled drawings. This block has secured to its side and end walls a flexible diaphragm 181 which is preferably composed of a sheet of rubber 182 faced with an impregnated fabric 183. The edges of this diaphragm 181 are disposed against the sides and the ends of the block 180 and are secured in airtight condition to the sides and ends of the block 180 by means of side strips 184 and 185 and end strips 186 and 187 by any suitable means such as screws 188. This forms an air chamber 189 through which air is admitted through a conventional automobile innertube valve stem 190. Compressed air can be admitted to the chamber 189 in the same manner as compressed air is admitted to the interior of an automobile tube until the desired pressure of say 10 to 15 lbs. per inch pressure has been built up in the chamber 189 or whatever pressure is necessary for the particular work which is being done. It is thus seen that this diaphragm 181 will conform to the undulations of a workpiece such as 21 and it will thus force the abrasive belt 76 into engagement with the ridges and grooves on the face of the workpiece.

In Figures 20 to 23, inclusive, still another modified form of the invention is shown in which an inverted U-shaped member 191 is provided, which likewise has the bracket 147 with its ball 145 thereon and the downwardly projecting legs of the member 191 are penetrated by pins 192 and 193 and mounted for up-and-down movements on these pins 192 and 193 is a plurality of thin sheet members or strips 194.

Each of these strips 194 has two vertically disposed slots 195 therein which are penetrated by the pins 192 and 193.

Mounted in the downwardly projecting legs of the U-shaped member 191 are the screws 196 which when driven home are adapted to press the strips 194 together and hold them in any position which they may assume when they are placed in engagement with a workpiece such as 21 and conform to the surface of the workpiece as shown in Figures 21 and 22. When it is desired to adapt this pressure applying member to a particular workpiece, all that is necessary is to loosen the screws 196 and place the assembly on top of the workpiece, and the parts will assume the position shown in Figures 21 and 22. Then the screws 196 are driven home to clamp the plates 194 in the position shown in Figures 21 and 22, and due to the fact that plates 194 will be pressed into close engagement with each other, the overall width would probably be slightly decreased and during this tightening of the screws 196 the member 191 would be manipulated by moving it relative to the workpiece and raising it up and down so as to cause perfect conformation of the lower edges of the strips of plates 194 with the contour of the workpiece.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In an abrading machine for abrading an uneven surface such as molding strips and the like, a platform, said platform having a longitudinally extending groove therein along which strips are adapted to be moved, an endless conveyor associated with the intake end of said groove for engaging strips of material to be abraded and feeding them along said groove, a pressure roller for pressing the strips being fed against said endless conveyor, a motor mounted near one end of the platform and having a pulley thereon, an idler pulley mounted near the other end of the platform and means for adjusting the idler pulley longitudinally of the platform, a vertically disposed bar extending from one side of the platform and having an idler pulley thereon, an endless abrasive belt mounted on said pulleys and driven at a faster rate than the strips of material, pivoted means mounted on said vertically disposed bar and having a pressure member for engaging the non-abrasive side of said abrasive belt and pressing it against the strips being passed along said groove in said platform, the lower surface of said pressure member being grooved to conform to the configurations of the upper surface of the strips being passed along said groove, whereby the abrasive belt will be pressed into contact with all portions of the upper surface of said strips as they are fed along said groove, the electric motor having the pulley thereon on which the abrasive belt is mounted serving to impart movement to the abrasive belt with the lower reach of the belt moving in the same direction of travel as the strips are traveling through said groove.

2. An abrading machine comprising an elongated table having a longitudinally disposed groove extending from one end of the table to the other, an endless conveyor mounted in the table and having its upper reach also mounted in one end of the groove and onto which workpieces are adapted to be placed to move them along said groove, a motor driven pulley mounted near one end of the table above said groove, an idler pulley mounted near the other end of the table above said groove, a second idler pulley mounted a substantial distance above the table and intermediate the ends thereof, an abrasive belt mounted on all of said pulleys, the lower reach of the belt extending in substantially parallel relation to the upper surface of the table, a pivoted framework

disposed above the table and having a pressure applying member adapted to engage the upper surface of the lower reach of said abrasive belt for holding the abrasive belt in contact with the upper surfaces of the workpieces as they are moved along said groove, the lower face of the pressure applying member being grooved to agree with the configurations of the upper surface of the workpieces being passed along said groove, said pressure applying member being mounted for universal movement on said pivoted framework for allowing its lower surface to conform to unevenness in the upper surface of the workpieces, said pivoted frame having a lever arm extending therefrom and a weight adjustable along said lever arm for regulating the pressure of said workpiece, said pivoted frame also having a slidable rod associated therewith and means for securing said rod in adjusted position to hold the pressure applying means out of contact with the abrasive belt when desired, said slidable rod having a tension spring associated therewith biased to counteract the weight on said lever to thereby provide a resilient movable mounting for said pivoted framework.

3. In a sanding machine for polishing one side of a workpiece, means for feeding the workpieces longitudinally of the machine, an abrasive belt extending longitudinally of the machine, an idler pulley near one end of the machine on which the abrasive belt is mounted, a motor driven pulley near the other end of the machine on which the abrasive belt is mounted, a second idler pulley disposed a substantial distance above the machine and over which the upper reach of the abrasive belt travels, a pivoted framework mounted at one end above the framework, the other end of the pivoted framework having a pressure applying member adapted to engage said belt and force it into contact with the workpieces as they move longitudinally of the machine, the pivoted framework having extending therefrom a lever arm and a weight adjustably mounted on the lever arm for regulating the amount of pressure applied to the pressure applying member to be in turn applied to the abrasive belt to hold it in contact with the upper surface of the workpieces, the lower surface of the pressure applying member being grooved to conform to the grooves and projections on the upper surface of the workpiece, a link having one end pivotally mounted to the free end of the pivoted framework and having its other end slidably mounted in a fixed portion of the machine, a tension spring associated with said link for normally urging the free end of the pivoted framework away from the abrasive belt but not being sufficient to overcome the pressure exerted by the adjustable weight on said lever, and means associated with said link for engaging the link when the pivoted framework is raised on its pivot to hold the pivoted framework in elevated position whereby its pressure applying member will be held out of contact with the abrasive belt.

4. In a sanding machine having a table with a groove extending longitudinally thereof through which workpieces are fed, an abrasive belt for engaging the upper surface of the workpieces as they travel along said groove, an idler pulley near one end of the table, a motor driven pulley near the other end of the table, a vertically disposed bar intermediate the ends of the table having an idler pulley on its upper end, an abrasive belt mounted on all of said pulleys, said vertically disposed bar having a shaft projecting

therefrom, a framework pivoted at one end on said shaft, the other end of the framework having an arm extending therefrom and a weight adjustably mounted thereon, for normally urging the free end of the framework downwardly toward the lower reach of said abrasive belt and to force it into contact with the upper surfaces of the workpieces being passed along said groove, the free end of the framework having a vertically disposed member pivoted near its upper end on the framework and having its lower end slidably mounted on a transversely disposed bolt, compression springs disposed on said bolt and on each side of the lower end of said pivoted member for allowing lateral swinging movement of said pivoted member, the lower end of said pivoted member having a universal joint thereon, a pressure applying member having a bearing extending from its upper surface and secured in said universal bearing, the lower surface of said pressure applying member being grooved to conform to the configurations of the workpieces being passed along said groove, the pressure applying member being adapted to engage the upper surface of the lower reach of the abrasive belt for forcing the abrasive belt into contact with the workpieces as they travel along said groove.

5. In a sanding machine having means for feeding workpieces through the machine and an abrasive belt for engaging the upper surfaces of the workpieces as they pass through the machine, pressure applying means for engaging the lower reach of said abrasive belt for pressing it into contact with the workpieces, comprising a frame pivoted at one end and having a downwardly projecting member pivoted at its upper end in an upper portion of the free end of said pivoted frame, spring means for allowing lateral swinging movement of the pivoted member transversely of the path traveled by the workpieces, a pressure member having its lower surface grooved to conform to the grooves in the workpieces being engaged by the abrasive belt, said pressure member being pivoted to the lower end of the downwardly projecting member and being adapted to engage the upper surface of the lower reach of the abrasive to engage the upper surface of the lower reach of the abrasive belt for forcing the abrasive belt into contact with the workpieces as they travel through the machine, means for applying pressure to the free end of the pivoted frame for in turn applying pressure to the workpiece to force it into contact with the abrasive belt and to force the abrasive belt into contact with the workpieces passing through the machine, and means for latching the pivoted framework in raised position to hold the workpiece out of contact with the abrasive belt.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
470,794	Shempp	Mar. 15, 1892
1,493,779	Humphreys	May 13, 1924
1,927,330	Williams	Sept. 19, 1933
1,961,210	Fenton	June 5, 1934
1,978,149	Stevenson	Oct. 23, 1934
2,064,476	Johnson	Dec. 15, 1936
2,227,865	Scott	Jan. 7, 1941
2,338,644	Illmer et al.	Jan. 4, 1944