

May 10, 1927.

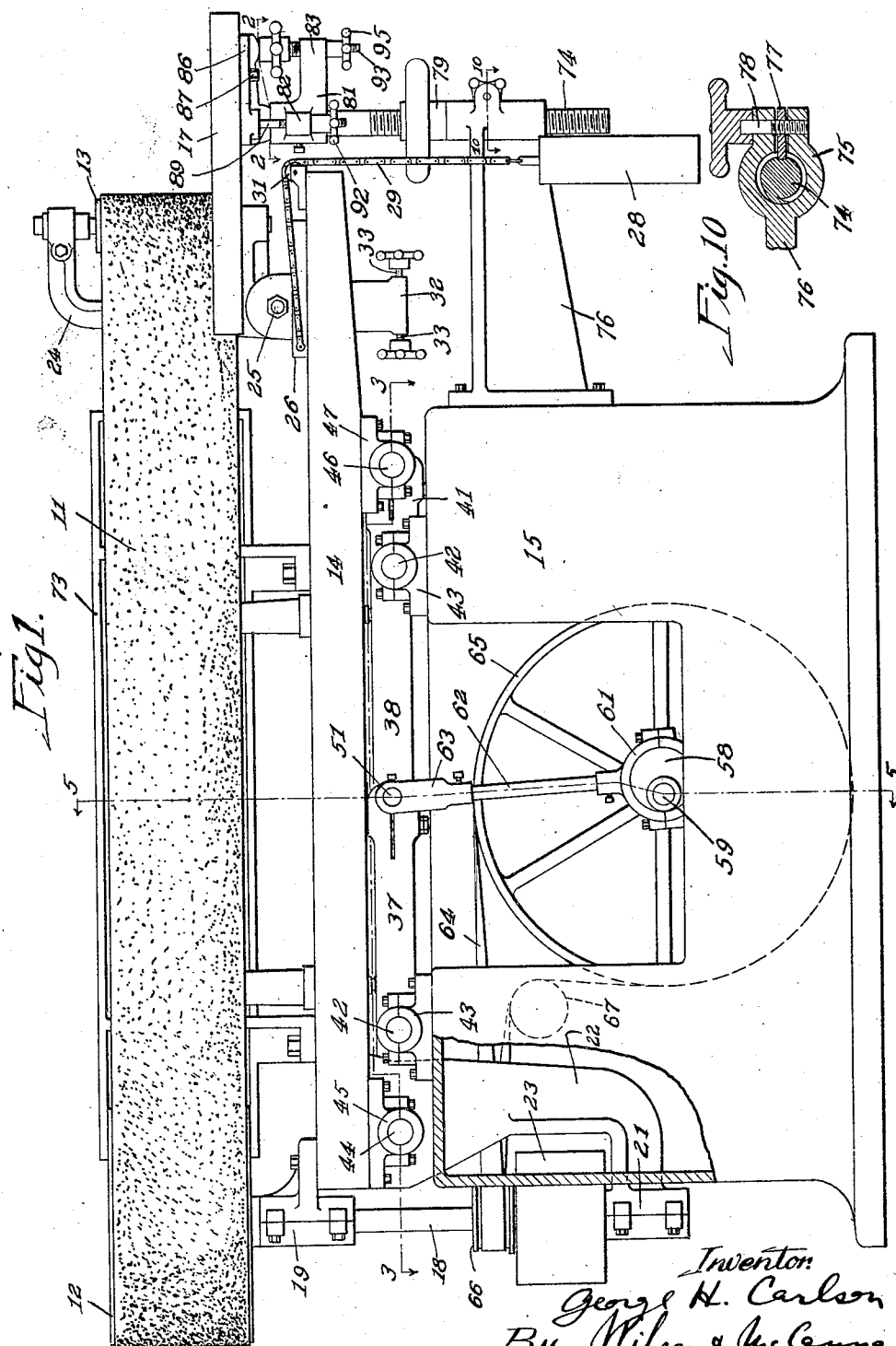
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1,628,531

OSCILLATING BELT SANDER

Filed March 26, 1924

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

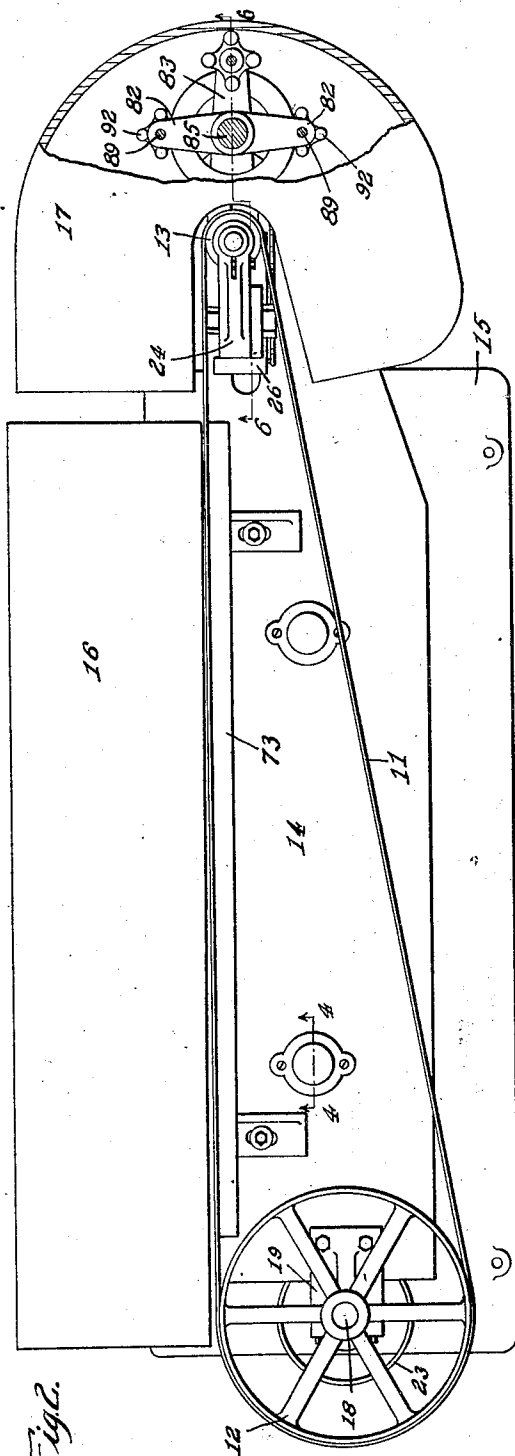


Fig. 2.

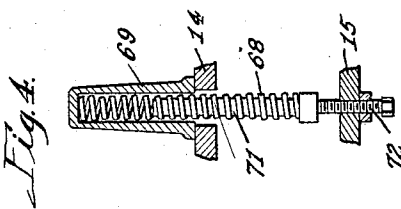


Fig. 4.

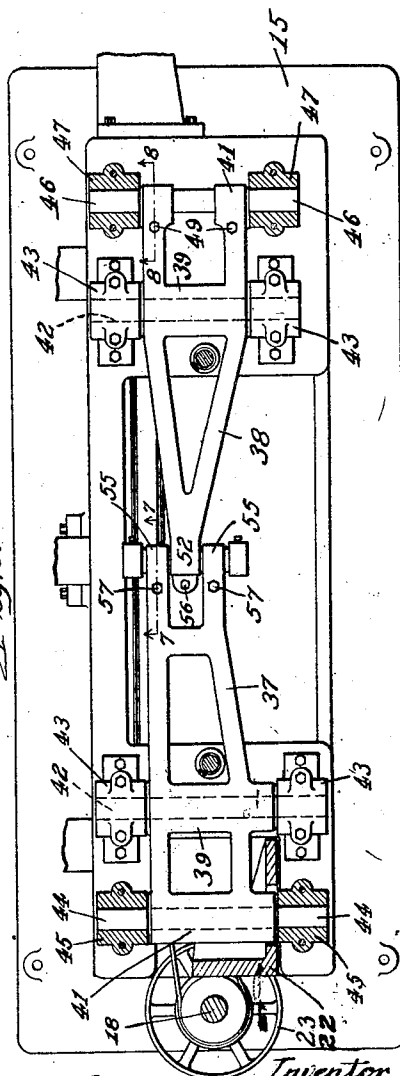


Fig. 3.

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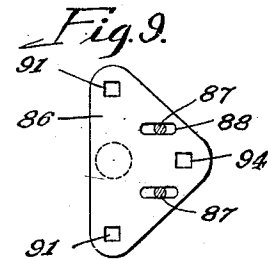
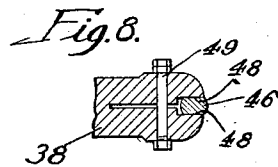
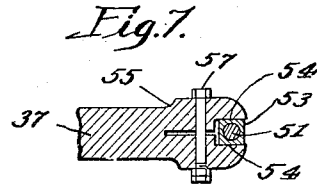
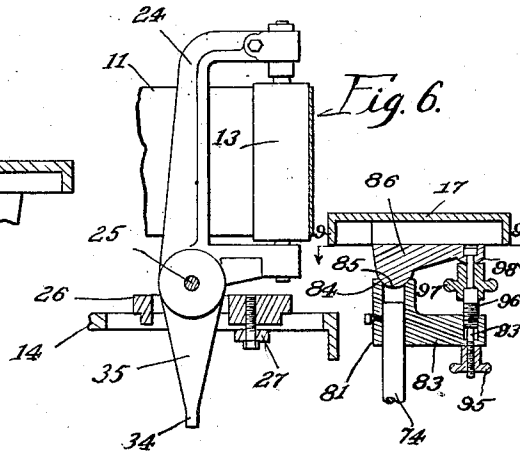
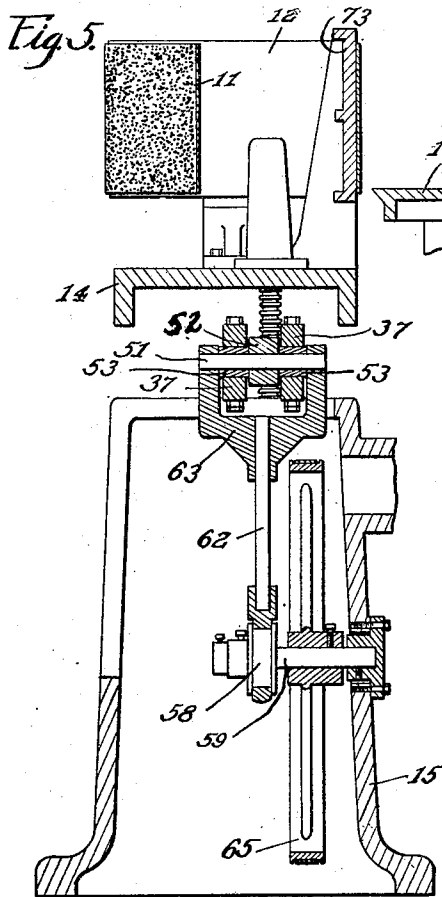
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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OSCILLATING BELT SANDER.

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This invention relates to the art of abrading and has more particular reference to machines employing a traveling endless flexible band or belt of abrading material to which is imparted a bodily transverse reciprocation. In these machines the work-piece is supported on a suitable table or carrier and brought into contact with the periphery of the traveling-band so as to be surfaced by an abrading action, the purpose of the reciprocating or oscillating movement of the traveling-band being to prevent streaks or grain marks in the finished surface of the work. The present invention pertains especially to machines of this type in which the traveling-band has a sand abrasive, or the like, adapted for surfacing flat curved or shaped wood pieces, these machines being known in the trade as "oscillating belt sanders".

The primary purpose of the present invention is to improve the construction and operation of sanders of the character described, with the view to reducing friction losses and lowering power consumption, and to provide a machine which is thoroughly practical, long-lived, and capable of production at a comparatively low cost.

In furtherance of the foregoing I have provided improved means for supporting and reciprocating the traveling-band, consisting preferably, but not necessarily, in a lever mechanism of novel construction, which supports and operates a bed or carrier for the traveling-band, and in providing springs serving to counter-balance the weight of the bed and parts carried thereby, the arrangement being such that there is but little friction resulting from the reciprocating action and but little power is required for transmitting such action.

I have also aimed to provide an improved table support for holding the work-pieces at any desired angle with respect to the traveling band.

Other objects and attendant advantages will be appreciated by those skilled in this art as the invention becomes better understood by reference to the following description when considered in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a sander embodying my invention;

Fig. 2 is a plan view of the machine, the

part in section being taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section taken substantially on the line 3—3 of Fig. 1;

Fig. 4 is a detail section taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical transverse section taken on the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary section taken substantially on the line 6—6 of Fig. 2;

Figs. 7 and 8 are detail sections taken on the lines 7—7 and 8—8, respectively, of Fig. 3;

Fig. 9 is a detail section taken on the line 9—9 of Fig. 6; and

Fig. 10 is a detail section taken on the line 10—10 of Fig. 1.

In this machine the abrading element is in the form of an endless flexible belt 11 the peripheral face of which is coated with a sand abrasive or any suitable abrading material. This abrading element, hereinafter referred to as the traveling-band, is trained over a driving roll 12 and an idler roll 13 suitably journaled on vertical axes on a bed designated generally by 14. The bed in turn is mounted through the intermediary of a lever mechanism (described hereinafter) upon a base designated generally by 15. Suitable means may be employed for rotating the driving roll for imparting rotation to the traveling-band; and said lever mechanism will be operated by suitable means for vertically reciprocating the bed 14 and consequently the traveling-band. The work-pieces to be surfaced may be brought into and out of contact with the sander face of the traveling-band while supported on either or both of the tables 16 and 17, which likewise will be described more particularly hereinafter.

The means at present employed for rotating the driving roll comprise a drive shaft 18 to which the driving roll is fixed, this shaft being journaled in an upper bearing 19 mounted on the top of the bed 14 and a lower bearing 21 carried by an underhanging bracket 22 also fixed to said bed. Said shaft may be driven by any suitable means, such, for example, as a belt pulley 23 driven from any suitable source.

The idler roll 13 is suitably journaled in a yoke shaped bearing bracket designated generally by 24 pivotally supported on a

pivot pin 25 carried by a carriage 26 in turn mounted to slide horizontally on the bed 14 toward and from the driving roll 12. Suitable means such as a guide plate 27, Fig. 6, holds the carriage 26 in position on its ways on the bed 14; and suitable means such as a weight 28 connected by means of a chain 29 trained over a pulley 31 and connected to the carriage constantly urges the latter in a direction to tighten the traveling-band. The carriage has a depending rigid arm 32 carrying a pair of opposed hand-adjustable screw stops 33 between the adjacent ends of which is interposed the lower end 34 of a depending arm 35 integral with the bearing bracket 24. The screw stops 33 clamp the end 34 and hold the bearing bracket 24 and consequently the idler roll 13 in a set position with respect to the vertical. By adjustment of said screw stops it will be manifest that the bracket 24 may be tilted on the pivot pin 25 for inclining or tilting the idler roll 13 in one direction or the other for changing the position of the traveling-band thereon, as is well known in this art.

The lever mechanism above referred to which supports the bed 14 and transmits reciprocatory movement thereto comprises in the preferred embodiment, a pair of levers 37 and 38 of the first class. These levers are preferably in the form of comparatively heavy castings, each having a trunnion-type fulcrum on the base, the distance between the trunnion bearings for each lever being sufficient to give a stable support for the bed and other parts carried thereby and the castings being of sufficient size to amply carry the weight of such parts. Viewing Fig. 3 it will be seen that the fulcrum portion 39 and the weight-carrying portion 41 of each lever are uniform in width and that the force-applying end of the lever 37 is bifurcated to receive the force-applying end of the lever 38. The fulcrum for each lever is established by a pivot pin 42 passed through each fulcrum portion 39 and providing trunnion ends journaled in suitable bearing blocks 43 fixed to the top of the base. A pivot pin 44 passed through the end 41 of the lever 37 is journaled at its ends in bearing blocks 45 bolted to the under side of the bed 14, thus establishing a pivotal connection therewith. The end 41 of the lever 38 is likewise pivotally connected to the bed 14 by means of a pivot pin journaled in bearing blocks 47 bolted to said bed, but in this instance said end 41 of the lever 38 has a sliding connection with the pin 46. Viewing Fig. 8 it will be seen that the pivot or connecting pin 46 is shaped to provide flat bearing faces 48 which are engaged by complementary faces on the lever. For convenience in manufacture the end 41 of the lever 38 is separated into two similar arms each of which is slotted lengthwise so that its flat

bearing faces may be relatively adjusted. By means of a bolt 49 through each slotted arm of said lever its bearing faces may be drawn together to secure the proper contact with the faces 48 and to take up for wear. The force-applying ends of said lever, disposed in juxtaposition as described, are pivotally connected by means of a pin 51 journaled in the end 52 of the lever 38 and in bearing blocks 53 located between bearing faces 54 (Fig. 7) in the slotted ends 55 of the lever 37. The pin 51 is clamped to the lever end 52 by means of a bolt 56 and clamp bolts 57 serve to take up wear between the faces 54 and the blocks 53.

From the foregoing it will be manifest that by moving the pin 51 back and forth in a vertical plane, the bed 14 and parts carried thereby such as the band 11 and its platen 73 will be raised and lowered in a parallel movement, thus imparting bodily transverse reciprocation to the traveling-band. In order to take care of the play between the pivotally connected ends of the levers 37 and 38 the slide connection above described is provided; and inasmuch as the bed is connected by a fixed pivot to the lever 37 and the latter is fulcrumed in fixed bearings, the arcuate travel of the pivot pin 46 is taken care of by the slide connection also described above.

Suitable means may be employed for imparting vertical reciprocation to the pin 51, such as an eccentric 58 fixed to a drive shaft 59 and connected by means of an eccentric band 61, connecting rod 62 and yoke 63 to the outer ends of said pin as clearly shown in Figs. 1 and 5. The shaft 59 may be continuously revolved in either direction by any suitable driving means. At present said shaft is driven from the shaft 18 above mentioned, through the agency of an endless belt 64 trained over a pulley 65 fixed to the shaft 59, a pulley 66 fixed to the shaft 18 and an intermediate idler pulley 67.

In order to relieve as much weight as possible from the bearings of the lever mechanism to reduce friction and to aid in operating said mechanism, I have provided means for counter-balancing the weight of the bed 14 and parts carried thereby. This means comprises a pair of coil compression springs 68 interposed between the base and bed (Fig. 4), each spring being in the present instance confined at its upper end in a housing 69 fixed to the bed and coiled about and resting upon a stem 71 the lower end 72 of which is threaded in the top of the base and held in such position by a suitable lock nut. These springs counter-balance the weight of the bed and its parts and will be put under additional compression when the bed is lowered so that the stored up pressure materially aids in elevating the bed on the upstroke. As a result of the use of such

counter-balancing means much weight is taken from the bearings of the lever mechanism and comparatively little force is required for operating such mechanism. Another advantage of this construction is that there is comparatively little wear on the parts employed for reciprocating the traveling-band, and the motion is exceptionally smooth and free from vibration.

It will be observed that a platen 73 is carried directly by the bed 14 at the back of the stretch of the traveling-band, paralleling the table 16, for backing the band for work on said table, as is well known in this art. By reciprocating the platen with the band instead of having the band reciprocate relative to the platen as was done heretofore I avoid the tearing of the band when work is pressed against the band toward the platen. No means is shown for supporting the table 16 in operative relation to the platen 73 as this forms no part of the present invention, it being manifest that any suitable or well known means may be employed for this purpose.

The circular work supporting table 17 embraces one side of the roll 13 and two stretches of the traveling-band and is mounted in a novel manner for adjustment to different angular positions. This table is carried by a single post 74 supported for vertical adjustment in the end 75 of a knee bracket 76 fixed to the base 15. A key 77 (Fig. 10) operating in a key way in the post 74 holds the latter against rotation. The bracket end 75 is slotted lengthwise and adapted to be clamped onto the post 74 by means of a clamp screw 78 for locking said post in any adjusted position. By means of a hand-wheel nut 79 engaging the screw post and resting on the top of the bracket end 75 said post and consequently the work table 17 may be raised and lowered as will be obvious. To the upper end of the post 74 is fixed a bracket 81 having a pair of diametrically opposed arms 82 in a plane at right angles to the major axis of the machine and an intermediate arm 83 parallel with said axis. This bracket also has concentric with the post 74 a socket or seat 84 for the reception of the spherical portion 85 of a table-supporting block 86. The table is attached to this block by bolts 87 passing through slots 88 (Fig. 9) in said block permitting adjustment of the table toward and from the roll 13 to accommodate rolls of different diameter. Each arm 82 is connected at its outer end to the table supporting block 86 by means of a bolt 89 the head of which is seated in a square socket 91 in the block and the threaded end of which passes loosely through its arm 82 and is equipped therebelow with a hand adjusting nut 92. It will be manifest that by tightening and loosening the nuts 92 the work table 17 may

be tilted on its spherical rest about an axis parallel with the major axis of the machine. Adjustment of the table 17 on a horizontal axis at right angles to said major axis is afforded by a connection between the arm 83 and the table supporting block. In the present instance this adjustment is provided by means of a bolt 93 having a square head seated in a complementary socket 94 in the block 86 and passing loosely through the bracket arm 83 and equipped therebelow with a hand adjusting nut 95, and a screw sleeve 96 loose on the bolt 93, threaded in the arm 83 as shown in Fig. 6 and having a hand adjusting nut 97 which bears against a spherical underface 98 on the block 86. By loosening the nut 95 and turning the nut 97 the table 17 may be adjusted about the transverse axis in either direction, as will be obvious, and may be secured in such adjusted position by tightening the nut 95. The construction just described provides for not only adjusting the work table 17 about a longitudinal and a transverse axis but also universally to any angular position within, of course, the limits of adjustment afforded by the particular construction.

It is believed that the foregoing conveys a clear understanding of the objects prefaced above and while I have illustrated but a single working embodiment it should be understood that many changes might be made in details of construction and in the substitution of equivalents without departing from the spirit and scope of the present invention as expressed in the appended claims, in which—

I claim:

1. In a sander, a base, a traveling band of abrasive material, means supporting the same for vertical reciprocation relative to the base while traveling, means for vertically reciprocating said band support, a platen for backing up said band to assume the pressure of the work, and means supporting said platen for reciprocation vertically with said band, said platen support moving with said band support whereby the band merely travels across the front of said platen but does not reciprocate relative thereto in its vertical reciprocation substantially as and for the purposes described.

2. A sander comprising, in combination, a base, a bed arranged for movement up and down relative thereto, a traveling-band mounted thereon, a pair of levers extending lengthwise relative to said bed connected at their outer ends with said bed and extending inwardly for connection with said base, and means to operate said levers in unison in a rocking motion to impart bodily transverse reciprocation to said bed and the band thereon.

3. A sander comprising, in combination, a base, a traveling-band, lever mechanism

supporting the traveling band on the base, including a pair of levers of the first class connected together at their force-applying ends and supporting the traveling-band at 5 their weight-carrying ends, and means for operating the force-applying ends of the levers for imparting bodily transverse reciprocation to the traveling band.

4. A sander comprising, in combination, 10 a driving and an idler roll, an endless flexible band of abrading material trained on said rolls, a bed upon which said rolls are supported, a platen mounted on said bed behind said band, a table for supporting work 15 in operative relation to the periphery of said band, means for revolving the driving roll, a base, a pair of levers supported on said base and connected with the bed and adapted to be operated in a rocking motion 20 to reciprocate it and thereby impart bodily transverse reciprocation to the traveling-band, and springs operative between the base and bed for counterbalancing the latter and the parts thereon.

25 5. In a machine of the character de-

scribed, in combination, a base, a traveling-band mounted for vertical reciprocation on the base, a work table for supporting work to be surfaced by said band, a support for the table mounted on the base, and means 30 attaching the table to said support comprising a ball and socket joint on which the table is adjustable, and adjusting elements operative between the table and said support for universally tilting the table and 35 holding it in any tilted position.

6. In a machine of the character described, in combination, a base, a traveling-band mounted for vertical reciprocation on the base, a vertical screw post axially ad- 40 justable on the base, a bracket fixed to the upper end of the post and having diametrically opposed arms in a plane transverse to the major axis of the machine and an intermediate arm parallel with said axis, a work 45 table supported on said bracket in operative relation to the traveling-band, and connections between said arms and said table for universally tilting the table.

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