No. 890,542. PATENTED JUNE 9, 1908.

A. V. WALKER.

ABRADING MACHINE.

APPLICATION FILED MAY 15, 1907.

5 SHEETS—SHEET 1.

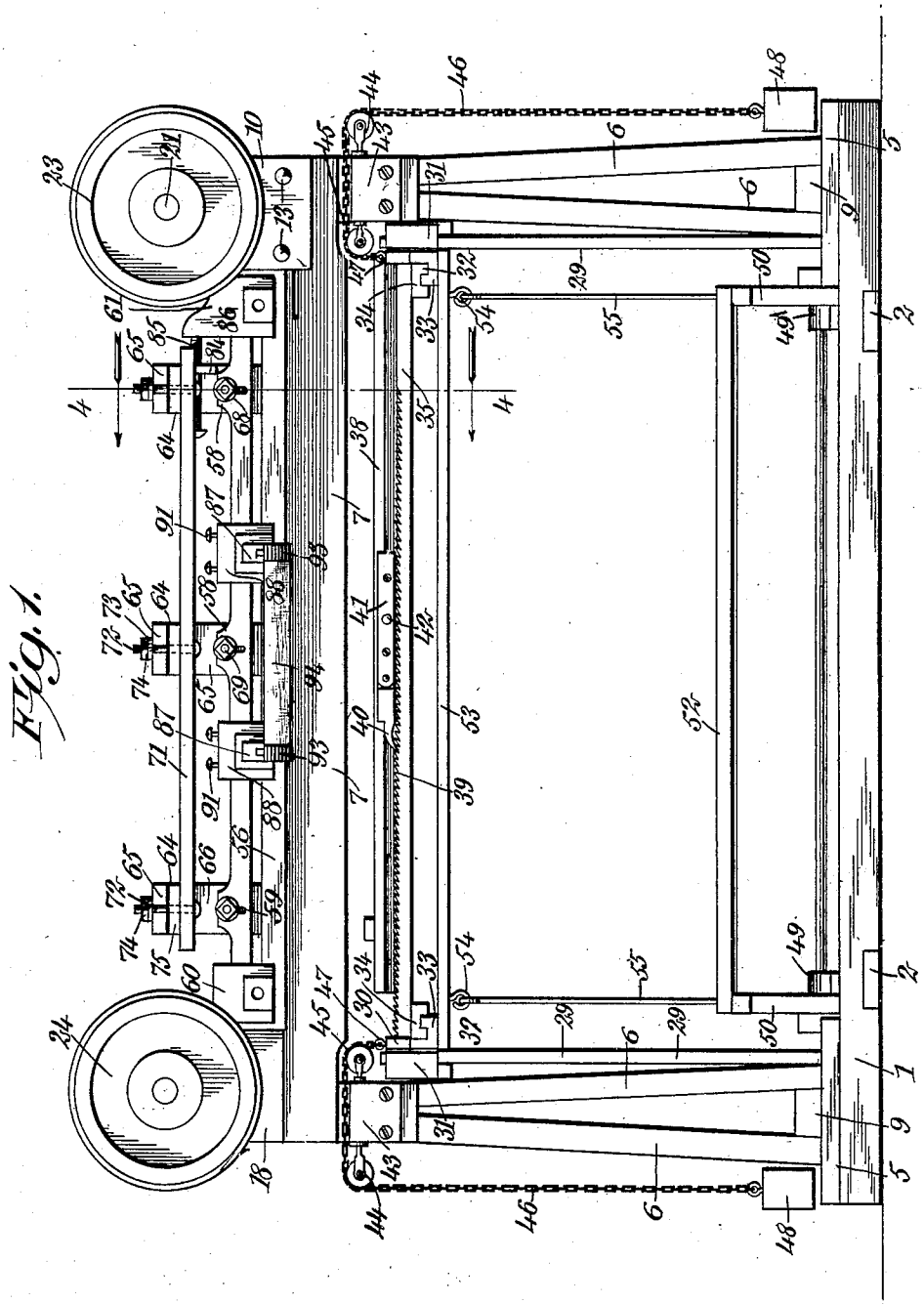


Fig. 1.

WITNESSES

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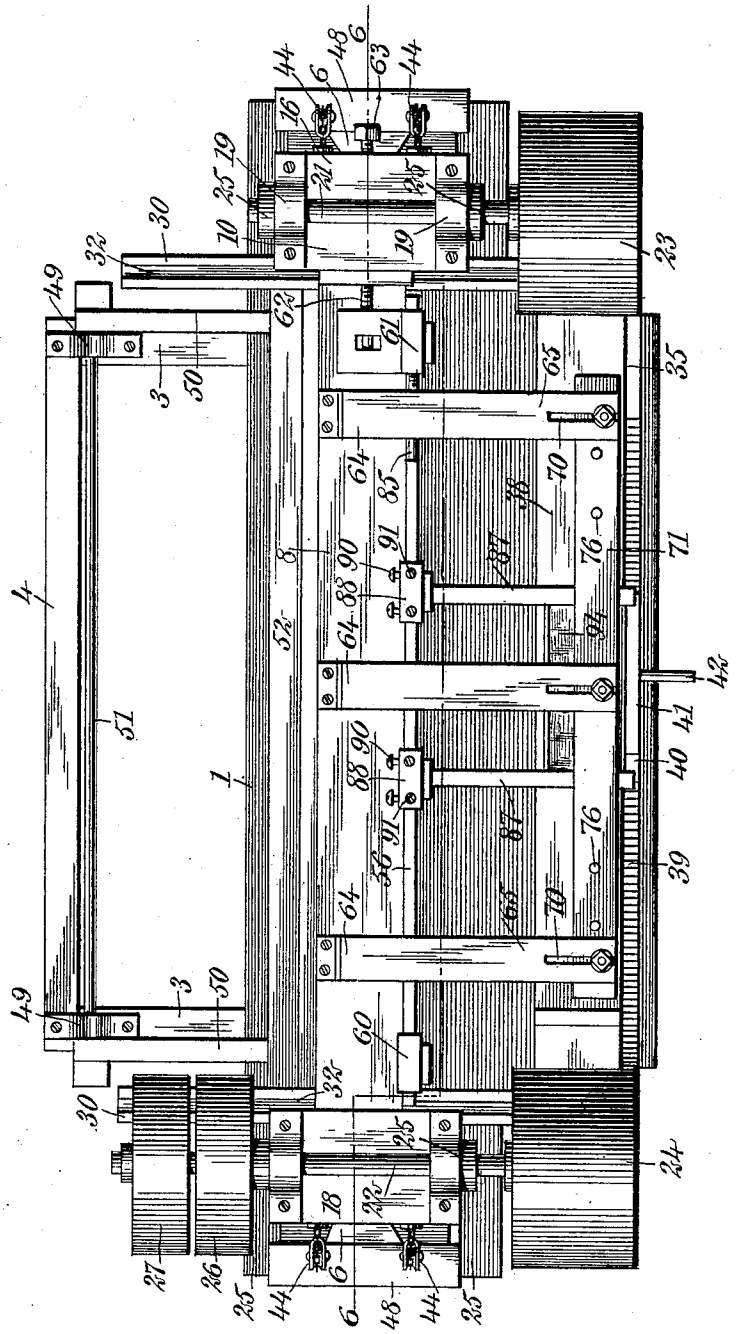
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5 SHEETS—SHEET 2.

FIG. 2.



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5 SHEETS—SHEET 3.

Fig. 3.

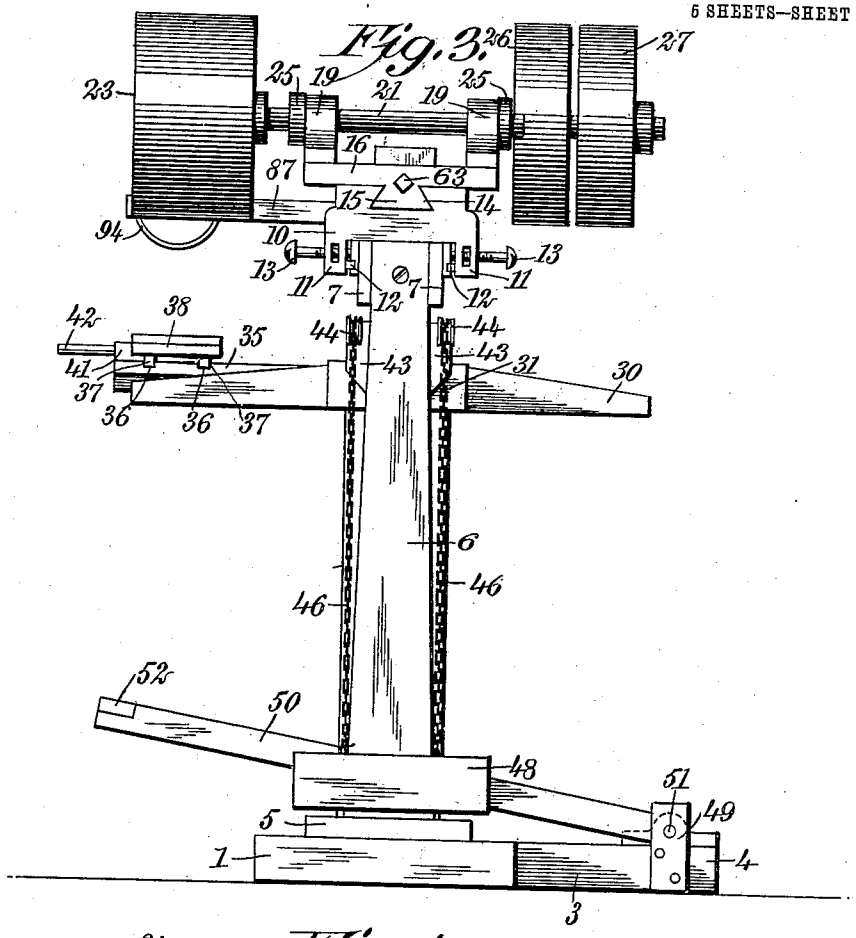
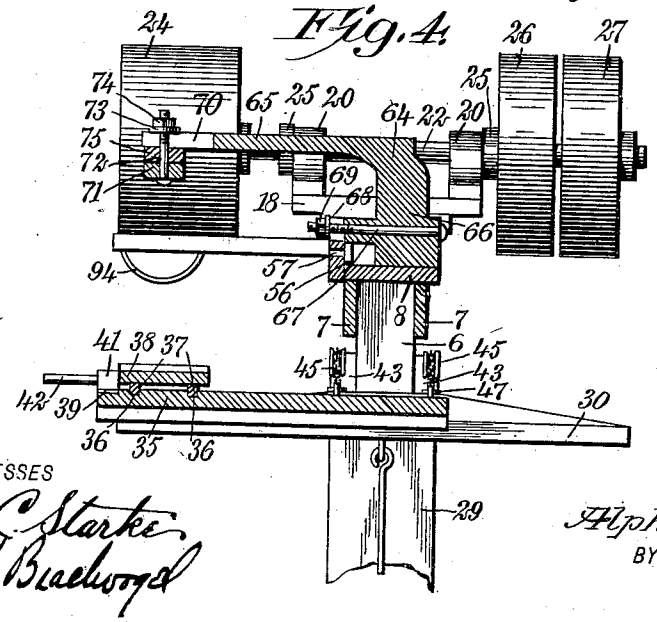


Fig. 4.



WITNESSES

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6 SHEETS—SHEET 4.

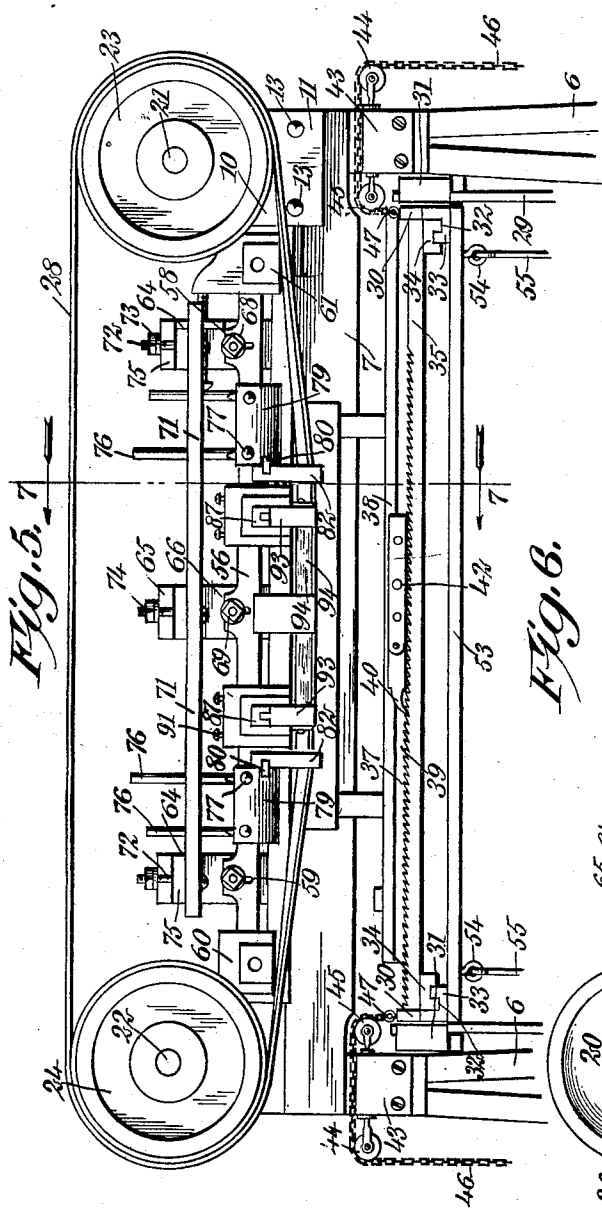


Fig. 5.

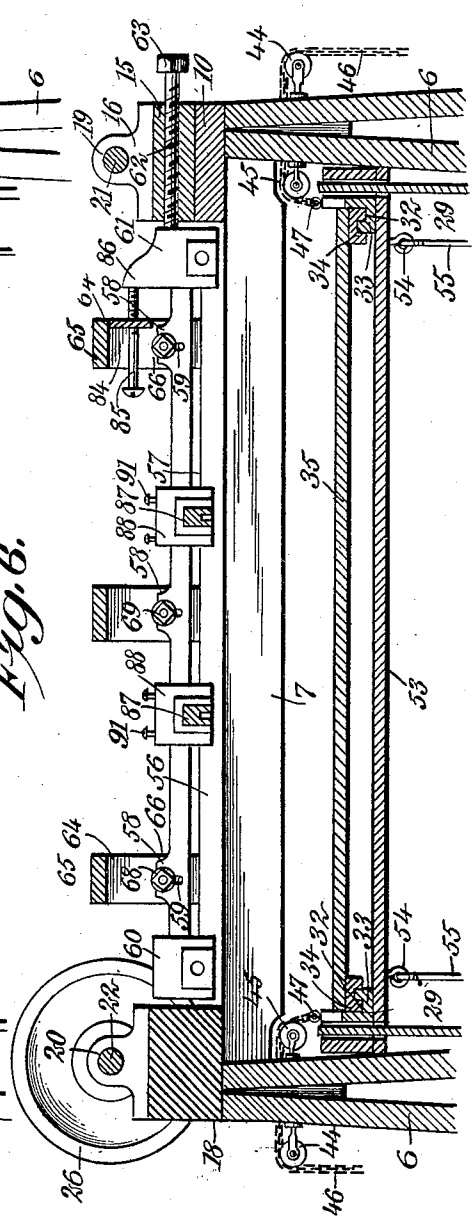


Fig. 6.

WITNESSES

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No. 890,542. PATENTED JUNE 9, 1908.

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APPLICATION FILED MAY 15, 1907.

5 SHEETS—SHEET 5.

Fig. 7.

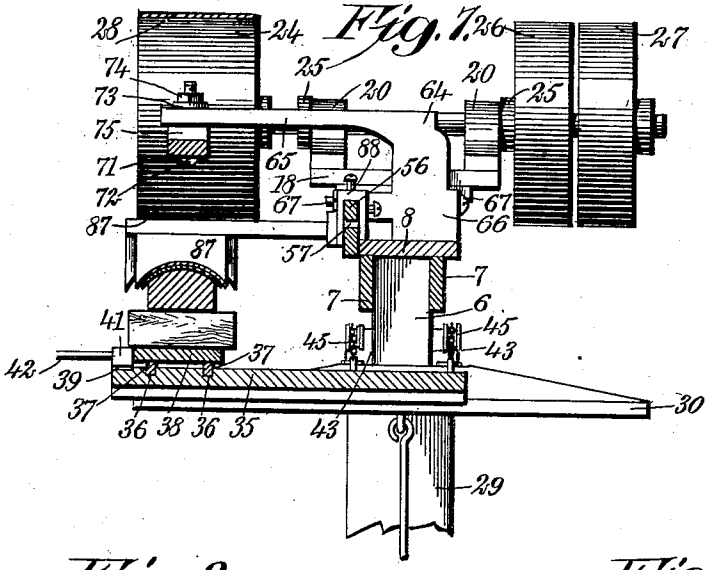


Fig. 8.

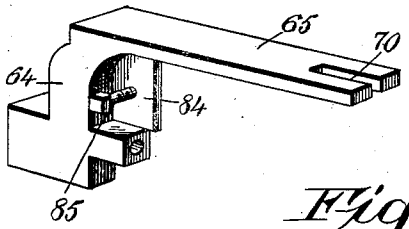


Fig. 9.

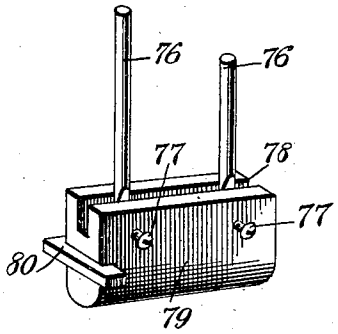
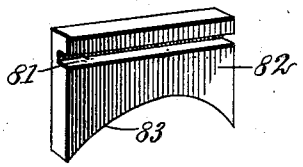
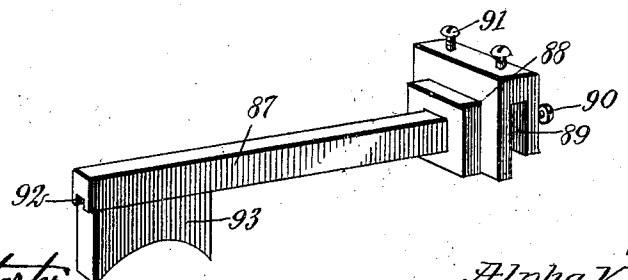


Fig. 10.

Fig. 11.





WITNESSES

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UNITED STATES PATENT OFFICE.

ALPHA VIVIAN WALKER, OF LEOMINSTER, MASSACHUSETTS.

ABRADING-MACHINE.

No. 890,542. Specification of Letters Patent. Patented June 9, 1908.

Application filed May 15, 1907. Serial No. 373,718.

To all whom it may concern:

Be it known that I, ALPHA VIVIAN WALKER, a citizen of the United States, and a resident of Leominster, in the county of Worcester and State of Massachusetts, have invented a new and Improved Abrading-Machine, of which the following is a full, clear, and exact description.

This invention relates to abrading machines and more particularly to that class of abrading machines in which the abrasive material is carried upon a moving flexible band or belt.

The object of the invention is to provide a simple, strong and efficient abrading machine by means of which curved surfaces of wood-work and the like can be rendered smooth, or finished, rapidly and easily, and which is adapted for the application of the abrasive to work presenting different curved surfaces.

A further object of the invention is to provide a device of this class in which a traveling band or belt presents an abrasive surface shaped to correspond to the curve of the work by means of removable dies, and in which the work is held upon a suitable carrier having three independent motions.

A still further object of the invention is to provide an abrading machine having an abrasive belt shaped to conform to the curve of the work by means of interchangeable removable dies.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which

Figure 1 is a front elevation of the machine; Fig. 2 is a plan view; Fig. 3 is an end elevation; Fig. 4 is a vertical cross section of the upper part of the device on the line 4—4 of Fig. 1; Fig. 5 is a front elevation of the upper part of the machine showing the same in operation; Fig. 6 is a longitudinal section on the line 6—6 of Fig. 2; Fig. 7 is a vertical cross section on the line 7—7 of Fig. 5; Fig. 8 is a perspective view of a detail showing a die-carrying arm; Fig. 9 is a perspective view of a detail showing an adjustable die; Fig. 10 is a perspective view of an attachment to the adjustable die shown in Fig. 9; and Fig. 11 is a perspective view of a further adjustable arm carrying a die.

Referring more particularly to the drawings, I provide a base 1, having transverse members 2 arranged in suitable recesses formed at the under side of the base and having extensions 3 projecting laterally at one side of the base. The extensions 3 are joined by a longitudinal member 4. At each end of the base is a supporting plate 5 carrying standards comprising mutually inclined uprights 6. The uprights 6 are joined at their upper extremities by longitudinal frame members 7 extending from support to support and rigidly mounted at the side edges of the upright 6. A further longitudinal frame member 8 is arranged upon the upper ends of the uprights and rests upon the upper edges of the members 7. The members 7 and 8 are secured to the uprights by means of screws or rivets, or in any other suitable manner. The uprights 6 are rigidly mounted upon the supporting plates 5 and have spacing blocks 9 arranged between their lower extremities. At one end of the machine the members 7 are provided with grooves. A slidable yoke 10 having laterally disposed downwardly-extending flanges 11 presenting tongues 12 is slidably arranged upon the transverse frame members near one end thereof, the tongues 12 engaging the grooves in the frame members 7. The yoke 10 has set-screws 13 arranged in suitably threaded openings of the flanges 11 by means of which it may be rigidly secured in position. The yoke member has at the upper side thereof under-cut grooves or recesses 14 in which is slidably arranged a tongue 15 of a bearing bracket 16. A second bearing bracket 18 is rigidly carried at the opposite end of the machine upon the longitudinal frame members and is secured in position by means of bolts or rivets or in any other suitable manner. The bearing brackets 16 and 18 have bearings 19 and 20 in which are revolubly arranged shafts 21 and 22. The shafts 21 and 22 extend laterally beyond the bearings 19 and 20 at one side of the machine and carry rigid pulleys 23 and 24. The shafts are provided with suitable stop collars 25. The shaft 22 extends laterally beyond the bearings at the opposite end and is provided with driving pulleys 26 and 27 by means of which the machine may be operated. A

flexible band or belt 28 having an abrasive surface, for instance emery cloth, is arranged upon the pulleys 23 and 24.

Adjacent to the supports of the machine frame and at the inner sides thereof, are guide uprights 29. Transverse supporting members 30 having sleeves 31 arranged to slide upon the guides 29 are mounted underneath the longitudinal frame members and present guide grooves 32 formed by laterally and upwardly disposed flanges 33. Slidably mounted at the guide grooves 32 are members 34 having downwardly-disposed flanges engaging at each side of the flange 33 of the members 30. The members 34 carry a rigid joining table 35. The table 35 near the outer edge thereof has longitudinal guide grooves 36 in which are slidably arranged tongues 37 of a work-carrier 38. At the forward edge the table 35 has a plurality of notches 39. A finger 40 rigidly secured at the forward edge of the work-carrier engages one of the notches 39 to lock the carrier against movement in one direction. The finger 40 is mounted upon the carrier by means of a shank 41 presenting an extension 42 by means of which the carrier may be manually adjusted. Near the upper extremities of the supports of the frame at each side thereof, are brackets 43 having laterally-extending pulleys 44. Similar pulleys 45 are secured to the transverse sliding members 30 near the center thereof at each side. Flexible members 46, preferably consisting of chains are secured to the members 30 by means of eyelets 47 carried by the latter and pass over the pulleys 44 and 45 depending from the latter outside of the frame supports and carrying weights 48. It will be understood that the weights normally force the transverse table-carrying members 30 upward toward the belts carried by the pulleys 23 and 24.

As the table is slidable transversely of the frame upon the members 30 and as the work-carrier is slidable at right angles to the movement of the table, longitudinally of the frame, the work can be adjusted in three different directions: Upwards towards the pulley, transverse of the same, and longitudinally thereof. When the work is forced into engagement with the abrasive belt the latter tends to carry the work with it in the direction of movement of the run of the belt which engages the work. To lock the work-carrier upon the table the notches 39 and the finger 40 are provided, the lower run of the belt traveling in the direction of the pulley 24 from the pulley 23. At the outer extremities of the extensions 3 are bearing brackets 49 at which are pivoted levers 50 by means of a bearing rod 51. The free ends of the lever 50 are joined by a bar 52 by means of which the levers may be depressed by the foot of the operator of the machine. At the under side of the transverse members 30 is a longitudinal joining rod 53 presenting eyelets 54. Links 55 are mounted at the eyes 54 and have the upper extremities secured to the levers 50, so that when the latter are depressed by means of the bar 52 the transverse members and the work carrier therewith are depressed, and the work is disengaged from the abrasive belt. When the bar 52 is released the weights 48 return the work into operative engagement with the belt.

At the upper edge of the longitudinal frame members 7, adjacent to the pulleys 23 and 24, is arranged a frame member 56 presenting a longitudinal slot 57 and having upward extensions 58 provided with recesses 59. The frame member 56 is secured in position by means of screws or rivets or in any other suitable manner. At the end, the member 57 is secured to blocks 60 and 61 presenting grooves for the purpose, and resting upon the longitudinal frame member 8 and rigid therewith. The block 61 adjacent to the yoke 10 engages a lateral screw 62 arranged in a suitably threaded opening of the bearing bracket 16 and having a head 63 by means of which it may be operated. As the screw 62 is turned in one direction, the bearing bracket 16 will be moved longitudinally of the frame, carrying the pulley 23 in a direction away from the pulley 24, thereby increasing the tension of the belt. If the screw 62 is turned in the opposite direction, the tension of the belt will draw the pulley 23 towards the pulley 24, thereby causing the belt to become slack and decreasing the tension. Members 64 having lateral arms 65 and bodies 66 are located upon the longitudinal frame member 8, the arm 65 extending between the upper and lower runs of the belt. Bolts 67, passing through suitable openings in the body 66, have threaded extremities arranged in the recesses 59 of the member 56 and are held in place by means of stop-washers 68 and nuts 69. The members 64 are rigidly mounted upon the longitudinal frame members. The arms 65 at the outer extremities have slots 70. A beam 71 extends longitudinally of the frame and is carried at the outer extremities of the arms 65 by means of bolts 72 having threaded extremities arranged in the slots 70 and secured in position by means of stop-washers 73 and nuts 74. Spacing blocks 75 may be arranged between the under sides of the arms and the joining beam 71 if necessary. The beam 71 is provided with openings therethrough in which are arranged slidable rods 76, having their lower extremities flattened and secured by means of screws 77 in slots 78 of a die 79. The under part of the die 79 is curved to conform to the curve of the work and engages the inner side of the lower run of the belt to curve the latter into the form of the work. It will be understood that the dies may be

varied as necessary and that by means of them it is possible to abrasively finish woodwork and the like having surfaces of substantially any curvature. As the rods 76 are slidably arranged with respect to the beam 71 they may be controlled manually and may be used to force the belt against the work more or less firmly. The dies 79 have at one end transverse tongue extensions 80 adapted to engage with grooves 81 of die plates 82 having the lower edges 83 of any desired curvature. By means of the die plates 82, the die 79 may be employed for providing the belt with a different curvature without necessitating the changing of the die 79 itself.

The body of the member 64 adjacent to the block 61 has a cheek 84 provided with a set-screw 85 the end of which abuts against an extension 86 of the block 61, to hold the same more firmly in position against the tension of the belt transmitted through the movable bearing bracket 16 and the screw 62.

Further die-carrying arms 87 are slidably mounted by means of sockets 88 upon the longitudinal frame member 56. The sockets 88 have recesses 89 at the lower edges thereof, seating upon the upper edge of the member 56 and extending downwardly beyond the slot 57. The sockets have screw-pins 90 arranged in suitable openings and extending through the recesses 89 into the slot 57 to prevent the displacement of the arms 87. The sockets 88 further have a set-screw 91 by means of which they may be clamped in position upon the member 56. The arms 87 have grooves 92 at the under sides near the extremities in which are slidably arranged suitable tongues of die plates 93, the lower edges of which are of any desired curvature and which can be replaced to change the curvature as required. It will be understood that by providing a plurality of dies, the action of the abrasive belt upon the work can be controlled with exactitude. The dies 79 permit the regulation of the pressure with which the belt is forced against the work and the die plates 93 arranged slidably, longitudinally of the work. The dies 79 permit the thorough application of the abrasive belt to the work between the latter dies. I thus provide dies adjustable longitudinally of the work and dies adjustable substantially perpendicular of the work.

It will be understood that the dies and die-plates may have the parts engaging the belts suitably fashioned for the purpose, or, if necessary, faced with material of different character from that comprising the dies and plates; for instance, the die-plates 93 may have the curved edges joined by a band 94 of woven material to assist in forcing the flexible belt against the work. The pulleys may be of any common or preferred form suitable for the purpose.

Having thus described my invention I claim as new, and desire to secure by Letters Patent:—

1. In an abrading machine, a frame, a movable, flexible belt having an abrasive surface and carried by said frame, an arm adjustably secured to said frame, a die removably mounted upon said arm and engaging said belt, said arm being free to move longitudinally of said belt, said die extending between the runs of said belt, a second die adjustable transversely of said belt, and work-carrying means having three independent movements.

2. In an abrading machine, a frame, a movable, flexible belt having an abrasive surface and carried by said frame, an arm adjustably secured to said frame and movable longitudinally thereof, a die on said arm, a second arm carried by said frame and rigid therewith, a second die carried by said second arm and movable in a direction at an angle to the movement of said first die, and work-carrying means having three independent movements.

3. In an abrading machine, a frame, a movable, flexible belt having an abrasive surface and carried by said frame, said frame presenting a slot, an arm having a projection slidably arranged in said slot and movable longitudinally of said belt, a removable die on said arm, a second arm rigidly mounted upon said frame and presenting a member between the runs of said belt, a second die carried by said member and movable transversely thereof, and work-carrying means movable toward said belt, longitudinally of said belt and transversely of the same.

4. In an abrading machine, a frame carrying a movable, flexible abrasive belt, a longitudinal member presenting an elongated opening and arranged substantially parallel to said belt, a movable member having a socket mounted to slide upon said member and a projection engaging said slot, a die removably secured to said arm and engaging said belt, and work-carrying means having three independent movements.

5. In an abrading machine, a frame, a movable, flexible belt having an abrasive surface carried by said frame, an arm adjustably secured to said frame, a die removably mounted upon said arm and engaging said belt, said arm being free to move longitudinally of said belt, said die being located between the runs of said belt, and a second die adapted to engage said belt and adjustable transversely thereof.

6. In an abrading machine, a movable, flexible belt having an abrasive surface, a die movable longitudinally of said belt, and a second die movable at an angle with said belt.

7. In an abrading machine, a frame, a movable, flexible belt having an abrasive

surface carried by said frame, an arm adjustably secured to said frame and movable longitudinally thereof, a die on said arm, a second arm carried by said frame and rigid therewith, and a second die carried by said second arm and movable in the direction substantially at right angles to the movement of said first die, said dies being adapted to engage said belt.

8. In an abrading machine, a frame, a movable, flexible belt having an abrasive surface carried by said frame, said frame presenting a slot, an arm having a projection slidably arranged in said slot and movable longitudinally of said belt, a removable die on said arm, a second arm rigidly mounted upon said frame and presenting a beam between the runs of said belt, and a second die carried by said beam and movable transversely thereof, said dies being adapted to engage said belt.

9. In an abrading machine, a frame having a longitudinal member presenting a slot, pulleys on said frame at the ends respectively of said longitudinal member, a movable, flexible belt having an abrasive surface and carried by said pulleys, an arm having a socket slidably arranged upon said longitudinal member and a projection engaging said slot, means for clamping said socket upon said member, said arm having a die engaging a run of said belt, further arms rigidly carried by said frame and having a beam between the runs of said belt, said beam having an opening, a rod slidable in said opening and having a die, said rod being movable in a direction transversely of said longitudinal member of said frame, said dies being adapted to engage said belt.

10. In an abrading machine having a frame carrying a movable, flexible, abrasive belt, a longitudinal member presenting a slot and substantially parallel to said belt, a movable member having a socket arranged to slide upon said member and a projection engaging said slot, and a die removably secured to said arm and engaging said belt.

11. In an abrading machine having a frame carrying a movable, flexible belt, a longitudinal member presenting a slot substantially parallel to said belt, a movable arm engaging said slot, and a die secured to said arm and engaging said belt, and a second die adapted to engage said belt and adjustable transversely thereof.

12. In an abrading machine having a frame carrying a movable, flexible abrasive belt, a longitudinal member presenting a slot substantially parallel to said belt, a movable arm having a socket presenting a recess arranged to slide upon said longitudinal member and a projection engaging said slot, a die removably secured to said arm and engaging said belt, fixed arms having a connecting beam, and a die carried by said connecting beam and movable substantially at right angles to the movement of said movable arm.

13. In an abrading machine having a frame carrying a movable, flexible abrasive belt, a longitudinal member having an arm, a die presenting a tongue and adjustably carried by said arm, and a die-plate having a groove adapted to be removably mounted upon said tongue of said die.

14. In an abrading machine having a frame carrying a movable, flexible abrasive belt, a longitudinal member having an arm, a die presenting a tongue and adjustably carried upon said arm, a die plate having a groove and adapted to be removably mounted on said tongue of said die, another arm movable longitudinally of said belt and having a groove, and a die having a tongue removably arranged in said groove of said movable arm.

15. In an abrading machine, a frame, a fixed revoluble pulley, a movable, revoluble pulley, a flexible abrasive belt carried by said pulleys, means for operating said fixed pulley, means for adjusting said movable pulley, a longitudinal frame member having a slot, an arm arranged to slide at said slot and having a die engaging said belt, a fixed arm, and a second die carried by said fixed arm and arranged to move in a direction at substantially right angles to the movement of said first die.

16. In an abrading machine, a frame, a fixed revoluble pulley, a movable revoluble pulley, an abrasive belt carried by said pulleys, means for operating said movable pulley to regulate said belt, work-carrying means having three independent movements, an arm adjustably secured to said frame, and a die removably mounted upon said arm and engaging said belt.

17. In an abrading machine, a movable flexible belt having an abrasive surface, a die movable longitudinally of said belt, a second die movable at an angle with said belt, and work-carrying means permitting the movement of the work towards said belt, longitudinally of said belt and transversely of the same.

18. In an abrading machine, a frame, a fixed revoluble pulley, a movable revoluble pulley, an abrasive belt carried by said pulleys, means for adjusting said movable pulley to regulate said belt, an arm adjustably carried by said frame and movable longitudinally of said belt, a die on said arm, a second arm carried by said frame, a second die carried by said second arm and movable in a direction at an angle to a run of said belt, said dies being adapted to engage said belt, a movable work-carrier, means for adjusting said carrier in three directions, and means for operating said carrier to adjust the same.

19. In an abrading machine, a frame, a fixed revoluble pulley, a movable revoluble pulley, an abrasive belt carried by said pul-

leys, means for operating said movable pulley to regulate said belt, an arm adjustably carried by said frame and movable longitudinally of said belt, a die on said arm, a second arm carried by said frame, a second die carried by said second arm and movable in a direction substantially perpendicular to a run of said belt, said die being adapted to engage said belt, a movable work-carrier, means for guiding said carrier towards said belt, longitudinally of said belt and transversely of the same, and means for operating said work-carrier.

20. In an abrading machine, a movable, flexible belt having an abrasive surface, means for adjusting the tension of said belt, and a plurality of independently movable dies, the direction of movement of each of said dies being at an angle with the direction of movement of another of said dies.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALPHA VIVIAN WALKER.

Witnesses:
MONROE J. RICH,
FRED E. SHORT.