Oct. 8, 1935. W. W. PRICE ET AL 2,016,725

ABRASIVE MACHINE

Filed July 6, 1931 5 Sheets-Sheet 1

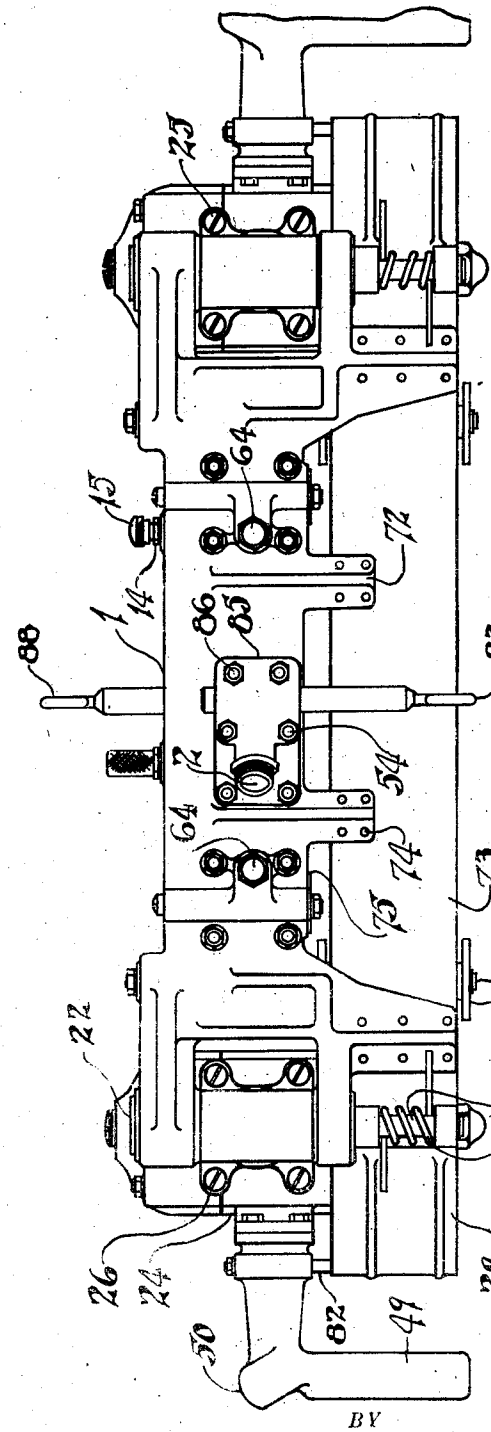


Fig. 1

INVENTORS
William W Price
Charles W Ripsch
BY
Taulmin & Taulmin
ATTORNEY

Oct. 8, 1935. W. W. PRICE ET AL 2,016,725

ABRASIVE MACHINE

Filed July 6, 1931 5 Sheets-Sheet 2

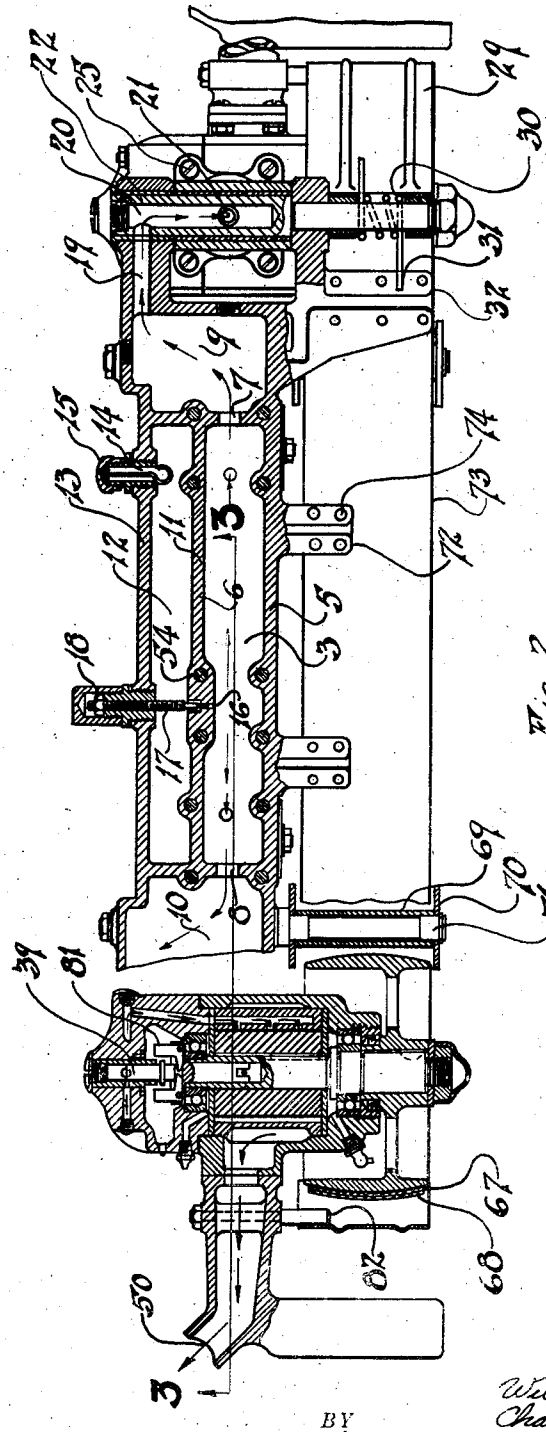


Fig. 2

INVENTORS
William W. Price
Charles W. Rypoch
BY
ATTORNEY

Oct. 8, 1935. W. W. PRICE ET AL 2,016,725

ABRASIVE MACHINE

Filed July 6, 1931 5 Sheets-Sheet 3

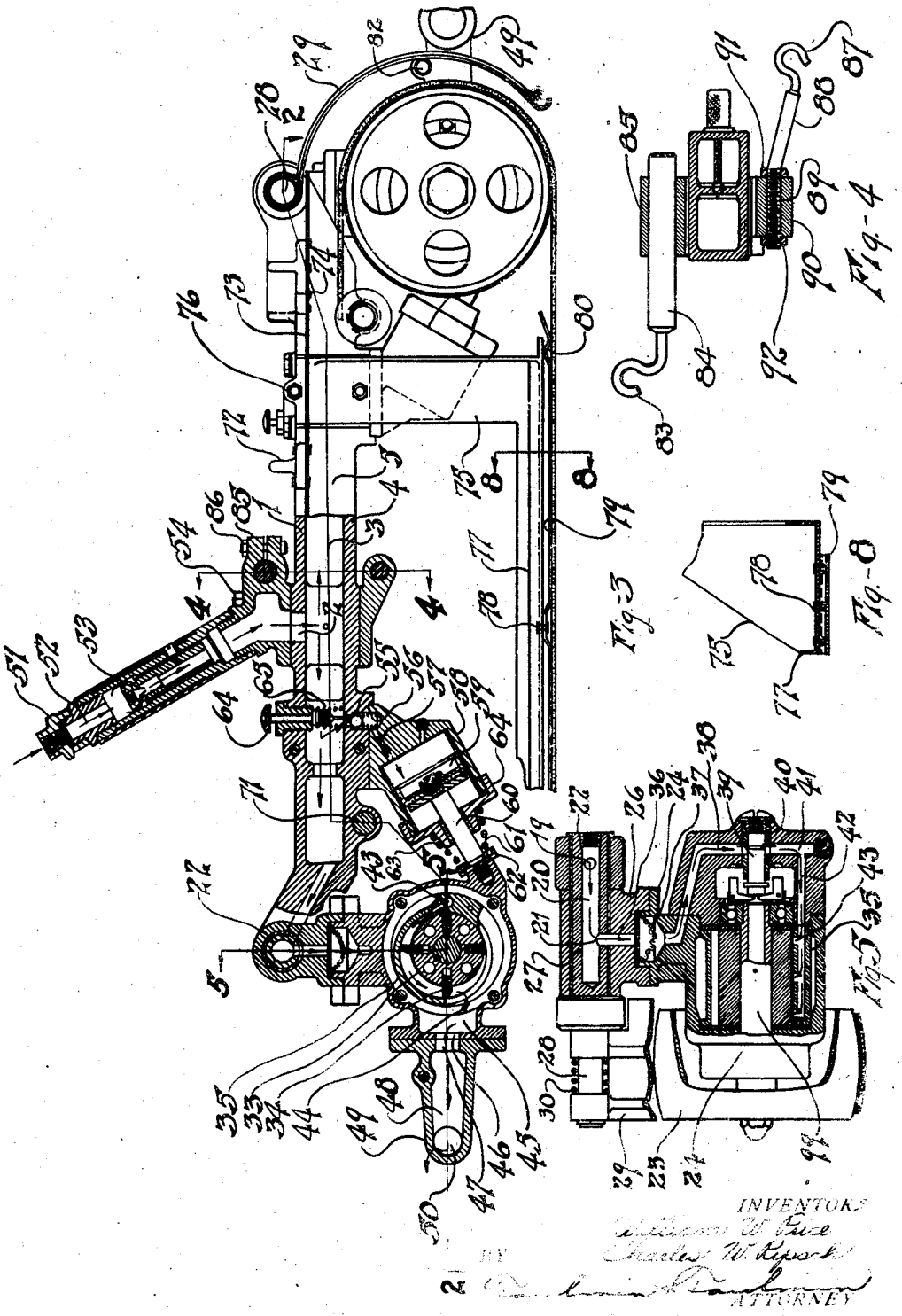


Fig-4

Fig-3

Fig-8

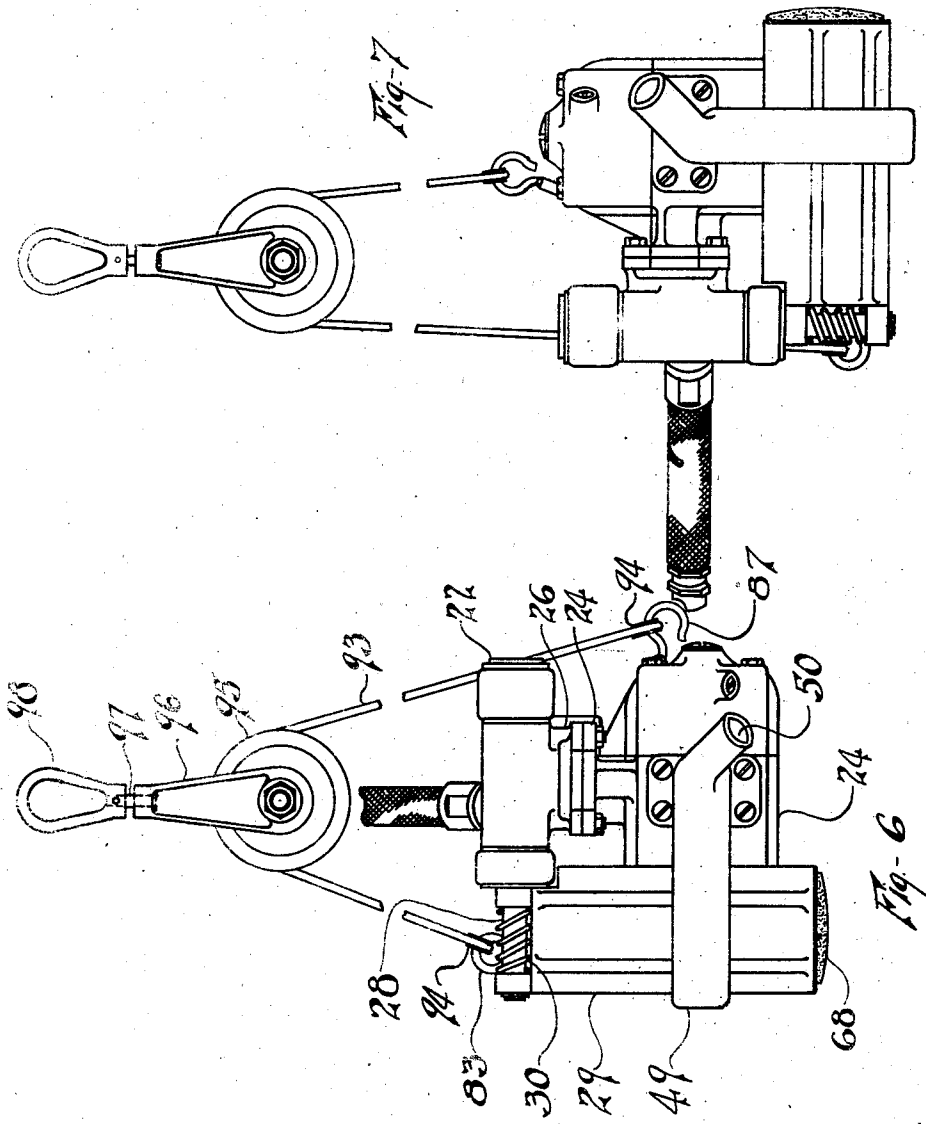
Fig-5

INVENTORS
William W. Price
Charles W. Kipper
BY
ATTORNEY

Oct. 8, 1935. W. W. PRICE ET AL 2,016,725

ABRASIVE MACHINE

Filed July 6, 1931 5 Sheets-Sheet 4



INVENTORS
William W. Price
Charles W. Ripsch
BY
ATTORNEY

Oct. 8, 1935. W. W. PRICE ET AL 2,016,725

ABRASIVE MACHINE

Filed July 6, 1931 5 Sheets-Sheet 5

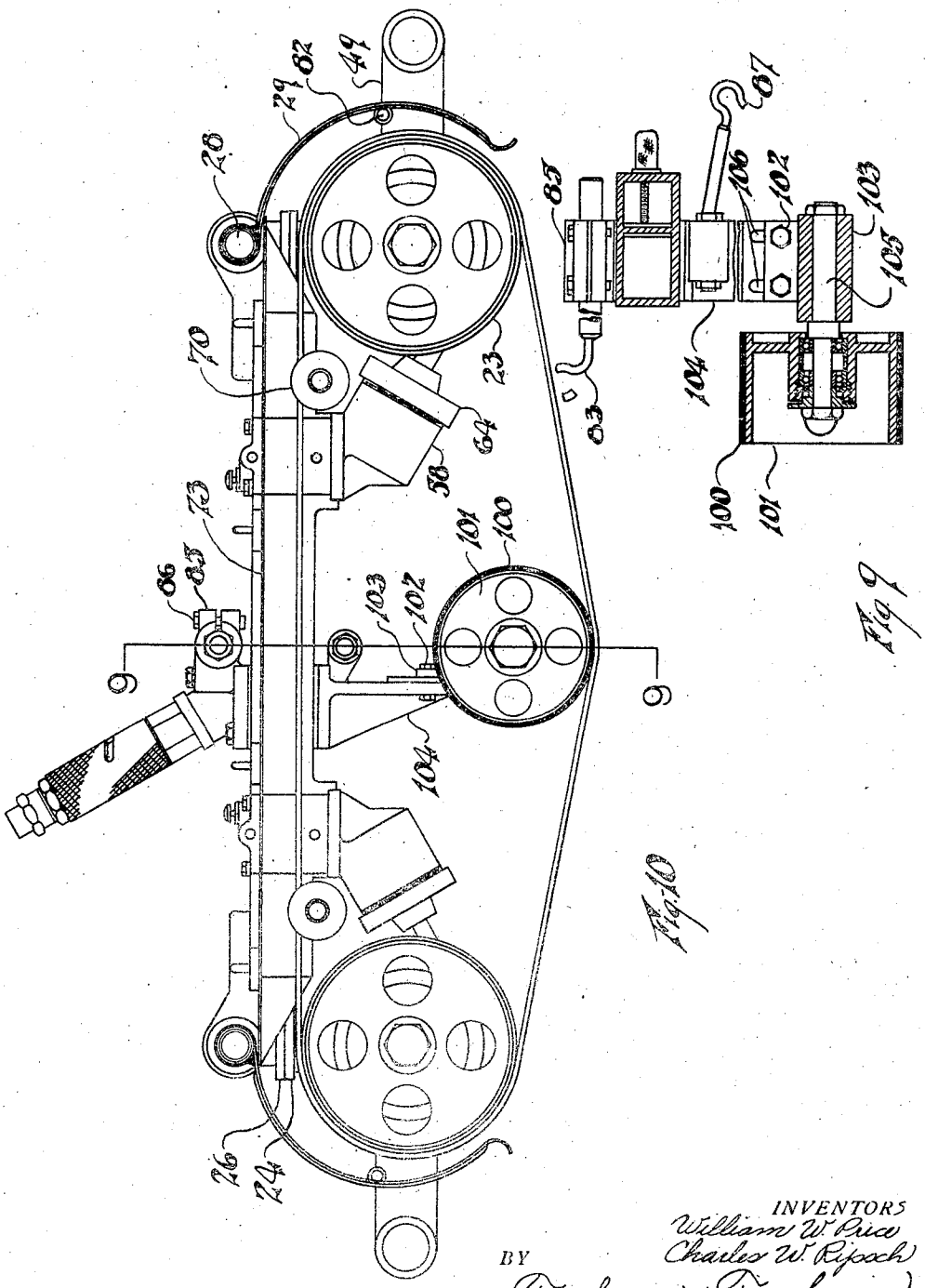


Fig. 9

Fig. 10

INVENTORS
William W. Price
Charles W. Rijsch

BY Pauley & Pauley
ATTORNEY

Patented Oct. 8, 1935 2,016,725

UNITED STATES PATENT OFFICE

2,016,725

ABRASIVE MACHINE

William W. Price and Charles W. Ripsch, Dayton, Ohio, assignors to The Buckeye Portable Tool Company, Dayton, Ohio, a corporation of Ohio

Application July 6, 1931, Serial No. 548,746

31 Claims. (Cl. 51—135)

Our invention relates to abrasive machines.

It is the object of our invention to provide an abrasive machine employing an abrasive band, which band can be guided either in a predetermined plane, or may be arranged to conform to the surface engaged by the abrasive band.

It is an additional object of our invention to provide an abrasive band, means to drive the band, and means to maintain the band in taut working engaging position.

It is a further object of our invention to provide an air-operated tool, in which an abrasive band is operated by air motors and the band is maintained in taut condition by air-operated pistons, all of such agencies being supplied from a common source of air, whereby when the motors are started by the air, the band will be brought into taut condition and maintained yieldingly in that condition either to travel in a horizontal or vertical plane over a flat surface or to yieldingly conform to a surface that is not flat.

It is a further object to provide guards for the ends of the band, which will move with the ends of the band and which may be yieldingly moved away from the band in case any obstruction gets between the abrasive band and the guard, such as the hand or glove of a workman.

It is a further object of our invention to provide a tool which may be supported in balanced position with the band either in horizontal or vertical position by support from a common supporting means.

It is a further object to provide a tool that is balanced for mounting on said support and a tool in which the handles constitute the air exit lines.

It is a further object of our invention to provide a guide shoe and yielding means thereon for guiding the abrasive band in a predetermined plane of movement.

It is a further object to provide a detachable abrasive guard plate, which will protect the tool from flying abrasive from the band, and which may be detached and attached from time to time as the plate becomes worn out without the necessity of reconstructing the tool due to the abrasive action of the flying abrasive.

It is a further object to provide a detachable air motor unit and a detachable belt unit so that the respective units may be detached from the tool for replacement or repair without disturbing the remainder of the tool.

Referring to the drawings:

Figure 1 is a top plan view thereof;

Figure 2 is a section on the line 2—2 of Figure 3;

Figure 3 is an elevation partially in section on the line 3—3 of Figure 2;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a section on the line 5—5 of Figure 3;

Figure 6 is an end elevation of the tool with the band in horizontal position;

Figure 7 is a similar view with the tool adjusted so that the band is in vertical position.

Figure 8 is a section on the line 8—8 of Figure 3 showing the relationship between the shoe, the spring guide plate and the band.

Figure 9 is a vertical section along the line 9—9 of Figure 10;

Figure 10 is a side elevation of the tool as applied to the abrading of concave surfaces, and employing a guide roller beneath the abrasive belt.

It will be understood that we may employ in connection with our tool varying types of motive power and varying types of power mechanism for maintaining the belt in taut condition and of stretching the belt simultaneously with the application of power, but we have found that air pressure is one of the most satisfactory belt actuating mediums and one of the most satisfactory mediums for employment in maintaining the belt taut, as it will yieldingly maintain under a predetermined pressure and tension the belt in the position desired.

Referring to the drawings in detail, the tool consists of a backbone member comprising a chambered casting having a top wall 1 with an inlet port 2 and an air chamber 3 formed by the bottom wall 4 to the top wall 1, the side wall 5 and the partition wall 6. The contents of this chambered casting discharge at either end through the ports 7 and 8 into the chambers 9 and 10.

The air chamber 3 has one wall thereof formed at 11 which has a partition wall between the air chamber and the oil chamber 12. The oil chamber 12 is formed by the outside wall 13, the top wall 1 and the bottom wall 4.

Communication with the oil chamber for filling is secured through the port 14 closed by the cap 15 and the exit of the oil is controlled through the port 16 into the air chamber 3 by the screw needle valve 17, the lock nut for which at 18 is mounted on the exterior of the tool body.

The passageways or chambers 9 and 10 discharge through the passageway 19 into the hori-

zontally-disposed passageways 20 and thence through the port 21. The passageway 20 is formed within the hollow shaft 22 that acts as the support for the swinging pulley 23 and the swinging motor housing 24, which housing is detachably mounted by the bolts 25 to the collar 26 and is mounted upon the shaft 22 with the bearing sleeve 27 interposed therebetween.

The extension of the shaft 22 into a spindle 28 serves as a support for the pivoted guard plate 29 that is yieldingly held in position by the spring 30 which engages the guard plate at one end, surrounds the spindle 28 at its central portion and engages the backbone member at its other end 31 against the plate 32.

Thus, the pulley 23 and the motor housing 24 move as a unit, the pulley 23 being mounted upon the motor shaft 99 which drives it. The motor shaft 99 carries a motor rotor 33 having slidable blade members 34 which are engaged by the air. The motor rotor 33 is mounted eccentrically of the cylinder 35. The air enters the passageway 21, thence through the passageway 36, through the screen 37 interposed between the motor frame 24 and the swinging support 26, through the passageway 38 past the governor valve member 39 operating in the sleeve 40, through the passageway 41, passageway 42 into the inlet ports 43 of the cylinder 35 and thence after engaging with the motor blades 34, it discharges at 44 into the chamber 45 through the port 46, port 47, through the passageway 48 in the handle 49 out the end of the handle as at 50.

It will be understood that any form of motor may be employed and we have merely shown a successful form which we have used for this purpose.

The inlet of air is controlled by the hose attachment 51 which contains a passageway 52 and a valve member 53 for controlling the inlet of the air through the port 2 in the backbone casting 1, to which it is bolted by the bolts 54.

The air from the air chamber 3 lifts the ball check valve 55 normally seated by the spring 56 so that the air can pass through the passageway 57 into the cylinder 58 behind the belt stretching piston 59. This piston actuates the piston rod 60, the free end of which at 61 rides against a cup 62 carried on the motor housing casting 24. A spring 63 is interposed between the detachable end cover 64 of the cylinder 58 and the cup 62, such spring being of beehive construction. This spring is not essential but it is desirable in some installations to maintain the belt, hereinafter described, in some degree of stretch to prevent it from buckling or wrinkling when the air is off.

In the event the operator should desire to cut off the motive power operating the motors by shutting off the air to stop the belt but still not desire to release the tension on the belt, then the ball check valve 55 will seat under the influence of the spring 56 and retain the pressure behind the piston 59.

When it is desired to release this pressure, the operator can depress the plunger 64 against the resistance of the spring 65 to unseat the ball 55 releasing the air into the air chamber 3.

The belt itself consists of a woven fabric support 67 with an abrasive surface 68, but it will be understood that any form of abrasive belt may be employed.

The belt is guided on its upper portion by the spools 69 having guide flanges 70, which spools are mounted upon the spindles 71 at either end of the tool.

Directly over the belt and carried by the backbone casting on the arms 72 is a detachable steel plate 73 held on by the rivets 74. This plate receives the flying abrasive and other foreign material and thereby protects the tool itself from becoming worn out, because this plate can be detached and a new one substituted without difficulty, and the plate itself can be made of very hard material.

Mounted upon the backbone member is a U-shaped shoe member having depending end portions 75 attached by bolts 76 to the backbone member of the tool. It is provided with a horizontal member 77. The horizontal portion of the shoe carries a yielding, horizontally-disposed spring plate interposed between the shoe and the back of the belt. This spring plate is riveted at 78 to the center of the horizontal portion of the shoe 77 and extends downwardly into engagement with the interior of the belt as at 79. It has struck up spring portions 80 at either end.

When it is desired to employ this abrasive machine on curved surfaces or other surfaces other than those strictly plane, then the shoe can be detached by removing the bolts 76 and the belt can be mounted upon the curved surface to be dressed so that the belt will conform to the curved surface and the air pistons and cylinders at either end of the belt will yieldingly maintain it in taut condition over the work.

On the other hand, if the shoe is used with the spring plate having the arms 79 and spring ends 80, this spring plate tends to maintain the belt yieldingly in generally horizontal or vertical plane of movement depending upon the position of the tool.

The convex surface of each pulley 23 provides against lateral movement of the belt.

In order to control the speed of the motors at either end of the belt driving the respective pulleys 23, we have provided a governor 81 which serves to reciprocate the valve member 39 that controls the air flow through the passageways 38 and 41. This governor is mounted upon the rotor shaft 99.

As mentioned heretofore, the guard 29 moves with the motor and pulley. It is limited in its approach under the influence of the spring 30 to the surface of the belt by the limiting pin 82 carried on the handle member 49. Thus, if a workman gets his glove or hand between the guard 29 and the belt, the guard will spring out to relieve the difficulty, but the guard will be normally held yieldingly in such position as to prevent such an occurrence.

It will be noted that the tool in some forms is of sufficient weight as to necessitate a proper support or suspension system for the tool to maintain the belt either in a horizontal plan or in a vertical plane.

For this purpose we have provided an upper supporting hook 83 on the pin 84 carried in the clamping sleeve 85 which is clamped by the bolt 86.

We also provide a lower hook 87 carried on the bolt 88 that is threaded at 89 in the eye 90 and is clamped by the nuts 91 and 92 in adjusted position.

A cable 93 has its end eyes 94 mounted upon these hooks 83 and 87 and fastened over the supporting pulley 95.

This pulley 95 is mounted upon a yoke 96 that is connected by a swivel 97 to an eye 98 that is in turn connected to a cable that may be

counterbalanced by a spring or weight or other means.

This support is so arranged that the tool is balanced in the position shown in Figure 6 to remain in a horizontal plane with respect to the belt, but it may be rocked to the vertical position shown in Figure 7 without changing the connections or the arrangement of the cable 93 or the associated parts.

This provides for perfect balancing of the tool and easy operation by the workmen employing the tool.

It will be noted that the handles 49 are located at opposite ends of the tool. It will be further noted that the motor pulley and handle all move as a unit.

When it is desired to apply the abrasive belt to a concave surface, we provide a guide roller 101 having a resilient surface 100 (Figures 9 and 10). The roll 101 is mounted on the axle 105 in the sleeve 103, which is attached by the bolts 102 through the slots 106 to a depending bracket 104 that is mounted upon the backbone member heretofore referred to.

It will be noted that this guide roller 101 is adjustable vertically and if desired the bracket 104 may be pivotally mounted to permit of lateral adjustment.

It will be understood that we desire to comprehend within our invention such modifications as may be necessary to adapt it to varying conditions and uses.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In combination, a backbone member, swinging supports mounted on either end thereof, pulleys on said supports, a belt mounted on said pulleys, motors carried in each of said supports driving said pulleys and belt, cylinders and pistons with piston rods interposed between said backbone member and said swinging members, means for applying pressure to said pistons and said cylinders for moving said swinging members to maintain said belt in taut condition, means of applying said pressure to said motors for operating said motors, and means for exhaust from said motors comprising handle members mounted on said swinging members through which said exhaust can pass.

2. In combination in a tool, a backbone member, swinging supports pivoted at either end thereof, motors in each support, pulleys driven by said motors, a belt mounted on said pulleys, pressure actuated means between said backbone member and swinging members for tightening said belt, means connected to the motors for applying pressure to the pressure actuated means when said motors are operated and the belt is moved, and means to retain the pressure on said belt tightening means when the motors are inoperative.

3. In combination in a tool, a backbone member, swinging supports pivoted at either end thereof, motors in each support, pulleys driven by said motors, a belt mounted on said pulleys, pressure actuated means between said backbone member and swinging members for tightening said belt, means connected to the motors for applying pressure to the pressure actuated means when said motors are operated and the belt is moved, means to retain the pressure on said belt tightening means when the motors are inoperative, and means of releasing said pressure irrespective of the operation of said motors.

4. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, fluid pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone member supplied with fluid pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, and means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off.

5. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone member supplied with pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off, and means for releasing said pressure retaining means to permit the exhaust of fluid pressure behind said pistons irrespective of the control of the fluid pressure on the motors.

6. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, fluid pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone member supplied with fluid pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, and means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off, a guide shoe carried by said backbone member adapted to guide said belt.

7. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, fluid pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone

member supplied with fluid pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off, and means for releasing said pressure retaining means to permit the exhaust of fluid pressure behind said pistons irrespective of the control of the fluid pressure on the motors, a guide shoe carried by said backbone member adapted to guide said belt.

8. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, fluid pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone member supplied with fluid pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off, a guide shoe carried by said backbone member adapted to guide said belt, and yielding means interposed between said guide shoe and said belt.

9. In combination, a backbone member having a passageway therethrough for conducting fluid pressure, means of supplying fluid pressure thereto, swinging belt supporting members pivoted at either end thereof having fluid passageways therethrough communicating with the backbone member passageway, fluid pressure operated motors in said swinging members communicating with said passageway, pulleys operated by said motors, a belt mounted on said pulleys, pressure operated pistons and piston rods interposed between said swinging members and backbone member supplied with fluid pressure from said backbone member, whereby the application of pressure to the backbone member will operate said motors and stretch said belt, means to retain pressure behind said pressure operated pistons when the fluid pressure in the backbone member and motors is cut off, means for releasing said pressure retaining means to permit the exhaust of fluid pressure behind said pistons irrespective of the control of the fluid pressure on the motors, a guide shoe carried by said backbone member adapted to guide said belt, and yielding means interposed between said guide shoe and said belt.

10. In combination in a tool, a backbone member comprising a fluid passageway, means of supplying fluid to said passageway, depending swinging motor supports having ports and passageways, bearing members for supporting said supports at either end of said backbone member having passageways and ports therethrough communicating with passageways and ports through the swinging motor supports, a pressure actuated motor and shaft mounted therein, and a pulley mounted on said shaft.

11. In combination in a tool, a backbone member comprising a fluid passageway, means of supplying fluid to said passageway, depending swinging motor supports having ports and passageways, bearing members for supporting said supports at either end of said backbone member having passageways and ports therethrough communicating with passageways and ports through the swinging motor supports, a pressure actuated motor and shaft mounted therein, and a pulley mounted on said shaft, a governor controlled by said shaft, and a valve member controlled by said governor located in the passageway through said swinging motor support between the motor and the source of supply.

12. In combination in a tool, a backbone member comprising a fluid passageway, means of supplying fluid to said passageway, depending swinging motor supports having ports and passageways, bearing members for supporting said supports at either end of said backbone member having passageways and ports therethrough communicating with passageways and ports through the swinging motor support, a pressure actuated motor and shaft mounted therein, and a pulley mounted on said shaft, a governor controlled by said shaft, and a valve member controlled by said governor located in the passageway through said swinging motor support between the motor and the source of supply, cylinders mounted between said swinging supports on said backbone member, pistons and piston rods associated therewith, and means for receiving the ends of said piston rods on said swinging motor supports, said cylinders and backbone member having means of supplying fluid pressure behind said pistons and said cylinders.

13. In combination, a backbone member comprising an air passageway and an oil chamber, valve means of regulating communication therebetween, chambered pivotal supports at either end thereof, chambered housings mounted thereon communicating therewith, an air operated motor in each of said housings, a handle on each of said housings having exhaust passageways communicating with said motor, pneumatic cylinders mounted on said backbone member between said housings and disposed at an angle thereto, a piston and piston rod in each of said cylinders, said piston rod engaging said housing to force it outwardly, means to support a belt driven by said air motors in each housing, whereby said belt will be maintained taut when the pressure is supplied to said cylinders against said pistons.

14. In combination, a backbone member comprising an air passageway and an oil chamber, valve means of regulating communication therebetween, chambered pivotal supports at either end thereof, chambered housings mounted thereon communicating therewith, an air operated motor in each of said housings, a handle on each of said housings having exhaust passageways communicating with said motor, pneumatic cylinders mounted on said backbone member between said housings and disposed at an angle thereto, a piston and piston rod in each of said cylinders, said piston rod engaging said housing to force it outwardly, means to support a belt driven by said air motors in each housing, whereby said belt will be maintained taut when the pressure is supplied to said cylinders against said pistons, a ball check valve associated with each of said cylinders to prevent the escape backwardly to prevent the pressure behind the pistons.

15. In combination, a backbone member comprising an air passageway and an oil chamber, valve means of regulating communication therebetween, chambered pivotal supports at either end thereof, chambered housings mounted there-

on communicating therewith, an air operated motor in each of said housings, a handle on each of said housings having exhaust passageways communicating with said motor, pneumatic cylinders mounted on said backbone member between said housings and disposed at an angle thereto, a piston and piston rod in each of said cylinders, said piston rod engaging said housing to force it outwardly, means to support a belt driven by said air motors in each housing, whereby said belt will be maintained taut when the pressure is supplied to said cylinders against said pistons, a ball check valve associated with each of said cylinders to prevent the escape backwardly to prevent the pressure behind the pistons, and means operable from the exterior of said backbone members for unseating said ball check valve to release the pressure behind said pistons in said cylinders.

16. In combination, a hollow backbone member for supplying fluid pressure, chambered swinging motor supports mounted on the backbone communicating therewith, motors in said supports driven by said fluid pressure, pulleys driven by said motors, and an abrasive belt on said pulleys, said chambered member and said belt being located parallel to one another.

17. In combination, a hollow member for supplying fluid pressure, chambered swinging motor supports mounted thereon communicating therewith, motors in said supports driven by said pressure, pulleys driven by said motors, an abrasive belt on said pulleys, said chambered member and said belt being located parallel to one another, and a detachable screen carried by said chambered member extending over the top of said belt.

18. In combination, a hollow member for supplying fluid pressure, chambered swinging motor supports mounted thereon communicating therewith, motors in said supports driven by said pressure, pulleys driven by said motors, an abrasive belt on said pulleys, said chambered member and said belt being located parallel to one another, a detachable screen carried by said chambered member extending over the top of said belt, and pivotal arcuate screens arranged to depend over the ends of said belt.

19. In combination, a hollow member for supplying fluid pressure, chambered swinging motor supports mounted thereon, communicating therewith, motors in said supports driven by said pressure, pulleys driven by said motors, an abrasive belt on said pulleys, said chambered member and said belt being located parallel to one another, a detachable screen carried by said chambered member extending over the top of said belt, pivotal arcuate screens arranged to depend over the ends of said belt, and means for causing said arcuate screens to move with the ends of said belt in spaced relationship thereto.

20. In combination, a backbone member having a fluid passageway therethrough, swinging motor supports having passageways therethrough communicating therewith, motors therein, pulleys driven thereby, and an abrasive belt mounted on said pulleys, a guide shoe mounted on said backbone member and engaging the interior of said belt, a detachable screen extending over the top of said belt mounted on said backbone member, depending arcuate screens pivoted on said backbone member and surrounding the ends of said belt and engaging said swinging motor supports to travel therewith.

21. In combination, a backbone member having a fluid passageway therethrough, swinging motor supports having passageways therethrough communicating therewith, motors therein, pulleys driven thereby, and an abrasive belt mounted on said pulleys, a guide shoe mounted on said backbone member and engaging the interior of said belt, a detachable screen extending over the top of said belt mounted on said backbone member, depending arcuate screens pivoted on said backbone member and surrounding the ends of said belt and engaging said swinging motor supports to travel therewith, and yielding means engaging said arcuate shield and backbone member for yieldingly maintaining said shield in predetermined relationship to said belt.

22. In combination, a backbone member having a fluid passageway therethrough, swinging motor supports having passageways therethrough communicating therewith, motors therein, pulleys driven thereby, an abrasive belt mounted on said pulleys, a guide shoe mounted on said backbone member and engaging the interior of said belt, a detachable screen extending over the top of said belt mounted on said backbone member, depending arcuate screens pivoted on said backbone member and surrounding the ends of said belt and engaging said swinging motor supports to travel therewith, and yielding means engaging said arcuate shield and backbone member for yieldingly maintaining said shield in predetermined relationship to said belt, and means on said swinging motor support for limiting the approach of the shield to the belt.

23. In an abrasive tool, a supporting backbone member, spaced pulleys and a abrasive belt thereon, means for driving said pulleys, means for swinging and supporting said pulleys, means for moving said pulleys away from one another, yieldingly mounted end guards depending from said support and engaging said swinging pulley supports whereby as the pulleys move with the belt the guards will move with the pulleys and the belt, and means for limiting the inward movement of the guards towards the belt while permitting the free outward movement of the guards from the belt.

24. In combination in an abrasive belt tool, a support, supporting pulleys mounted thereon, an abrasive belt mounted thereon, arms extending from said support over said belt, and a detachable guard plate supported thereby and arranged parallel to and in spaced relationship to the top of said belt, whereby as the abrasive flying from the belt wears out the guard, it may be detached and a new one attached.

25. In combination in an abrasive tool, a support, supporting pulleys thereon, and an abrasive belt mounted thereon, a laterally and downwardly extending shoe member detachably mounted on said support, a spring plate mounted on the bottom of said shoe member depending downwardly and laterally in engagement with the interior of the belt, and yielding means on the end of said spring member for engaging said belt and said shoe member for maintaining said belt in predetermined spaced relationship with respect to the shoe.

26. In an abrasive tool comprising a support, an abrasive belt, means for driving said belt, a hooked member extending laterally from the top of said member in one direction, a second hooked member extending laterally at a lower lever in the other direction, a cable connected to said hook members, a pulley swivelly mounted for supporting said cable, said tool being so arranged that it may be balanced on said cable and

pulley in either its horizontal or vertical position and when in either of said positions the belt will be either in horizontal or vertical position.

27. In combination, a tool having an abrasive belt and a support therefor with means to drive said belt, oppositely-extending support means, a cable attached thereto, a pulley over which said cable passes, means of supporting said pulley whereby said tool may be balanced with the belt either in a horizontal or vertical position.

28. In combination, a tool having an abrasive belt and a support therefor with means to drive said belt, oppositely-extending hooked means, a cable attached thereto, a pulley over which said cable passes, means of supporting said pulley whereby said tool may be balanced with the belt either in a horizontal or vertical position, means on said tool for stretching said belt and for driving said belt without upsetting the balance of said tool as thus supported.

29. In combination, a backbone, having an air passageway therein, means operated by the air passing through the passageway to drive a belt, an abrasive belt to be driven thereby, means to support said driving means at either end of said backbone support, at least one of said driving means being pivotally mounted with its support on the backbone support, and means operated by the air passing through the passageway to place the belt under tension.

30. In combination, a support, an abrasive belt, means mounted on said support for driving said belt and supporting it, and means operatively connected to the driving means for maintaining a uniform pressure on said belt irrespective of the deflection of the belt in working upon articles which deflect the belt.

31. In combination, a belt, means to drive said belt, means to pivotally support at least one of said driving means, means for delivering air to said driving means through said support, an oil chamber in said support, and means for admitting oil from the oil chamber into the air supply means for the driving means.

WILLIAM W. PRICE.
CHARLES W. RIPSCH.