May 9, 1950 A. P. ROBINSON 2,507,052

SURFACE FINISHING MACHINE

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Fig. 1

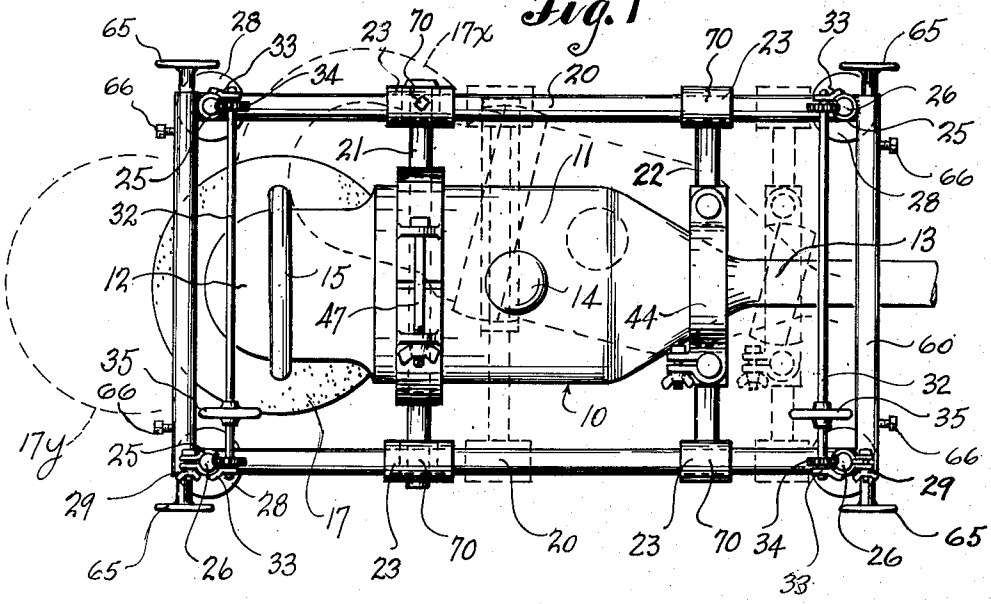
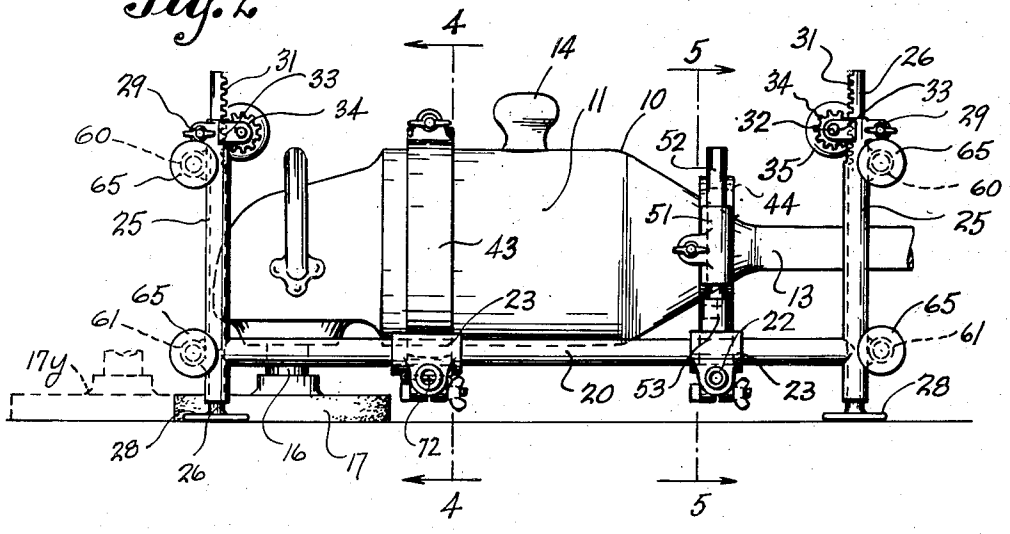


Fig. 2



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Fig. 3

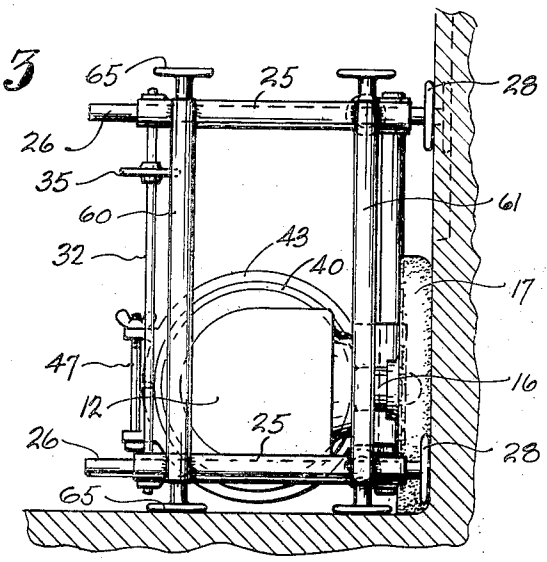


Fig. 4

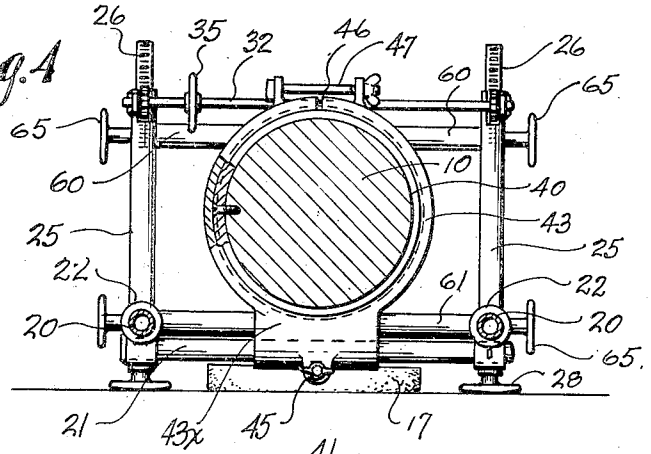
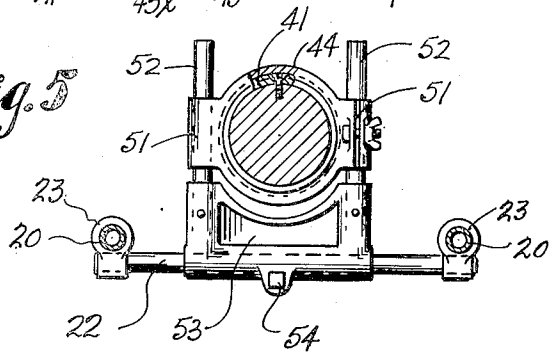


Fig. 5



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Fig. 6

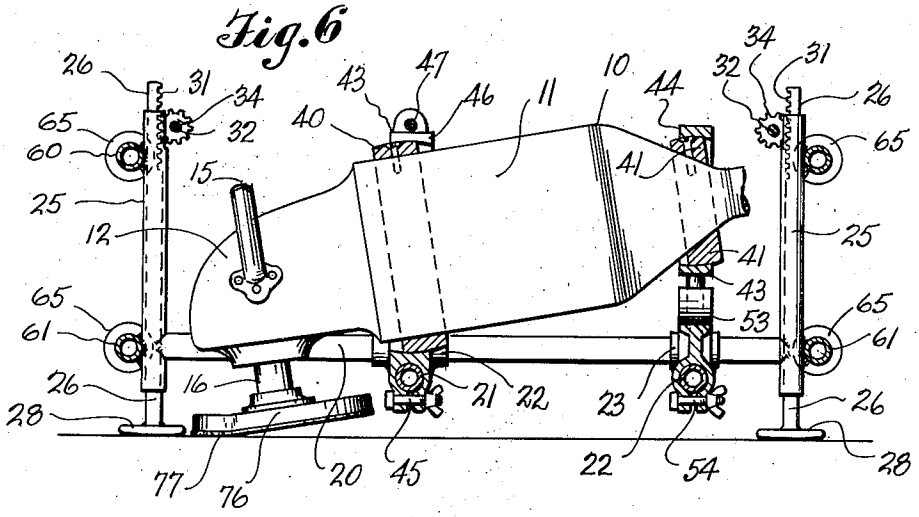


Fig. 7

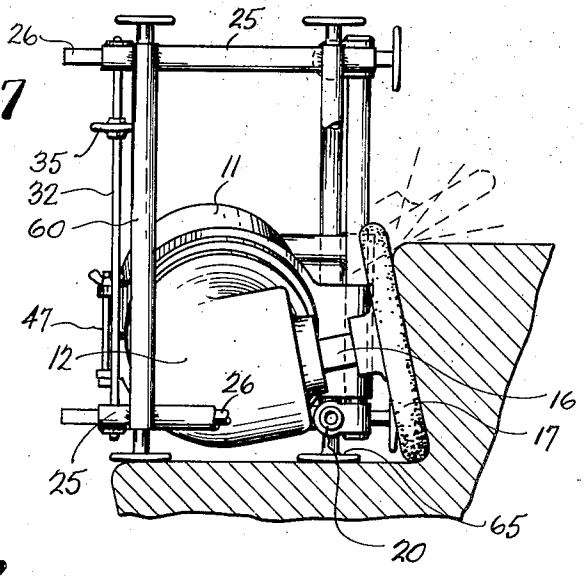
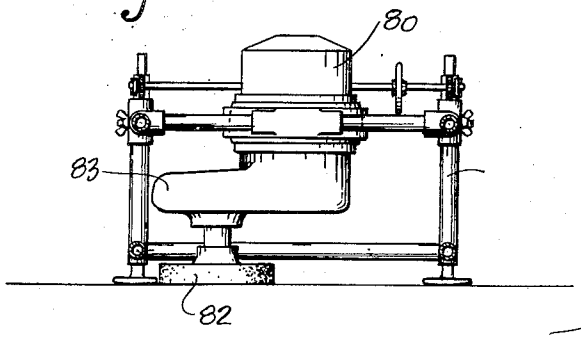


Fig. 8



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UNITED STATES PATENT OFFICE

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SURFACE FINISHING MACHINE

Albert P. Robinson, Seattle, Wash.

Application June 13, 1947, Serial No. 754,366

7 Claims. (Cl. 51—177)

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This invention relates to surface finishing machines, and it has reference more particularly to machines designed for finishing the surfaces of floors, stairways, base moldings, etc., that are made of terrazzo, or of any similar form of masonry which is surfaced by grinding and polishing.

It is the principal object of this invention to provide means for use with grinding apparatus, that makes a faster and better finishing operation possible, without any danger of gouging, or marring a surface by reason of improper holding of the grinding disk, and also relieves the operator of the heavy strain of holding the grinding machine in a definite position for the specific work being done.

Explanatory to the invention, it will be here stated that in the finishing or surfacing of floors, baseboards, stairways, etc., of terrazzo or the like, it is usually the case that a revolubly driven grinder of disk-like form is employed. This disk is fixed on the drive shaft of a motor, and the motor housing is equipped with handles whereby the operator holds and guides the device in use. To insure an even, smooth surface, that is free of irregularities or disk marks, it is necessary that the grinding disk be held perfectly flat against the surface being finished, for if it should be tilted to one side or the other, it is quite apt to quickly cut an arcuate groove that is damaging to the surface and detrimental to its appearance. Furthermore, the holding of the grinder in the proper position by hand is a strain on the operator and becomes quite exhausting, especially when machines of large size are used.

In view of the foregoing explanatory matter, it has been one of the principal objects of this invention to provide a light, substantial frame structure, that may be easily skidded on the surface being finished or adjacent thereto, and in which the grinder may be placed and secured in proper position for the finishing of a surface, thus to mechanically hold the grinder to insure the desired evenness of the surface finish and also to relieve the operator of the heavy strain of holding the machine against that tilting or improper position that would result in damage to a surface being finished.

It is also an object of the invention to provide a novel manner of mounting the grinding or surfacing machine in such a frame structure so that it may be rotated, shifted, or adjusted in position in the frame to adapt the grinder disk to the surfacing of floors, baseboards, undercut stair risers, base moldings, etc., or for other uses.

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Still another object of the invention is to provide a frame structure in which the grinding machine may be adjustably secured for work on floors, or other horizontal surfaces, and which frame may be turned on its side with grinder mounted therein, to support the grinding disk properly for operation on vertical surfaces, such as baseboards, stair risers, and the like.

Still further objects of the invention reside in the details of construction and combination of parts embodied in the combination of grinder and frame, and in the mode of use and operation as will hereinafter be described.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a plan, or top view of a surface finishing machine embodied by the present invention.

Fig. 2 is a side view of the same showing the grinding machine as supported in position for finishing a floor surface.

Fig. 3 is a forward end view of the grinder and the supporting frame structure, as positioned for surfacing a baseboard or vertical surface.

Fig. 4 is a cross-section, taken on the line 4—4 in Fig. 2.

Fig. 5 is a cross-section taken on line 5—5 in Fig. 2.

Fig. 6 is a vertical, longitudinal section of the supporting frame structure, showing the adjustment of the grinding machine for a floor sanding operation.

Fig. 7 is an end view of the machine showing the position of the grinder for a stair riser surfacing operation.

Fig. 8 is an elevation of a machine of a modified form.

Referring more in detail to the drawings—

First, it will be explained that in the present combination, I contemplate using motor driven grinders like, or similar to, those now in general use for floor surfacing operations, and altering them only to the extent necessary to adapt them for use in the present supporting and guiding frame structure. Also, it is the intent in this invention, that the means for supporting the grinder in the frame be of such character that the latter may be easily and readily disposed in the frame at any necessary or advantageous position. The function of the frame structure, primarily, is to hold the grinder at such level or position that the grinding disk will flatly engage with the surface being finished and not allowed to

gouge in; however, it serves additionaly as a means of sustaining the weight of the grinder that is usually held by the operator. Furthermore, by reason of the adjustability of the grinder in the frame, the grinding stone can be held at any set position of inclination as required for any specific work.

In the drawings, I have illustrated one common type of grinder, designated in its entirety by reference numeral 10, and it comprises an electric motor within a motor housing of cylindrical form, designated at 11. A gear case 12 is fixed rigidly to what will be referred to as the outer end of the motor, and a tubular portion 13 of reduced diameter, serving as a handle, extends from the inner end of the housing 11. Other handle members 14 and 15 are fixed rigidly to the parts 11 and 12 for convenience in the handling of the machine in use, especially when the grinder is used independently of the supporting frame structure.

Extended downwardly from the gear case 12, is a motor driven shaft 16 and mounted on this is a grinding disk 17. This disk surface lies in a plane parallel to the longitudinal axis of the housing 10. As seen in Fig. 1, the grinding disk is of such diameter that it extends substantial amounts to opposite sides of the housing 10 and also forwardly of the gear case 12.

The frame structure in which the grinder is supported for use, as noted best in Figs. 1 and 2, comprises parallel, horizontally extending, opposite side shafts 20—20, between which two cross rods 21 and 22, are extended; each of which cross rods is equipped at its opposite ends with fittings 23 that are longitudinally slidable on the shafts 20—20. It is upon the cross rods 21 and 22 that the grinder is operatively supported for use, as will presently be more fully described.

Secured rigidly to the opposite ends of the shafts 20 and 20, are vertical, tubular members 25, each of which has a frame supporting leg 26 adjustably contained therein. Each leg is in the form of a solid rod that extends at its lower end from its containing tube 25, and at that end is equipped with a shoe or runner 28 of a type that is easy to slide or skid upon a floor surface. For purpose of vertical adjustment of the legs 26, the upper end portions of each of the tubular members 25 are longitudinally split and equipped with clamp screws 29 adapted to be tightened for the securement of the legs at any position of adjustment as may be required to properly engage the grinding stone of the grinder supported on the frame with a surface being worked on.

The upper end portions of the rods or legs 26 are equipped with rack teeth 31 formed therealong and cross shafts 32 are extended between legs at opposite sides of the frame and revolubly held at their ends in bearings 33 on the upper ends of corresponding tubes 25. These shafts are equipped with gear pinions 34 at their ends in mesh with the rack teeth of the legs to provide for making simultaneous and equal adjustments A hand wheel 35 is fixed on each shaft for turning it in making an adjustment.

The grinding machine, comprising the motor, its housings 11 and 13, the gear housing 12 and disk 17, are designed to be handled as a unit, and to be functionally mounted in the frame structure. The means of support for the grinder comprises the two cross rods 21 and 22, which, as previously stated, are adjustable along the opposite side shafts 20—20 of the frame. It is

shown best in Figs. 4 and 5, that bearing rings or bands 40 and 41 are fixed about the motor housing parts 11 and 13, near the forward and rearward ends of the grinder and these bands have spherically curved outer surfaces and are fitted for turning in enclosing bearing bands 43 and 44 that, respectively, are mounted upon the cross rods 21 and 22.

It is shown in Fig. 4, that the band 43 is equipped at its lower side with a longitudinally split bearing portion 43x that is mounted on the cross rod 21 for endwise shifting thereon, and this portion is equipped with a clamp screw 45 for securing it at any set position. The band 43 also is cut at the top, as at 46, and a clamp bolt 47 joins the ends across the joint for drawing the band tight to secure the motor against movement after a rotatable adjustment thereof has been made.

Likewise, it is shown in Fig. 5, that the spherically surfaced band 44 which is fixed about the smaller end of the motor housing 13 is rotatably contained in a collar 44 that, at opposite sides has bearing portions 51—51 that are vertically adjustable on parallel, vertical posts 52—52 fixed in a bearing member 53 that is mounted on cross rod 22 for adjustment transversely of the frame. This bearing has a clamp bolt 54 associated therewith and adapted to be tightened to hold the bearing at any set position of adjustment.

It is to be understood that the described means of support for the grinder permits it to be rotatably adjusted on its longitudinal axis for the lateral tilting of the grinding disk, and also permits the forward end of the motor to be swung laterally to either side of the frame, for example, to positions corresponding to the dotted line position shown in Fig. 1. Furthermore, the mounting permits the up and down adjustment of one end of the grinder, for example, as shown in Fig. 6, as required for sanding a floor surface; a special sanding disk, of flexible character being used for this work.

The supporting frame structure, also, is equipped at opposite ends with upper and lower tubular cross rods 60 and 61 fixed at opposite ends to the vertical members 25. Adjustably mounted in the opposite ends of these tubular members are gauging or guiding shoes 65, with flat outer surfaces adapted to engage in sliding contact with a wall or floor to insure against the grinding disk being gouged into a wall surface. These shoes, also, are designed to serve as supports for the frame when it is turned on its side for use as has been indicated in Fig. 3. The guide shoes 65 have mounting rods of substantial length telescopically contained in the cross rods 60—61 and set screws 66 are applied to the cross rods for tightening against these rods for the securement of the shoes at any set position of adjustment.

Assuming the parts to be so constructed and assembled, the use of the grinder in this combination would be as follows:

First, the motor housing would be properly equipped with the bearing bands 40 and 41, and the proper or a selected grinding disk 17. Then the device is secured in the frame by seating the bands 40 and 41 in their respective bearing bands 43 and 44. The latter bands are then tightened to rigidly secure the grinder in its frame and the legs 26 are adjusted vertically in the tubular guides 25 so that, by means of the frame, the grinder is held secure and the surface of the disk 17 is located in proper grinding relationship

to the floor surface. With the parts so secured, the grinder is set in position, and is merely skidded back and forth on the floor surface during the grinding operation, being held properly in place at all times by the frame in lieu of having to be held by the operator. Thus, the chance of gouging and uneven grinding is eliminated and the effort of manually holding the machine is eliminated.

For ordinary surfacing operations, the grinder is located in the frame as illustrated in Figs. 1 and 2. However, for surfacing up close to a baseboard, it is advantageous to adjust the grinder to such position that the grinding disk will extend to one side of the frame, for example, as has been shown in dotted lines at 17*x* in Fig. 1. To make this adjustment, the clamp bands 43 and 44 are loosened, and then the adjustment is made. It is understood that, with this adjustment, the collars 40 and 41, which are secured to the motor housing, may turn freely in the clamp rings because of their spherical outside form. In this adjustment, the cross rods 21 and 22 will automatically adjust themselves in spacing on their supporting shafts. Set screws 70 in the fittings 23 may be tightened against the shafts 20—20 to secure the adjustment.

It is indicated also in Fig. 1, that the grinder might be shifted endwise so that the disk might project forwardly of the frame, as to the dotted line position of the disk designated at 17*y*.

Since it may, at times, be advantageous to use the grinder independently of the supporting frame structure, I have provided for its quick and easy detachment from the frame merely by the withdrawal of the cross shafts 21 and 22 from their fittings 23. Ordinarily the cross rods are secured by cotter keys passed through their end portions as at 72 in Fig. 2.

With the grinder secured properly in the frame structure, it is possible to manipulate it in the usual manner for any floor surfacing operation. The operator may grasp the framework or the handles of the housing for the movement of the grinder on a floor. The advantage of its use with the frame resides in the fact that it is impossible to tilt it to any position at which the grinder disk can damage the floor; even grinding is insured, and the heavy strain on the workman of holding the grinder in proper position is avoided.

If work is to be done close up to a baseboard, the grinder is first adjusted to one side of the frame, as indicated by dotted lines in Fig. 1, then the shoes 65 at that side are extended for guiding contact with the side wall surface so as to eliminate possibility of gouging or the disk cutting in too deep.

When it is desired to grind the face of a baseboard or other vertical surface, the frame structure may be turned on its side, as in Fig. 3, so that the shoes 65 at one side then become the frame supporting skids. The shoes or runners 28 may then be extended as wall contacting guides. Adjustments for properly positioning the grinding disk 17 are made as previously explained and operation for this job is substantially as for the surfacing of a floor.

For the surfacing of undercut stair risers, the frame is laid on the side in the same manner as for baseboard grinding and the motor is then rotatably adjusted about its longitudinal axis, as has been illustrated in Fig. 7, to bring the grinding surface of the disk 17 to a proper degree of inclination. Work is then carried on as for base surfacing. Also, by reason of the adjustability of parts, the nose of the tread may be surfaced as indicated in Fig. 7.

For floor sanding operations, the grinding disk 17 as used for floors is replaced by a flexible base disk 76 equipped with sandpaper disk 77 as has been shown in Fig. 7, and the desired inclination of the sanding disk is obtained by the vertical adjustment of the handle end of the motor housing. Use of the machine so equipped with sandpaper disk is substantially as for floor grinding operations.

Fig. 8 illustrates a modified or alternative form of device wherein a frame structure substantially like that already described is employed. A motor 80 is supported on cross rods 81 for rotatable adjustment about a vertical axis, and the grinding disk 82 carried by a radially directed arm 83 may be swung to advantgeous positions.

It is also anticipated that in the use of machines of this character, provision be made whereby the grinding disk will be automatically lifted clear of the surface with the shutting off of power. Such a mechanism could be manually or automatically operated.

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

1. The combination with a power driven surface finishing machine of portable type comprising a housing, a motor driven shaft extended from the housing and a surface finishing disk fixed on the shaft, of a support and guide for the machine comprising an open frame structure for the reception of the machine therein, means for the securement of the machine, in different working positions, in the said open frame structure, and surface engaging runners adjustably fixed on said frame structure and whereby the machine will be sustained while in functional use and the disk held in a definite relationship to the sustaining surface; said means for securement of the machine comprising a band for encircling the said housing and adapted to be tightened thereabout, and a cross support in said open frame on which said band is fixed for tilting adjustment to change the working angle of the disk.

2. The combination with a power driven surface finishing machine comprising a housing, a motor driven shaft extended downwardly from the housing and a surface finishing disk fixed to the shaft, of a support and guide for the machine comprising an open frame structure adapted to receive the machine therein, and including means for the securement of the machine in working position therein, and runners mounted by the frame at opposite sides and ends of the machine, whereby the machine will be sustained in working relationship to the supporting surface; said runners being adjustably mounted on the frame to maintain the disk in a working relationship to the surface being finished thereby; said means for the securement of the machine in said open frame comprising a cross-support in said open frame, a band encircling the said housing and equipped to be tightened thereabout, and tiltably secured to the cross support, for angular adjustment of the machine, and a vertically adjustable support for the machine fixed in the frame and spaced from the said band, to coact therewith in retaining the angular adjustment of the machine.

3. The combination with a power driven surface finishing machine comprising a housing, a motor driven shaft extended downwardly from

the housing and a surface finishing disk fixed to the shaft, of a support and guide for the machine comprising a rectangular, open frame structure, adapted to receive the machine therein and having corner posts and horizontal bars rigidly connecting said posts along opposite sides of the frame, cross supports extended between opposite side bars, means for adjustably fixing the said machine thereon with its disk in working relationship to the surface to be finished, runners mounted at the four corners of the frame for sustaining the machine in use and adjustable to maintain the disk parallel to the surface and at a designated working elevation.

4. A combination as recited in claim 3 wherein the said cross supports are slidably adjustable along said horizontal bars to dispose the grinding disk beyond or within the end of the said frame structure.

5. A combination as recited in claim 3 wherein the said cross supports are slidably adjustable along said horizontal bars to dispose the grinding disk beyond or within the end of the frame structure, and wherein said machine is angularly adjustable on said supports to locate the disk at one or the other side of the said frame structure.

6. The combination with a power driven surface finishing machine comprising a housing, a motor driven shaft extended therefrom and a surface finishing disk fixed to the shaft, of a support and guide for the machine comprising an open rectangular frame structure comprising corner posts, horizontal rods connecting said posts at sides and ends of the frame, cross bars mounted on the horizontal rods at opposite sides and slidably adjustable therealong, means on said cross bars adjustably fixing the said machine thereon in working position, and runners at the lower ends of the posts to support the machine at proper working level for floor surfacing operations, and other runners on the sides of the frame for guiding contact with a wall or for functional support of the frame and machine when laid on its side for baseboard surfacing operations.

7. A machine as recited in claim 6 wherein the said runners are adjustably mounted on the frame and said machine is rotatable in its mountings to adapt the positions of the disk to different positions of the frame.

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