Feb. 24, 1953

A. P. ROBINSON

2,629,210

SURFACE FINISHING MACHINE

Filed March 20, 1950

3 Sheets-Sheet 1

Fig. 1

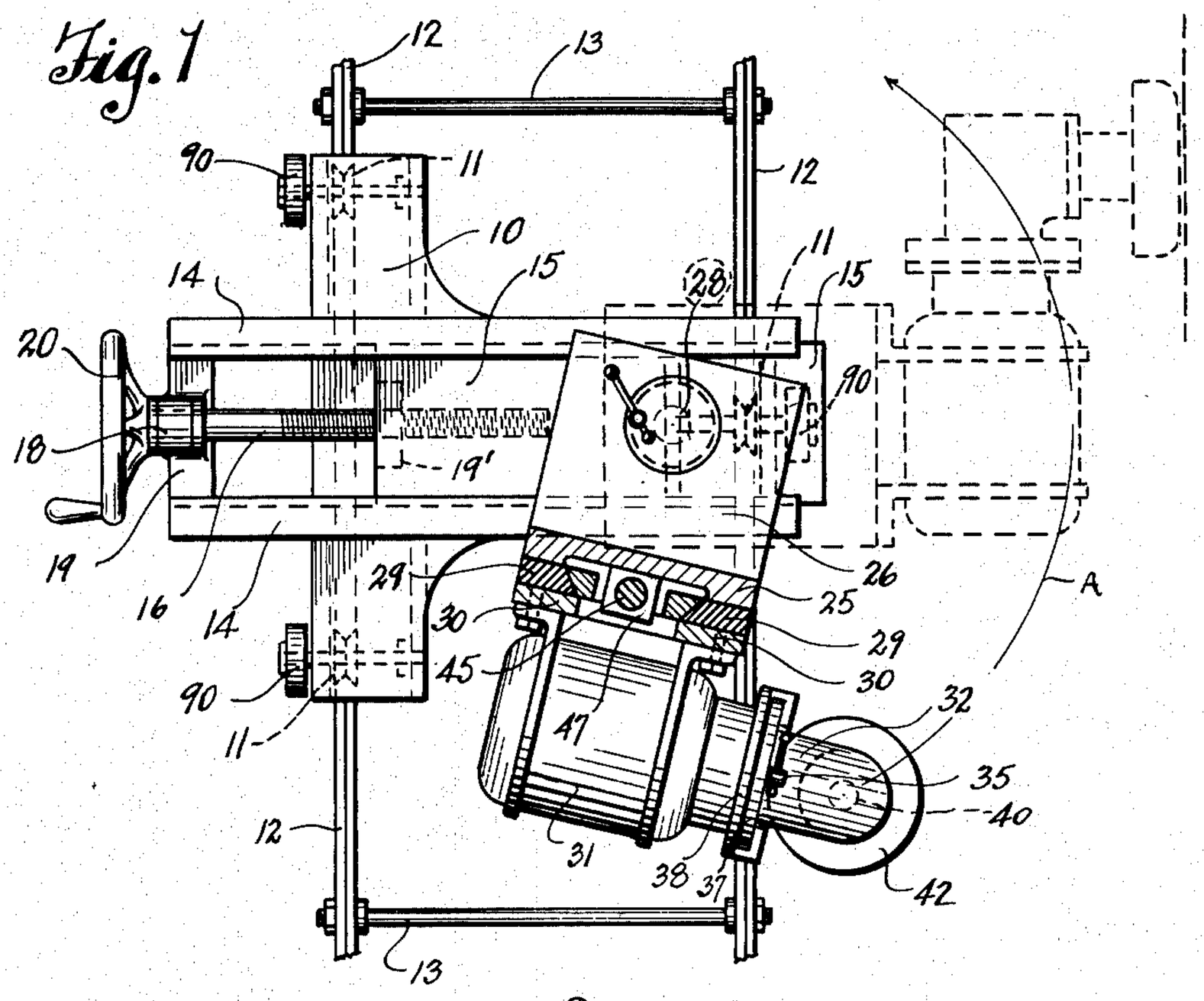

Fig. 2

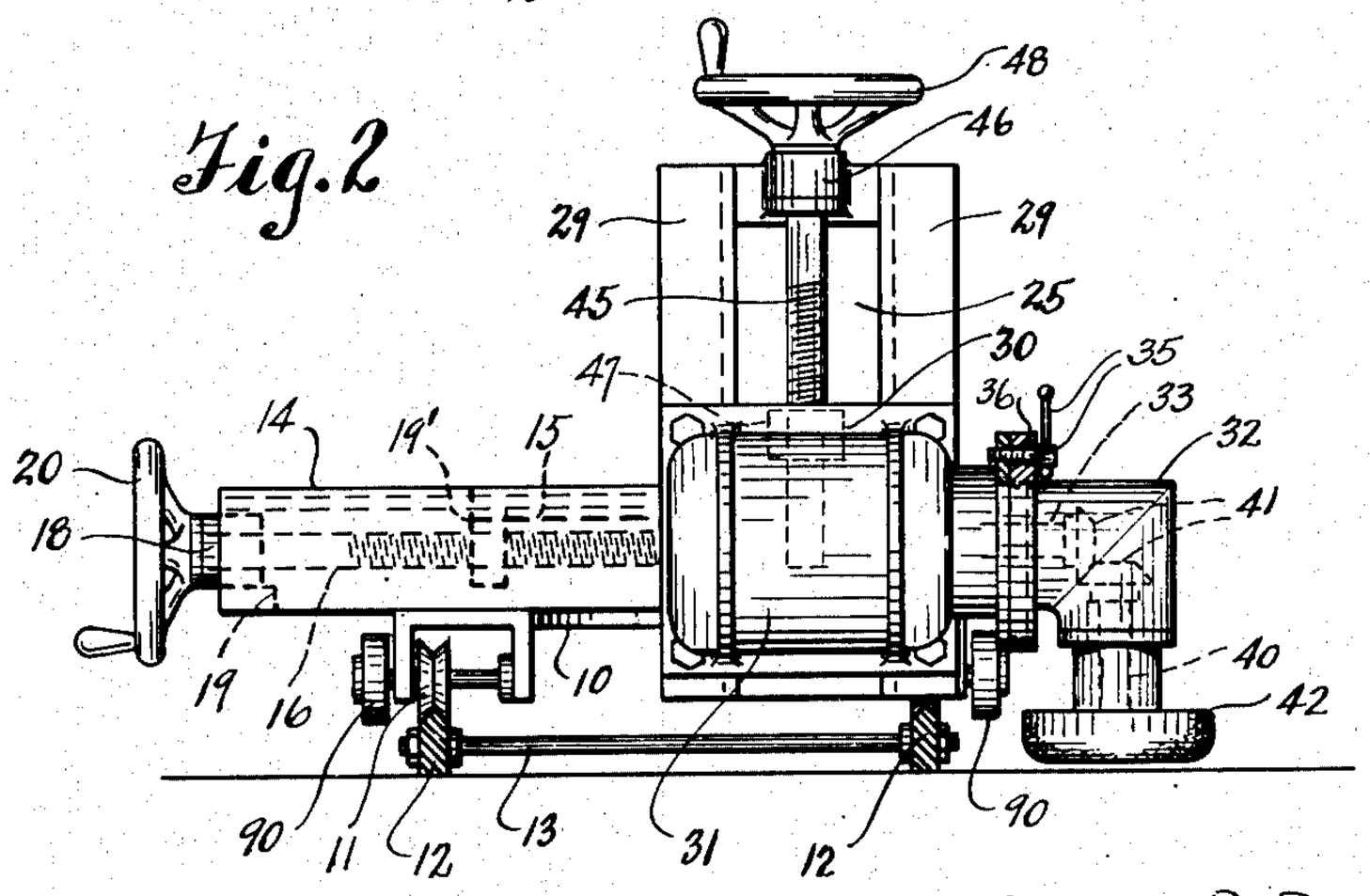

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Fig. 4

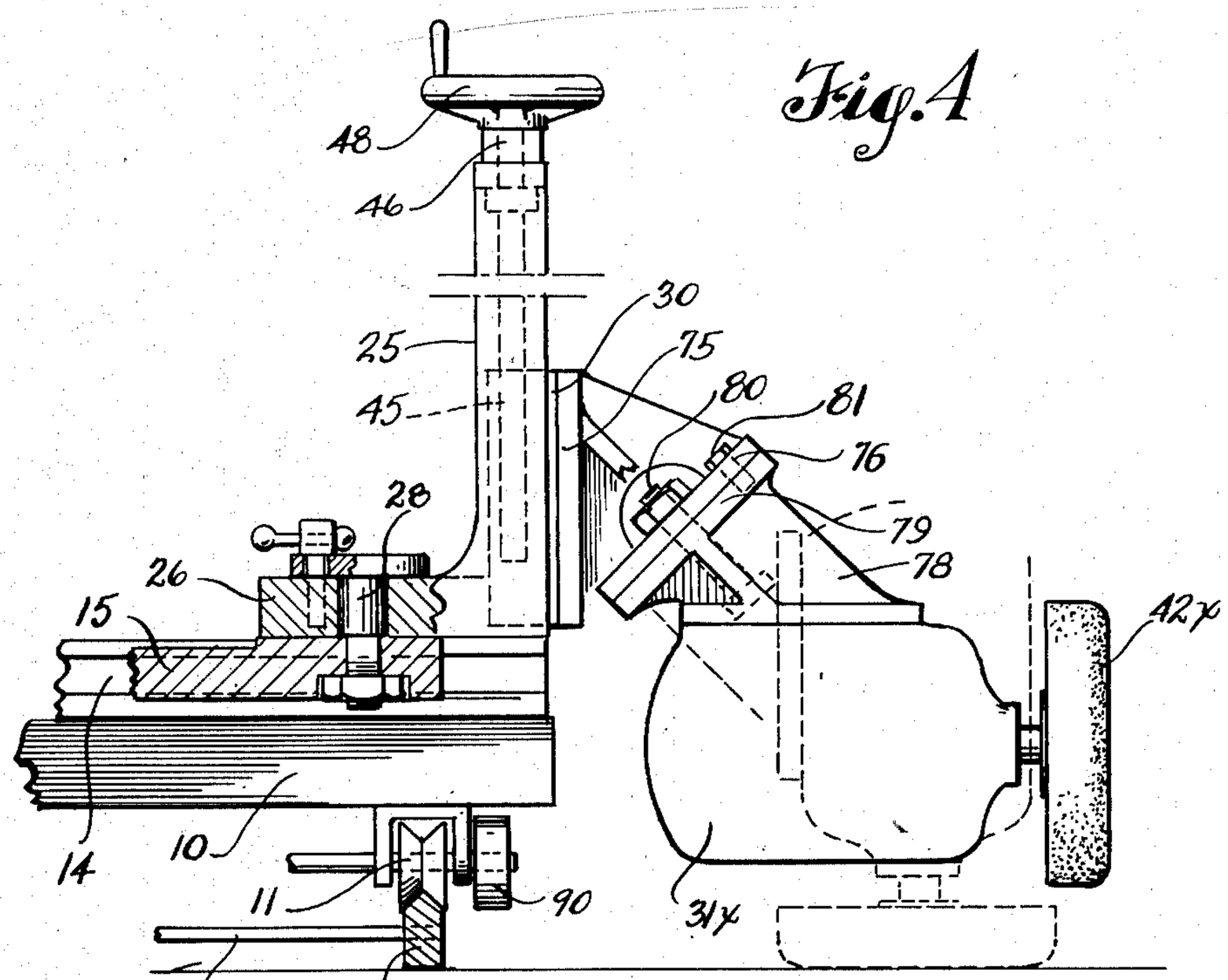

Fig. 3

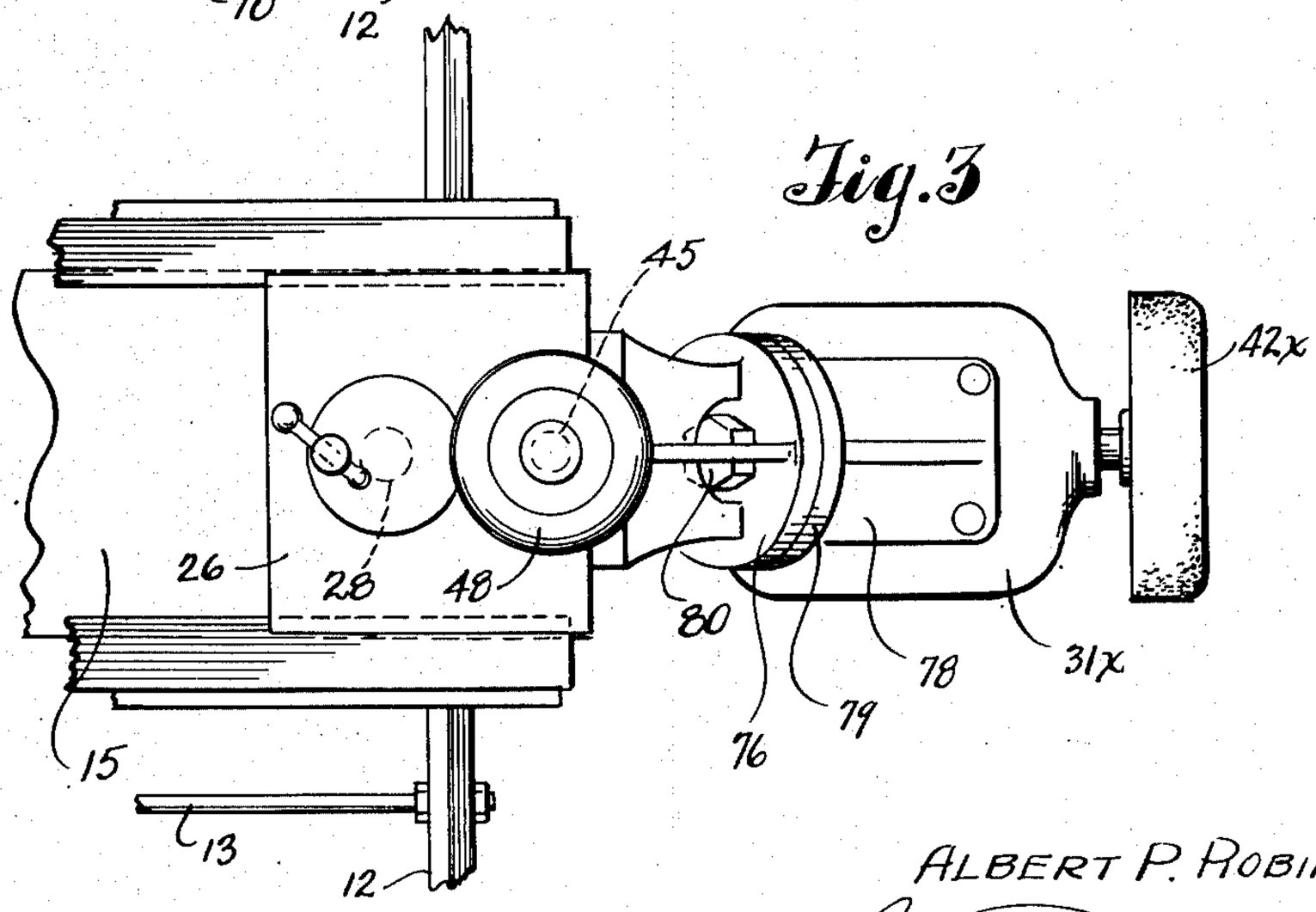

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Fig. 5

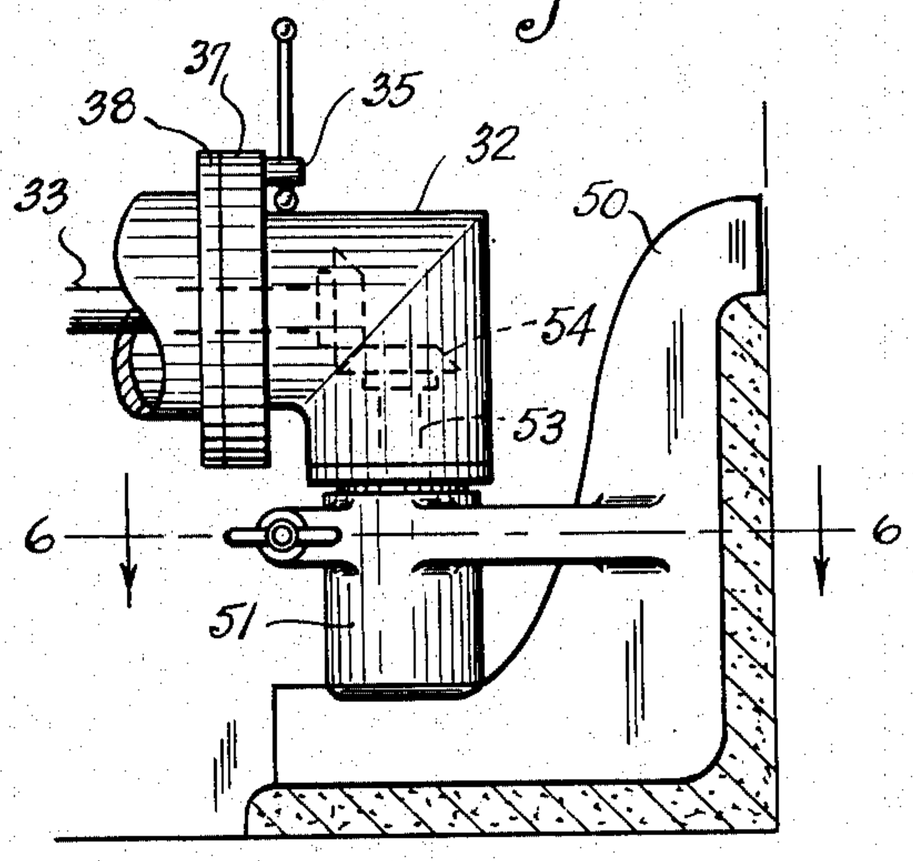


Fig. 7

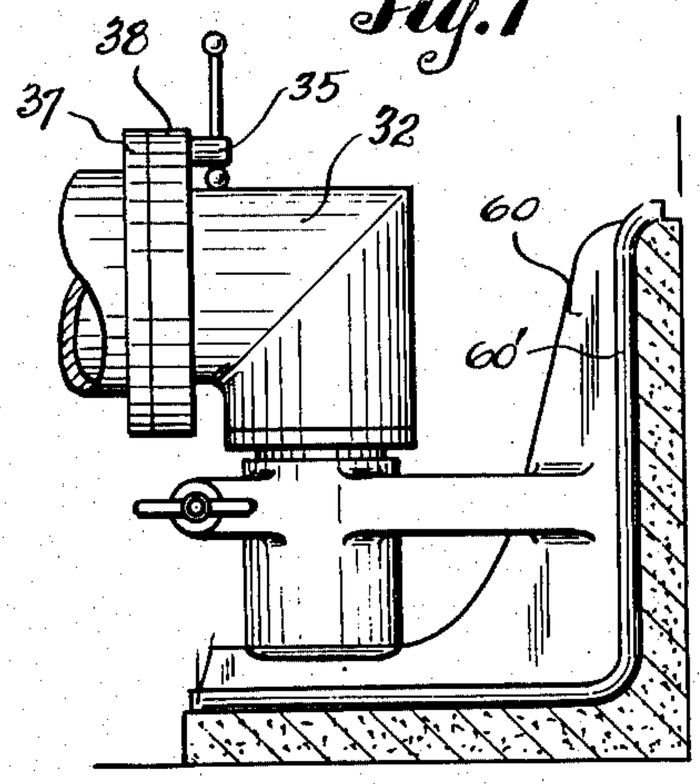


Fig. 6

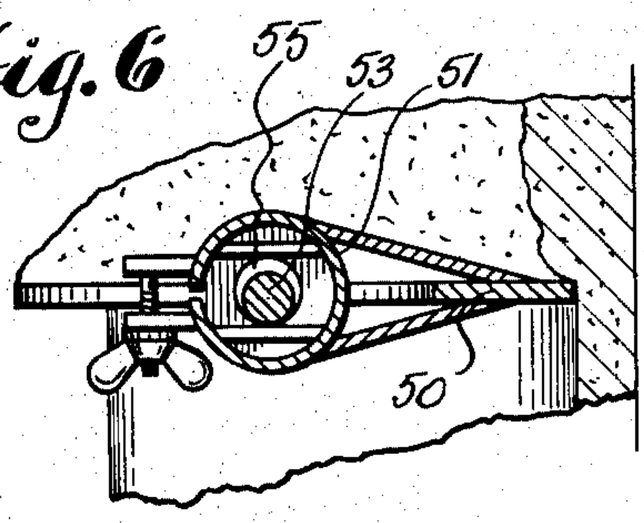


Fig. 8

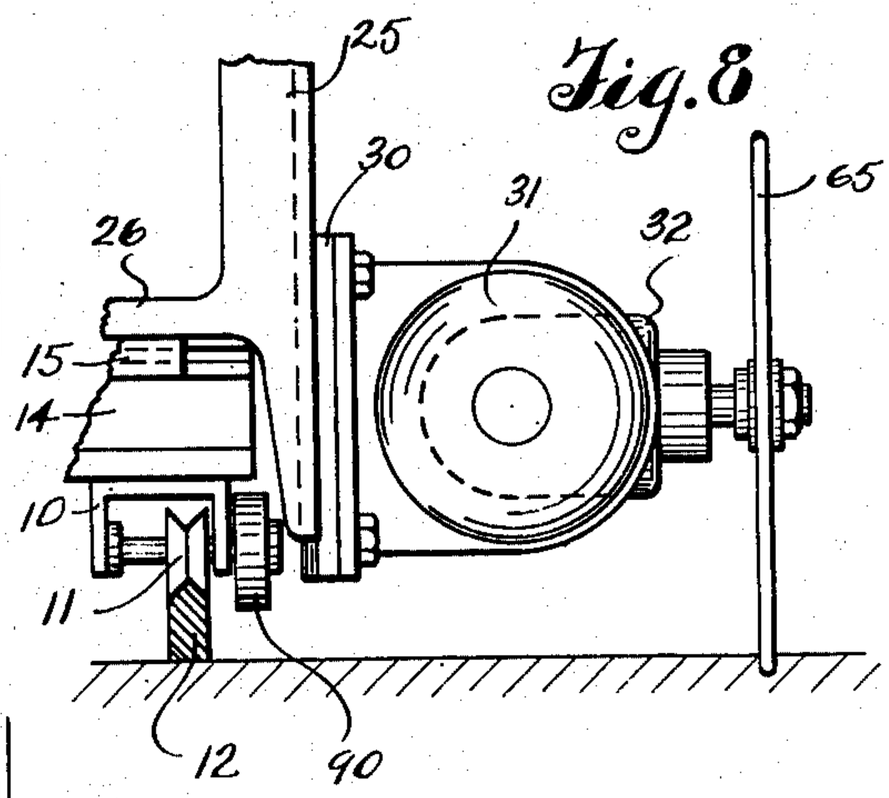
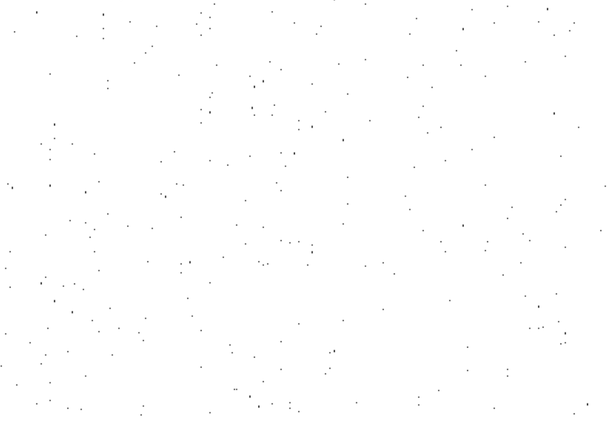


Fig. 9



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2,629,210

UNITED STATES PATENT OFFICE

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SURFACE FINISHING MACHINE

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Application March 20, 1950, Serial No. 150,575

2 Claims. (Cl. 51—177)

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This invention relates to surface forming and finishing machines, and it has reference more particularly to power driven machines designed for leveling and finishing the surfaces of floors, steps, base moldings, and the like, that are made of poured cement, terrazzo, or of any similar form of material and which are formed and surfaced by such machine operations as floating, troweling, grinding, brushing and polishing.

The present invention is a continuation in part of my co-pending application filed on June 13, 1947, under Ser. No. 754,366, now Patent No. 2,507,052, dated May 9, 1950.

In the leveling and finishing or surfacing of floors, baseboards, stairways, etc., made of terrazzo, or the like, it is common to employ a motor driven grinder of disk-like form. This grinder, generally, is fixed on the drive shaft of an electric motor and the motor is equipped with suitable handles whereby the operator supports and guides the grinder in use. To insure an even, smooth surface, free of irregularities and disk marks, it is necessary that the grinding disk be held flatly against the surface being finished, for if it should be tilted to one side or the other, it is quite apt to quickly cut a 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 above, it has been one of the main objects of this invention to provide a motor driven surfacing machine, together with a track on which it is mounted, and which machine is equipped with means for operatively mounting a surfacing tool that may be adjusted to and secured in different working positions as may be required to best suit the particular work being done, or the relationship of the surface that is being worked on to the level or position of the trackway.

It is a further object of the invention to adapt the present machine for the interchangeable use therewith of such tools as trowels, screeds, rollers, brushes, cutters, grinders and vibrators, so that the work of forming and finishing a surface in all of its different aspects, whether vertical or horizontal, may be taken care of.

Further objects of the invention reside in the details of construction and combination of parts, embodied in the machine and in the mode of use of the machine as will hereinafter be fully described.

In accomplishing these and other objects of

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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 top, or plan view of a surface finishing machine embodying improvements of the present invention therein.

Fig. 2 is an end elevation of the same, showing it as equipped with grinding disk for a floor surfacing operation.

Fig. 3 is a plan view of a part of the machine as equipped with a motor mounting of an alternative form.

Fig. 4 is a side elevation of the parts shown in Fig. 3.

Fig. 5 is an elevation of a part of motor of the machine of Fig. 1, illustrating the application of a screed to the motor head.

Fig. 6 is a horizontal section taken substantially on line 6—6 in Fig. 3.

Fig. 7 is an elevation of a part of the machine illustrating application of a surfacing trowel to the motor head, and its mode of use.

Fig. 8 is an elevation illustrating the mounting of a motor equipped with floor cutting disk or saw.

Fig. 9 is a view illustrating the application of a hopper and surfacing roller to the motor base plate.

Referring more in detail to the drawings—

In the use of power machines of the present type, probably the greater amount of the work will be done by use of grinders of those kinds now in general use for floor surfacing operations. In the present machine, the motor which drives the grinder, has a rotatably adjustable head that mounts the grinder and its drive shaft. This head is adapted to be detached for the interchangeable use on the motor of various tools, so that surface forming and finishing can be effected in various ways. The trueness of a formed surface is dependent, to great extent, upon the manner of and means for supporting the motor. In my co-pending application, above mentioned, a skid frame is employed to mount the motor and grinder and to steady the same in use. In the present instance, a track is utilized for mounting the motor for travel therealong, and this may be leveled up, or set as desired or required for the work being done, and the machine is advanced therealong to cause the grinder, or other tool, to form a true, even surface.

In Figs. 1 and 2, I have shown the present machine in one form of construction. It comprises a horizontal base frame 10, of T-shape in plan, and equipped at its extremities with circumfer-

entially grooved supporting wheels 11 whereby it is mounted for guided travel along a track. The track comprises two parallel rails 12—12, held rigidly in spaced relationship by connecting cross rods 13. The track may be made in any practical length, for example, from eight to twelve feet long and if desired equipped with suitable leveling means.

The base frame 10 is equipped on the top side with a pair of horizontal guide rails 14—14 disposed transversely of the track and between which a plate 15 is slidably mounted for adjustment along the rails 14—14. Adjustment is effected by means of an adjusting shaft 16 that is rotatably fixed in a bearing 18 on a cross bar 19 extended between and fixed to the outer ends of the rails 14—14. The shaft is threaded through a lug 19′ on the under side of the plate 15 and at its outer end has a hand wheel 20 fixed thereto. By turning this shaft in one direction or the other, the plate 15 will be adjusted accordingly along the guideway.

Mounted upon the plate 15, in a manner permitting it to turn about a vertical pivot, is a motor supporting frame or standard 25. This is in the form of a vertical plate and has a flat horizontal foot 26 formed thereon, resting directly upon plate 15 and through which a securing pivot bolt 28 is extended; the bolt being rigidly fixed in plate 15. The standard 25, is offset from the bolt and may be swung about the pivot axis, in the clear of the track, to various positions for a purpose presently explained.

Secured on the outside face of the standard, are spaced parallel, and vertically extended guide rails 29—29, along which a mounting base plate 30 for an electric motor is movable. Fixed to the plate 30, is an electric motor 31, that is horizontally disposed as best seen in Fig. 2. The motor housing is equipped at one end with a head frame 32 that is rotatably adjustable thereon about the axial line of the motor shaft 33, and is adapted to be secured at any position of its rotary adjustment by tightening of a clamp bolt 35 that is applied through an arcuate slot 36 in the base flange 37 of the head frame and threaded into the registering flange 38 of the motor housing.

Rotatably mounted in the head frame 32, perpendicular to the axis of shaft 33, is a shaft 40, this being operatively connected to the motor shaft by means of a set of bevel gears 41, as shown in Fig. 2. At its outer end, the shaft 40 is equipped with an abrasive surfacing disk 42 of a common type.

The motor base 30 is mounted for guided, vertical movement along the guide rails 29—29 by means of a vertical adjusting shaft 45 that is rotatably fixed in a bearing 46 on the upper end of the standard 25 and is threaded through a lug 47 on the motor base. At its upper end, the shaft 45 is equipped with hand wheel 48 whereby the shaft 45 may be turned to raise or lower the motor and grinding disk 42 relative to the floor.

The machine of Figs. 1 and 2 affords all the necessary adjustments for surface grinding and polishing operations by use of the disk grinder 42 or by similarly mounted grinding or polishing devices.

Assuming that the track rails 12—12 have been properly placed and leveled up, and set accurately relative to a side wall or base molding, then the motor supporting standard 25 can be swung on its pivot axis 28 and the motor raised or lowered along the standard as may be required to

accommodate the machine to the surface to be worked on. It is to be understood that the motor head 32 can be rotated from position shown in Fig. 2, to a position for grinding vertical surfaces or sloping surfaces. When the grinding disk is in the position seen in Fig. 1, a floor area at the side of the track of substantial width can be covered by adjusting the standard about the pivot 28, as indicated by the arcuate arrow A and adjusting the plate 15 along the guide rails 14—14. Then, by turning the head frame 32 through a 90 degree adjustment, as shown in dotted lines in Fig. 1, the grinder disk will be positioned for work on a vertical surface. Adjustment of the disk 42 from and toward vertical wall surfaces when in its dotted line position, can be accomplished by use of adjusting shaft 16. Its vertical adjustment is effected by means of wheel 48 and shaft 45.

In the use of the machine on a track, the travel of the grinder in any set position will be true and even. Irregularity of depth of grinding or line of travel is avoided.

In Figs. 3 and 4, I have illustrated an alternative form of motor mounting and means for effecting the vertical adjustment of the surfacing tool. This form of mounting provides both horizontal and vertical surfacing and for direct drive of the grinding disk from the motor shaft for both operations. In this construction an adapter base 75 is fixed to motor base plate 30. Base 75 includes a face plate 76 inclined at an angle of 45 degrees relative to the vertical plane. The electric motor 31x, likewise has an adapter mounting 78 fixed thereto and this has a face plate 79 rotatably fitted to the plate 76 and secured concentrically by a pivot bolt 80. By rotatable adjustment of the mounting 78 on plate 76 about pivot bolt 80, through a 90 degree turn, the electric motor can be adjusted from a horizontal position as seen in full lines, to a vertical position as shown in dotted lines. The adjustment may be secured by a clamp bolt 81 applied to the base flanges of the parts 76 and 79 in a manner similar to the securement of the standard in Fig. 1. In this device, the grinding disk 42x is fixed directly to the motor shaft.

In accordance with the object of providing for interchangeable use of various surface forming and finishing tools with the present machine, I have shown in Figs. 5 to 9, various devices that can be applied to the motor head 32 or motor base plate 30 for specific operations related to surface finishing.

In Fig. 5, I have shown the motor head frame 32 set as in Fig. 2 but the grinding disk and its mounting shaft have been removed for the application of a screed 50. As here shown, the screed is a thin, vertical plate of angular form, designed to shape the cross-sectional contour of a base molding, and it is rigidly secured to a mounting sleeve 51 that is fitted over and clamped to the bearing in which the disk shaft is mounted. Contained vertically in the bearing is a shaft 53 which has a drive gear 54 at its upper end in driving mesh with a bevel gear on the motor shaft. The shaft 53 is equipped with an eccentric 55 or off center weight, which results in giving the screed a high speed vibratory action incident to operation of the motor.

In operation the motor is slowly advanced along the track while the screed is brought into contact with the base mold material while it is still a plastic in working condition. The vibratory ac-

tion of the screed trues the surface and gives the base its desired shape. If desired the vibratory means may be omitted.

The trowel of Fig. 7 is similar in application to the device of Fig. 5 and also in mode of use. This device comprises a surface smoothing plate or trowel 60. This is shaped as required for smoothing horizontal and vertical surfaces of a base molding and is formed at its ends with outwardly rounded flanges 60' to avoid gouging into the base material. In using this tool, the motor is caused to be moved reciprocally on the supporting track and the base plate 15 is adjusted by means of the screw shaft 16 as required to cause the trowel to have the proper and desired pressure effect on the base material. Other adjustments of the motor may be made as required to meet conditions.

In Fig. 8, I have illustrated the machine as equipped for cutting a slot in a floor. In this device, the motor head 32 is adjusted as to the dotted line position of Fig. 1, and its shaft is fitted with a common type of saw or disk 65. This may be of metal or Carborundum, or the like, and its working or cutting depth is controlled by raising or lowering the motor through the mediacy of the screw 45 and the motor base plate 30. Such a saw could be applied to the motor shaft as used in the device of Fig. 3.

The attachment shown in Fig. 9 is adapted for direct securement to the motor base plate 30 upon removal of the motor therefrom. It comprises a mounting plate 70 from which a hopper 71 is supported by one or more arms 72. The hopper has an open bottom and side. Below the open bottom is a horizontal roller 57 supported from plate 70 by arms 56.

In use of this device, the base 10 would be set up on the tracks as in Fig. 2 and the hopper adjusted to position with its open side facing and close to a wall surface. The hopper is then filled with suitable matrix and by giving the hopper and roller a vertical reciprocal action, the matrix will be automatically fed onto the wall and rolled smooth by the action of the roller. The vertical reciprocal action can be effected through use of the shaft 45 and wheel 48 or by a hand operated lever mechanism applied to the base plate 15 and connected with plate 30.

It is further anticipated that power driven machines of this kind be used independent of tracks when the floor surface is substantially smooth. To do this, the frame 10 has been equipped with supporting wheels 90, which might be mounted on the same axles with wheels 11, and of slightly larger diameter and with flat tires to avoid marking the floor surface.

Machines of the various kinds described provide for the fast and accurate surfacing of floors, base boards, moldings, stair steps and the like. Floors may be smoothly surfaced and lines made straight and of uniform character. Furthermore, the operations can be carried out without undue strain or exertion on the part of the machine operator.

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

1. A surfacing means comprising a portable, unitary track adapted for support on a floor, a base frame mounted on the track for guided travel therealong, a horizontal guideway on said base frame directed transversely of the track, a bed plate secured in and adjustable along the said guideway, a standard mounted on said bed plate for turning thereon about a vertical axis, a vertical guideway on the standard substantially offset from the said vertical axis, a motor mounting plate movable in the vertical guideway, a motor fixed to the said plate, a shaft movable with and driven by the motor, and a surfacing tool supported from the motor housing and having a driving connection with the drive shaft and adapted to be positioned at a selected working level by vertical adjustment of the motor mounting plate, and said motor being adapted to be moved from and toward the track by adjustment of the said bed plate along its guideway, and said tool being adapted to be swung in an arcuate path by turning of the standard about said vertical axis on the bed plate.

2. A surfacing means comprising a portable, unitary track adapted for support on a floor, a base frame mounted on the track for guided travel therealong, a horizontal guideway on said base frame directed transversely of the track, a bed plate secured in the guideway for travel therealong, means on the base frame for moving the bed plate along the guideway and for securing it at selected positions, a standard equipped with laterally extended mounting foot disposed on the bed plate, a pivot bolt passed through the foot and secured in the bed plate and supporting the standard for swinging adjustment about the pivot bolt, a motor mounting plate vertically adjustable along the standard, a motor, fixed to the said plate, having a head rotatable about a horizontal axis, a motor drive shaft mounted by and extended from the head, perpendicular to the said horizontal axis, a surfacing tool on the shaft adapted to be positioned for work on horizontal, inclined or vertical surfaces by rotatable adjustment of the head, and adapted to be brought to different work levels by vertical adjustment of the motor mounting plate on the standard.

ALBERT P. ROBINSON.

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