

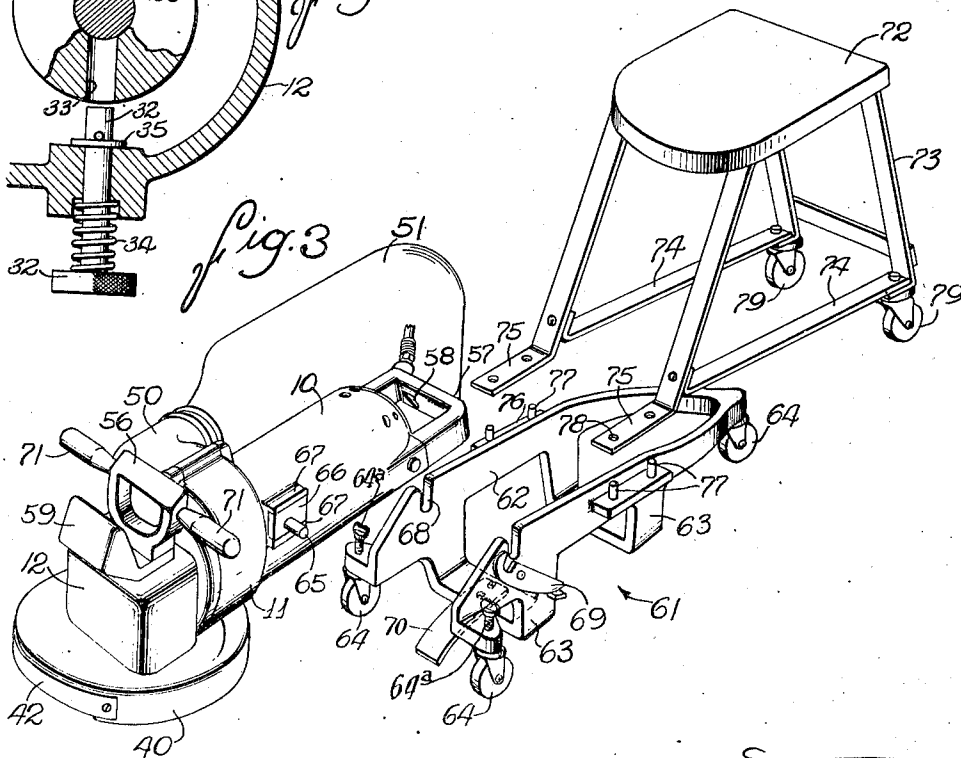
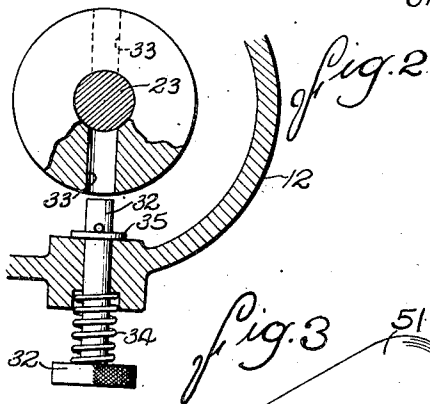
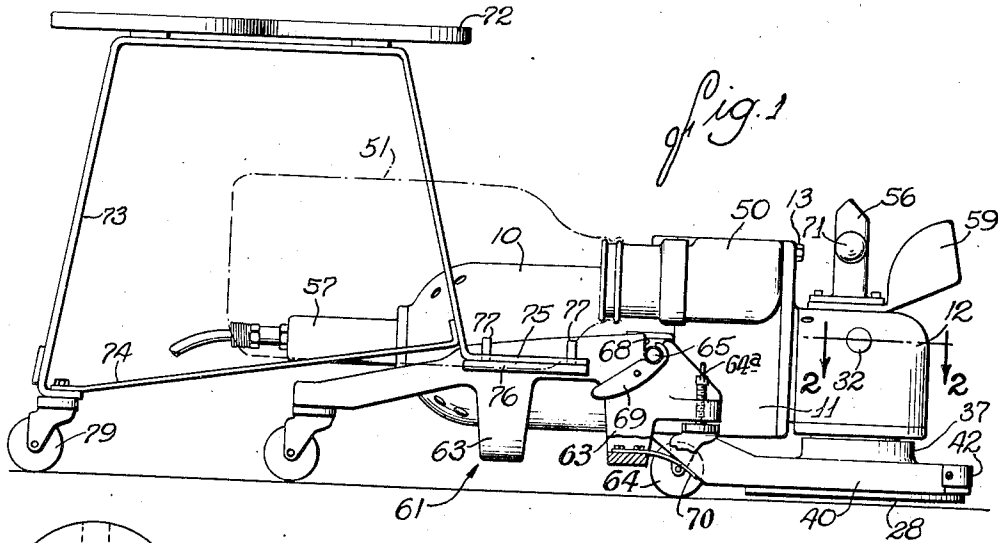
May 21, 1940.

H. M. ZSCHAU
ABRADING MACHINE

2,201,420

Filed Sept. 13, 1937

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

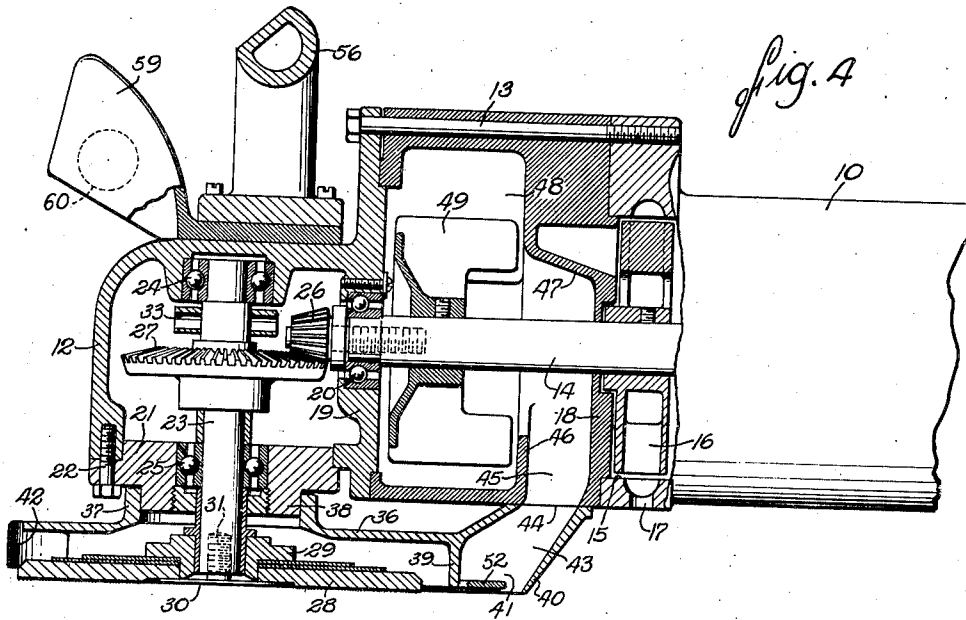


fig. 4

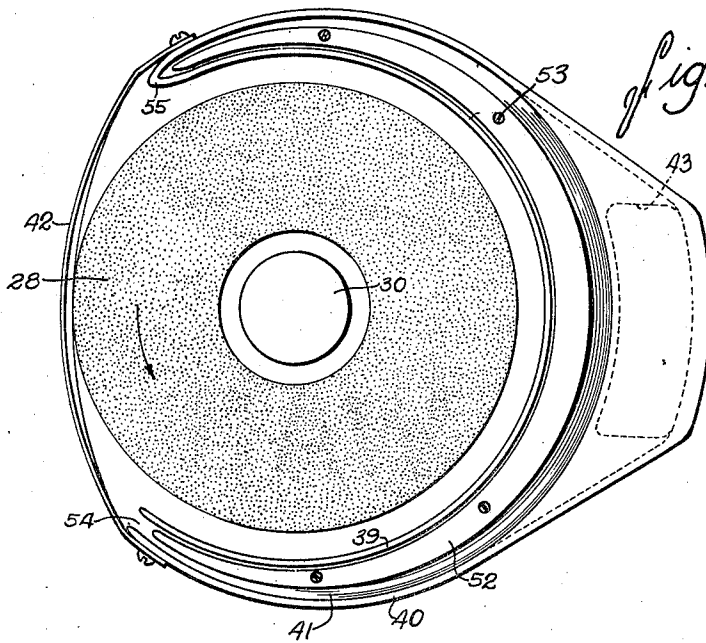


fig. 5

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UNITED STATES PATENT OFFICE

2,201,420

ABRADING MACHINE

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9 Claims. (Cl. 51—177)

The invention relates generally to abrading or grinding machines of the so-called "disk sander" type and more particularly to a machine which is eminently suitable for use in finishing floor surfaces, and especially the relatively narrow surface portion immediately adjacent to a wall or the like.

An object of the invention is to provide a novel machine of this character embodying an operating unit capable of being held and manipulated by hand and detachable unit supporting means which permits use of the machine as a movable unit conveniently disposed with respect to the surface to be treated for proper action thereon.

Another object is to provide a new and improved machine for grinding or finishing floor surfaces, or the like, in which a working unit is mounted on a carriage in such manner that a manipulative act by the operator to effect a working engagement between the unit and the surface is required and the unit, when idle or released by the operator, swings automatically to an inoperative position.

Another object is to provide in such a machine a detachable seat for the operator arranged for his convenience in the manipulation of the machine.

Further objects reside in the general combinations, relationships and arrangements embodied in the structure disclosed herein and specifically in improved dust collector systems, including a novel means for locating the dust collecting bag in an out-of-the-way position, in new and improved means enabling ready replacement of the abrasive disk, in novel illuminating means, and in a new and improved guard means for protecting an upright surface against damage by the grinding disk.

Other objects and advantages will become apparent in the following description and from the accompanying drawings, in which:

Figure 1 shows in side elevation an abrading machine embodying the features of the invention.

Fig. 2 shows a detail of a spindle holding mechanism in section taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a view of the machine in perspective showing the parts in disassembled relation.

Fig. 4 is an enlarged view of the front part of the machine in vertical, axial section.

Fig. 5 is a view looking toward the bottom face of the grinding disk.

While the invention is susceptible of various modifications and alternative constructions, I

have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

With reference to the drawings, in which an exemplary form of a machine embodying the invention has been shown, the abrading unit comprises generally a horizontally elongated casing which houses a driving motor, a driven exhaust fan, a discoidal abrasive or grinding element journaled for rotation on a horizontal plane, and driving connections between the grinding element and the motor.

More particularly, the casing is preferably formed in three sections comprising, as shown, a cylindrical rear end or motor housing section 10, an intermediate or fan housing section 11, and a front end or gear housing section 12. These sections are preferably fashioned for interfitting abutment and may be suitably secured together by such means as the bolts 13. Mounted in the motor housing is a conventional form of prime mover, such as an electric motor (not shown) having an elongated armature shaft 14 arranged to extend forwardly of the casing through the fan housing and into the gear housing. The front end of the motor housing has an annular opening 15 concentric with the shaft 14 in which a motor cooling fan 16 is mounted, the fan being secured to the armature shaft. An exhaust port 17 is provided in the front end of the motor housing. A transverse wall 18 on the fan housing closes the front end of the motor housing and a transverse wall 19 on the gear housing 12 closes the front end of the fan housing. The wall 19 supports a bearing 20 for the front end of the motor shaft. The lower side of the gear housing 12 is open and this opening is closed by a plate 21 detachably secured thereto as by screws 22. A vertical shaft 23 is journaled for rotation in bearings 24, 25 carried respectively by the gear housing 12 and the plate 21. The motor shaft 14 and the vertical shaft 23 are drivingly connected by gears 26, 27.

The lower end of the shaft 23 extends for a short distance beyond the plate 21 and at its end carries a work-performing device herein shown as being a discoidal abrading or grinding disk 28. Preferably, the grinding disk is secured to the shaft for convenient assembly

and disassembly therefrom. The securing means, in the present instance, comprises a flanged hub 29 on the shaft 23 arranged to receive and support the grinding disk. A washer-like element 30 has a stem 31 provided with external screw threads for engagement with a screw threaded recess formed in the end of the shaft 23. The disk may be assembled on or removed from the shaft merely by effecting relative rotation therebetween.

Since the shaft 23 will rotate relatively freely, means is provided for restraining the shaft against rotation during the assembly or disassembly of the grinding disk thereon. Thus, as shown in Fig. 2, a pin 32 is slidably mounted on the gear housing 12 for movement into engagement with a recess 33 formed in the shaft 23 or in a part rigid therewith. A spring 34 normally urges the pin outwardly of the housing to the extent permitted by a limiting stop 35 on the pin.

Means is provided which affords a combined guard for the grinding disk and an intake nozzle for the exhaust system for the removal of the dust and cuttings produced by the operation of the disk. To this end, a relatively flat, generally circular member 36, dimensioned to overlie the upper or non-working face of the grinding disk, has a central upstanding flange 37 arranged to fit snugly about and be suitably secured to a boss 38 on the plate 21. Depending from the peripheral portions of the member 36 are a pair of radially spaced flanges 39 and 40.

The inner one of the flanges (herein the flange designated 39) is fashioned and dimensioned to encircle, relatively closely, substantially the major portion of the peripheral edge of the grinding disk, the flange being interrupted at the front side of the guard to expose a small section of the front edge of the disk. The outer flange 40 is similarly interrupted, and from each side of the interruption is spaced at increasingly greater distances from the flange 39 to provide therewith, and with the member 36, a downwardly opening chamber 41 of generally crescent shape having its largest dimensions located opposite the space provided by the interruptions in the flanges.

The top member 36 of the guard is somewhat cut-away between the flange interruptions to expose a small section of the front portion of the abrading disk. To prevent contact of the abrading disk with an upright surface, such as a wall upstanding from the floor or other surface being treated, the outer flange 40 is completed by a thin, resilient member which traverses the interruption in the flange and permits the edge portion of the disk to approach an upright surface quite closely without coming in contact therewith. The resilient member, in this instance, is a thin strip 42 of spring steel having its ends connected to the flange 40 and adapted to extend across the front, otherwise exposed, edge of the grinding disk. This strip permits the abrading unit to be used in finishing corners and does not require that the unit be manipulated with particular care, even though the workman be engaged in finishing the portion of the floor immediately adjacent to the upstanding wall.

At the point of greatest dimensions of the chamber 41, a tubular, rearwardly and forwardly extending conduit 43 is provided having an upwardly facing opening which registers as at 44 with an opening in the fan housing 11. This

opening communicates with a passageway 45 which is defined by the transverse wall and by other internal walls 46 and 47 on the fan housing and opens substantially axially of the fan housing into a fan chamber 48. A fan 49 of suitable construction is mounted on the armature shaft 14 for rotation in the chamber 48. A circumferential outlet from the chamber 48 is provided by a casing 50 (Fig. 1), which, in turn, communicates with a removable receptacle or bag 51 for dust or cuttings produced by the operation of the abrasive disk.

As may be seen in Fig. 4, the inner flange 39 is narrower than the outer flange 40 so that the air flow created by the fan 49 will, when the device is operating, be drawn primarily beneath the flange 39. To increase this action, a baffle member 52 (Figs. 4 and 5) of generally crescent shape is suitably supported, as by screws 53, to occupy a position between and in spaced relation to the flanges 39 and 40 on a plane which substantially parallels, and is closely adjacent to, the floor surface when the abrading disk is in engagement with said surface. The spaced relationship of the flange 39 and baffle 52 provides a path for a relatively powerful draft of air immediately adjacent to the lower edge of the flange. To further insure removal of all of the dirt and cuttings produced by a grinder disk operation, the space between the ends of the flanges 39, 40, toward which the front edge of the grinder disk rotates, is open as indicated at 54 (Fig. 5). The opposite ends of the flanges, however, are preferably closed as at 55 to avoid an unnecessary intake of air at this point.

The unit which has been described is light weight and of relatively small dimensions and may be easily manipulated while it is held in the operator's hands. Preferably, handles 56 and 57, secured respectively, to the upper side of the gear housing 12 and to the rear end of the motor housing 10 are provided to facilitate manual operation of the unit. A control switch 58 may be associated with the handle 57, and a downwardly facing casing 59 may be conveniently secured between the handle 56 and the gear housing 12 to support a suitable source of illumination 60, the light being directed by the casing toward the front edge of the abrasive disk.

An important feature of the invention is the provision of means for supporting the manually operable abrading unit in such manner that the unit becomes a self-supported portable one. With reference to Figs. 1 and 2, 61 designates generally a carriage adapted and fashioned to receive the rear portion of the abrading unit and to support the unit with the abrading disk in proper operative relation to an underlying surface. The carriage in the present embodiment includes a horizontal, generally U-shaped frame 62 arranged to fit about the sides of the motor housing and supporting strap members 63 adapted to underlie the motor housing. Antifriction rollers 64, or the like, are mounted on opposite sides of the carriage at the front end thereof and on the base portion of the U-shaped frame 62. The mounting of the front rollers preferably includes such means as a supporting stem 64a in the nature of a thumb screw to provide for independent vertical adjustment of the rollers relative to the carriage. At approximately the point of balance between the front and rear ends of the abrading unit, horizontally aligned trunnions 65 are mounted in any suitable manner as by securing the trunnions to blocks 66 and, in 75.

turn, mounting the blocks on the abrading unit between guide ribs 67.

The carriage near its front end has horizontally alined, upwardly opening recesses 68 arranged to receive the trunnions 65, and such means as hook-shaped clamps 69 pivoted on the carriage for engagement with the projecting ends of the trunnions may be employed detachably to secure the carriage and the abrading unit together for limited relative movement on a horizontal axis. The arrangement of the abrading unit and the carriage is such that when the parts are assembled and the rear end of the abrading unit is depressed with respect to the carriage, the abrasive disk will be spaced (as shown in Fig. 1) a short distance from the underlying floor surface. This relationship may be obtained by properly balancing the unit but it is preferred to employ a positive holding means. Thus, a spring 70 (Fig. 1) mounted on the front carriage strap member 63 and extending forwardly therefrom to bear upwardly against the wall of conduit 43 may be employed yieldingly to maintain this spaced relationship as the normal position of the assembly. The abrading disk may be easily brought into operative engagement with the underlying surface merely by depressing the front end of the unit and, for the convenience of the operator, hand pieces 71 extending from opposite sides of the handles 56 are provided. Immediately upon release of the pressure applied by the operator, the abrading disk will be moved into spaced relation with the underlying surface and may be moved from place to place while it is running, or while it is idle without damage to the underlying surface. The adjustments made possible by the mounting of the front rollers 64 permits the abrasive disk to be brought into such operative engagement with the floor as may be desired, as for example with full face contact, or with the disk tilted to engage the floor only by its front or either side section.

The abrading unit and carriage assembly is a low, compact structure, and to facilitate its use, particularly over considerable periods of time, a detachable rest upon which the operator may sit while operating and guiding the machine is provided. As shown, the rest comprises a seat member 72 supported upon the base portion of parallel U-shaped strap members 73 connected by reinforcing bars 74. The front legs of the strap members are turned horizontally forwardly to provide ends 75 adapted to rest upon outstanding flanges 76. A quickly detachable connection between the ends 75 and the flanges 76 may comprise upstanding studs 77 on the flanges 76 for engagement with openings 78 in the strap ends 75. The rear legs of the strap members are preferably supported in properly spaced relation from the floor by roller elements 79.

It will be evident from the foregoing that a novel machine organization has been provided which embodies many improved features. An operator seated upon the rest may, by merely leaning forward, grasp the hand pieces 71 and exert the necessary downward pressure on the front end of the abrading unit to produce such cutting action of the abrading disk on the floor surface as may be desired. He may, while seated, move the unit from place to place without difficulty. When the apparatus is thus assembled, the dust collecting receptacle 51 will extend rearwardly from the outlet casing 50 and the major portion of the collector will occupy a convenient out-of-the-way position underneath the seat. The seat may be

quickly lifted from the carriage if, for any reason, it becomes desirable to use the unit without the seat. Moreover, if the operator desires to use the abrading unit without the carriage, it is only necessary to disengage the spring 70 and release the engagement between the clamps 69 and the trunnions 65. The unit may, therefore, be used for many purposes as distinguished from the prior single purpose machines.

I claim as my invention:

1. In an abrading machine, the combination of a horizontally elongated casing, power means mounted in said casing, a discoidal abrading member mounted on said casing and drivingly connected with said power means, a carriage having an upwardly facing recess dimensioned to receive the horizontal body of said casing, horizontally alined pivotal connections between said casing and carriage, and means for normally holding the abrading member out of engagement with the work except when the operator effects such engagement.

2. In an abrading machine, the combination of an elongated casing having a driven discoidal grinder journaled for rotation on an axis substantially perpendicular to the longitudinal line of the casing, a movable carriage arranged to receive said casing in a horizontal position with said grinder in operative relation to the work, and a seat for the operator detachably connected with said carriage and including roller elements for supporting said seat in part.

3. In a portable power driven abrading machine, the combination of a driving motor, a grinding disk operatively connected therewith, a housing overlying the non-working face of said disk and including a flange peripherally surrounding said disk, said housing being cut away at one point to expose a small portion of the edge of the disk, and a thin resilient guard member secured to the housing and traversing the cut-away portion for preventing engagement of the side edge of the disk with a surface upstanding from the surface being treated.

4. In an abrading machine of the character described, the combination of a power driven discoidal grinding element, a housing enclosing the upper and peripheral surfaces of said element, means on said housing defining a chamber substantially surrounding the periphery of said element, an exhaust fan communicating with said chamber and a baffle extending through said chamber in spaced relation to the side walls of the chamber and substantially on a plane parallel and adjacent to the plane occupied by a piece of work.

5. In an abrading machine, the combination of a carriage adapted for convenient movement from place to place, means on said carriage extending upwardly in transversely spaced relation to provide a horizontal upwardly facing recess, an abrading unit including a casing, a power unit in said casing, a discoidal abrading unit mounted on said casing and drivingly connected with said power unit, said casing being receivable in said recess for support by said carriage on a horizontal axis with the abrading unit projecting beyond one end of said carriage and located in a plane approximately parallel with the floor, and means for securing said casing and carriage detachably together.

6. An abrading machine having, in combination, an elongated casing having a power unit mounted therein, a discoidal abrasive element adapted to operate about an axis perpendicular

to the plane of the work surface, a movable supporting carriage having a recess to receive and support said casing in a horizontal position, means for mounting said abrasive element at one end of said casing for disposition in advance of said carriage and in substantially operative position with respect to the work surface when the casing is assembled on the supporting carriage, driving connections between said power unit and abrasive element, and means for detachably connecting said casing to said supporting carriage including horizontal pivot means permitting swinging movement of said casing to shift said abrasive element along the line of its axis.

7. In an abrading machine, the combination with an abrading unit having a discoidal abrading element adapted for operation on an axis substantially perpendicular to a work surface and a power unit drivingly connected therewith and operative on an axis substantially paralleling the work surface, of a carriage having a body shaped to underlie and partially enclose said power unit, horizontal and detachably engageable pivot means supporting said power unit on said body for limited movement relative thereto, said abrasive element being located with respect to that portion of the power unit engaged by said body for disposition in assembly beyond the end of said body.

8. The combination in an abrading machine of a carriage adapted for convenient movement from place to place and including means thereon extending in transversely spaced relation to provide a horizontal upwardly facing recess, said recess being dimensioned to receive an abrading unit having a discoidal abrading element and to support said abrading unit with said element located beyond one end of the carriage, means for securing such an abrading unit to said carriage, and a detachable seat for the operator including seat supporting members detachably engaging the extending recess providing means on said carriage.

9. In a portable power driven abrading machine, the combination of a driving motor, a grinding disk operatively connected therewith, a protective housing for the non-working face of said disk arranged to expose a peripheral side of the disk for close approach to a surface outstanding from the surface being treated, and a thin resilient guard member secured to extend in protective relationship to the exposed peripheral side to prevent engagement thereof with said outstanding surface.

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