July 12, 1927. 1,635,792

C. B. KELLER

GRINDING MECHANISM

Original Filed July 7, 1925

FIG. I.

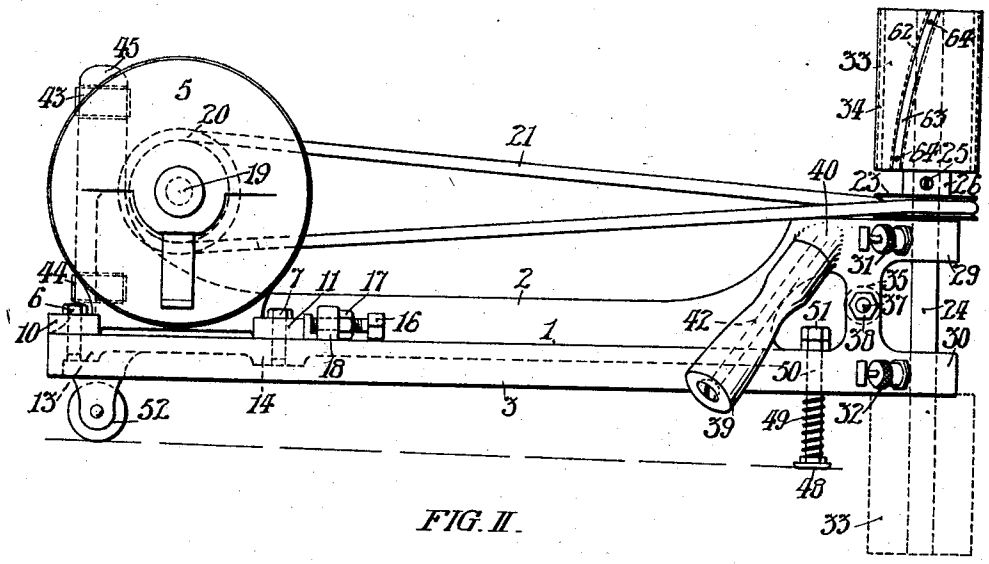


FIG. II.

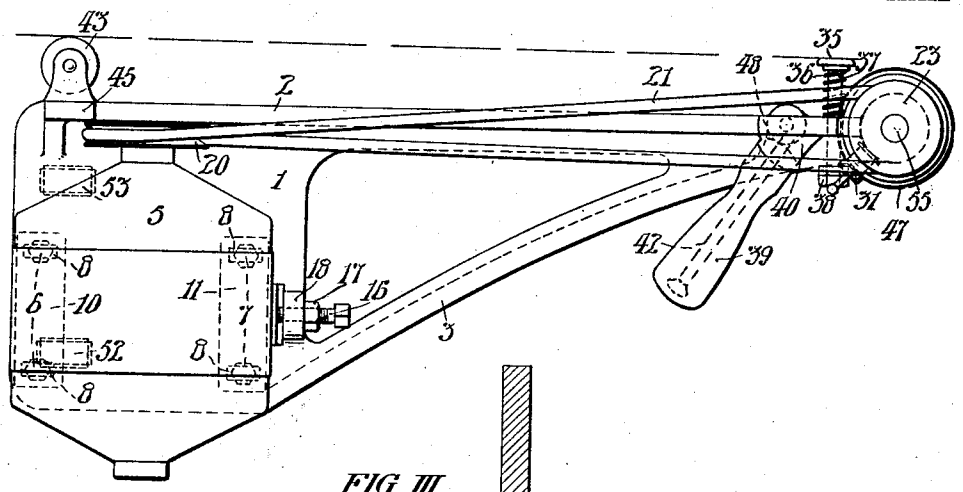
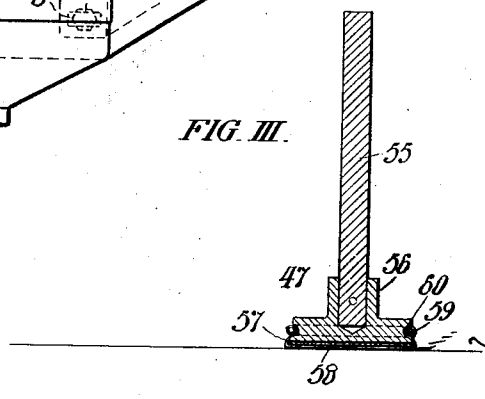


FIG. III.



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Patented July 12, 1927. 1,635,792

UNITED STATES PATENT OFFICE.

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GRINDING MECHANISM.

Application filed July 7, 1925, Serial No. 41,919. Renewed May 26, 1927.

My invention relates to portable mechanism which may be advantageously employed in surfacing floors, particularly for finishing hard wood floors, although adapted for use upon floors of other materials.

Ordinary floor surfacing machines and the tools employed therein, are so large that it is impossible to utilize the same to finish floors in the corners and narrow portions of rooms. Consequently, the use of such machines must be supplemented by hand work to finish the portions of the floor which are rendered inaccessible by the bulky form of such machines. Therefore, it is the object and effect of my invention to provide a grinding mechanism capable of presenting abrading tools in such close relation with the edges of a floor that the floor surface may be mechanically finished therewith throughout substantially its entire extent.

It is characteristic of my improved mechanism that it is capable of operating surfacing tools of both cylindrical and planular form, in alternation; such tools being provided with shafts which are adapted for interchangeable connection with the mechanism for rotating them and such mechanism being capable of supporting and driving such shafts alternatively parallel with and perpendicular to the floor.

The form of my invention hereinafter described is so compactly arranged that it is readily portable by one operator, for use in alternately presenting a cylindrical abrading tool and a plane disk abrading tool in operative relation with the floor or upon stair treads or risers.

That form of my invention includes a frame having a journal in which such tool shafts may be interchangeably mounted, and carrying an electric motor with means for rotating such shafts. Such frame is not only provided with distinct, different, base members whereby it may be supported upon the floor in either of the two positions aforesaid, but is conveniently provided with distinct spring pressed means for uplifting the abrading surface of the tool from the floor in either of said positions. The operator may readily depress said frame at the end carrying the abrading tool so as to put the latter into any desired degree of engagement with the floor, for coarsely or finely finishing the latter.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings; Fig. I is a plan view of a convenient form of my invention arranged to hold a cylindrical surfacing tool in its operative position, with its axis parallel with the floor being surfaced; such tool being reversible to project from either side of said machine frame, as indicated respectively in full and dotted lines.

Fig. II is a plan view of the same machine laid on its side, with another surfacing tool, having a planular disk abrading surface carried by a shaft with its axis perpendicular.

Fig. III is a vertical sectional view of the disk surfacing tool shown in Fig. II.

Referring to Figs. I and II; the L-shaped frame 1 is conveniently formed of cast metal comprising a plane web having stiffening flanges 2 and 3 at the opposite longitudinal edges thereof. The electric motor 5 is mounted upon said frame web 1 with which it is rigidly connected by the bolts 6 and 7 which extend through the slots 8 in the motor foot flanges 10 and 11 in screw threaded engagement with the bosses 13 and 14 in said frame. I provide said motor 5 with the belt tightening device which includes the bolt 16 and jam nut 17 in adjustable screw threaded relation with the lug 18 on the web of said frame 1.

Said motor 5 has, rigidly connected with its armature shaft 19, the grooved belt wheel 20 which is operatively connected by the belt 21 with the grooved belt wheel 23 which is detachably mounted upon an interchangeable tool shaft 24, conveniently by means of the set screw 25 in the hub 26 of said pulley 23. Said shaft 24 is mounted to rotate in the pair of journal bearings 29 and 30 at the end of said frame 1; which are conveniently provided with the grease cups 31 and 32. However, a single long journal may be substituted for said pair of short journals, and be provided with a single grease cup or other means for lubrication thereof.

As shown in Fig. I; said shaft 24 has, rigidly mounted thereon, a solid circular surfacing tool body 33 conveniently formed as a metal tube tightly fitting said shaft 24. Said tool body 33 is faced with a resiliently yielding tube, conveniently formed of sheet felt material 34 which is surrounded by the

abrasive tool cover comprising a flexible web carrying a granular abrasive substance.

As indicated in Fig. I; the position of said shaft 24 may be reversed so as to present said tool body 33 at either side of its journal in said frame 1 as may be most convenient to present the abrasive surface thereof to the surface which is to be ground or polished. As above noted; such a cylindrical tool 33 is designed for use with its axis parallel with the surface worked upon, which is indicated by the dash line at the top of Fig. II. Said tool 33 is arranged to be normally raised from contact with such surface by the plunger having the head 35 adapted to slide upon such surface, and the shank 36 fitted to reciprocate in a suitable plunger socket in said frame 1; said plunger being encircled by the spring 37 which continually tends to uplift said tool 33 in idle spaced relation with the surface to be worked upon, as indicated in Fig. II; such movement being limited by screw threads and nuts 38 on said plunger 37.

However, said frame 1 may be pressed toward the floor or other surface upon which the plunger head 35 is presented, as in Fig. II, by means of the handle 39 which is rigidly connected with the boss 40 on said frame 1 by the screw 42. In such movement; said frame 1 is supported by and arranged to tilt upon base members including the rollers 43 and 44 which are provided with suitable housings connected with the bracket extension 45 of said flange 2 of the frame 1 which is L-shaped. Said tool 33 is thus maintained with its axis parallel with the surface upon which said plunger head 35 and rollers 43 and 44 rest, as indicated by the dash line in Fig. II, and said tool 33 is thus movable toward and away from such surface upon the common axis of said rollers 43 and 44; said spring 36 instantly uplifting said tool to idle spaced relation with such surface whenever the operator relieves the pressure upon said handle 39. It may be observed that said base members, including said rollers 43 and 44 and said plunger 37, permit the mechanism to be freely shifted to and fro upon the surface parallel with the axis of said tool 33, with the minimum amount of exertion by the operator; whether said tool 33 is pressed into surfacing position or not. I find it preferable to rotate said tool so as to lift the particles of flooring which it loosens by its abrading operation; rather than to push them down toward the surface being worked upon. In other words; it is preferable to have the abrading surface of the tool 33 moving upon the floor surface in the direction in which the machine is being progressed. Therefore, the crossed relation of the belt shown in the drawings may be reversed, at the will of the operator; in accordance with the direction in which it is most convenient to progress the frame 1 with reference to the surface operated upon. Of course, such adjustment of the belt may be readily effected by loosening the set screw 25 so that the tool shaft 24 may be withdrawn. It is to be particularly noted that the same length of belt is required to drive the abrading tool in either direction.

Said frame 1 is provided with a second set of base members whereby it may be supported with the axis of the abrading tool 47 in normal vertical relation with the floor or other surface to be abraded, as shown in Fig. III. Such base members include the reciprocatory plunger having the slidable head 48 pressed against such surface by the spring 49 encircling the plunger which is mounted to reciprocate in the plunger socket 50 in the frame 1; the outward movement of said plunger being limited by screw threads and nuts 51 thereon. Said base member 48 cooperates with the pair of base members at the opposite end of the frame 1, including the rollers 52 and 53 mounted in suitable housings connected with said frame. As indicated by the dash line in Fig. I; said plunger spring 49 normally uplifts the frame 1 so that the tool 47 would be suspended in idle spaced relation with the surface indicated by that line but may be depressed to the position shown in Fig. III by the same handle 39; such rocking motion being with reference to the common axis of said rollers 52 and 53. It is to be particularly noted that said handle 39 is so located that the operator may directly apply pressure upon said frame 1 between said axis and the abrading tool, so as to directly press the latter against the surface worked upon, with a force which is limited only by the strength of the operator.

As shown in Fig. II; the tool shaft 55 is interchangeable with said tool shaft 24 in the same journal bearings in said frame 1. As shown in Fig. III; said tool shaft 55 is rigidly connected with the hub 56 of the surfacing tool 47 comprising a circular body having a plane face carrying the resilient material 57 which, like the material 34, may be sheet felt, which resiliently supports the abrasive cover 58 which includes a web of flexible material such as emery cloth or sand paper carrying granular abrasive material. Such cover 58 may be conveniently secured by the annular band 59 formed of a helical coil of spring wire which presses the edges of said cover into the groove 60 in said tool 47. However, any suitable means may be employed for providing an abrasive surface upon the tools described. For instance, the tool body 33 may have a slot 62 cut spirally in its cylindrical surface to receive the adjoining edges of an abrasive web, for instance, emery cloth or sand paper, which may be held therein by the plate 63 connected with said tool body by screws 64.

It may be observed that the arrangement

of said armature shaft 19 in transverse, right angular relation with the axis of the tool shafts 24 and 55 permits more compact arrangement of said mechanism so as to facilitate the projection of both tools 33 and 47 into regions which would otherwise be inaccessible.

It may be observed that although said cylindrical tool 33 may be presented close to the edge of a rectangular floor; it would be practically impossible to surface the floor completely to the edge thereof with such a tool because of the liability of scratching the baseboards. Therefore, I find it preferable not to attempt to use such tools so close to the floor edge and to finish the floor surfacing with the tool 47 which may be safely presented up against the baseboards.

Although I have found it convenient to employ the form of my invention above described, I do not desire to limit myself to the precise details of construction and arrangement thereof, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In a portable surfacing machine, arranged to interchangeably operate rotary abrasive tools with their axes parallel with and vertical to the floor; the combination with a frame having a journal for the rotary shaft of such a tool, and having different base members, respectively arranged to support said frame with the axis of said journal alternatively parallel with, and perpendicular to, the floor; of means arranged to rotate the tool shaft, including an electric motor on said frame, a belt wheel rigidly connected with the motor armature shaft; a belt wheel rigidly connected with a tool shaft; and a belt connecting said wheels.

2. The combination with interchangeable floor surfacing tools respectively provided with shafts of the same size and with abrading surfaces which are respectively cylindrical and planular; of means arranged to alternatively rotate said tools, including a frame having a journal in which said tool shafts may be interchangeably fitted; a belt wheel having means arranged to detachably secure it upon the tool shaft in said journal; an electric motor rigidly connected with said frame and having an armature shaft provided with a belt wheel; a belt operatively connecting said wheels; and base members on said frame arranged to support said frame in sliding relation with the floor with the axis of said journal alternatively parallel with and perpendicular to the floor.

3. In a portable surfacing machine, the combination with a frame; of an abrading tool having a shaft mounted to rotate in said frame, at one end thereof; an electric motor arranged to rotate said tool; supporting rollers on said frame having their axes at right angles to each other and arranged to support said frame with the axis of said tool alternatively parallel with and perpendicular to the surface worked upon; and a handle on said frame between said tool and said supporting rollers; said handle extending obliquely with respect to the axes of both of said rollers; whereby the operator may apply pressure to said handle to forcibly press said tool against the surface worked upon, in both of said alternative positions.

4. In a portable surfacing machine, arranged to interchangeably operate rotary abrasive tools with their axes parallel with and vertical to the floor; the combination with a frame having a journal for the rotary shaft of such a tool, and having different base members, respectively arranged to support said frame with the axis of said journal alternatively parallel with, and perpendicular to, the floor; of means arranged to rotate said tool shaft.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this second day of July, 1925.

CHARLES BERNARD KELLER.