

Sept. 3, 1963

K. W. VEZNER
TERRAZZO GRINDING MACHINE

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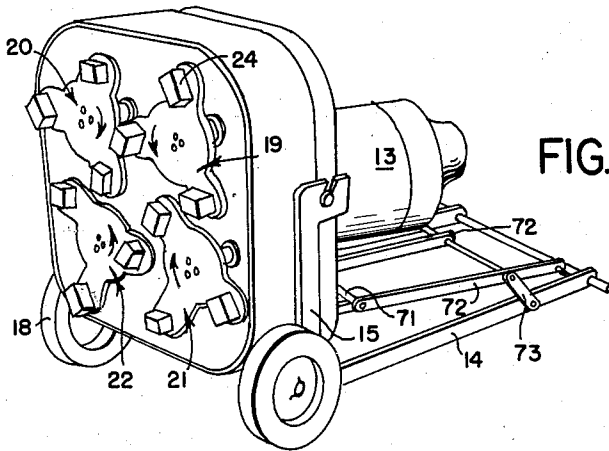


FIG. 6

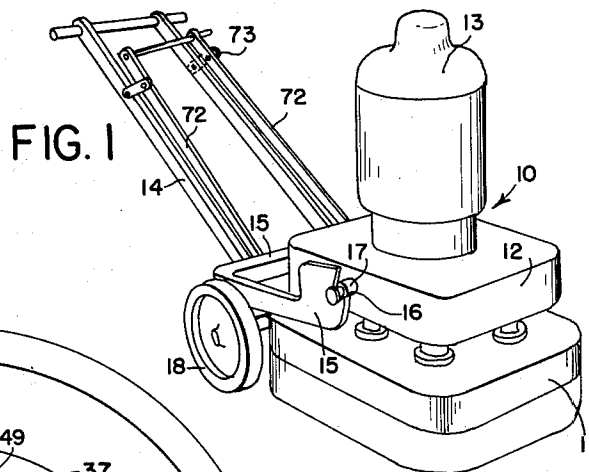
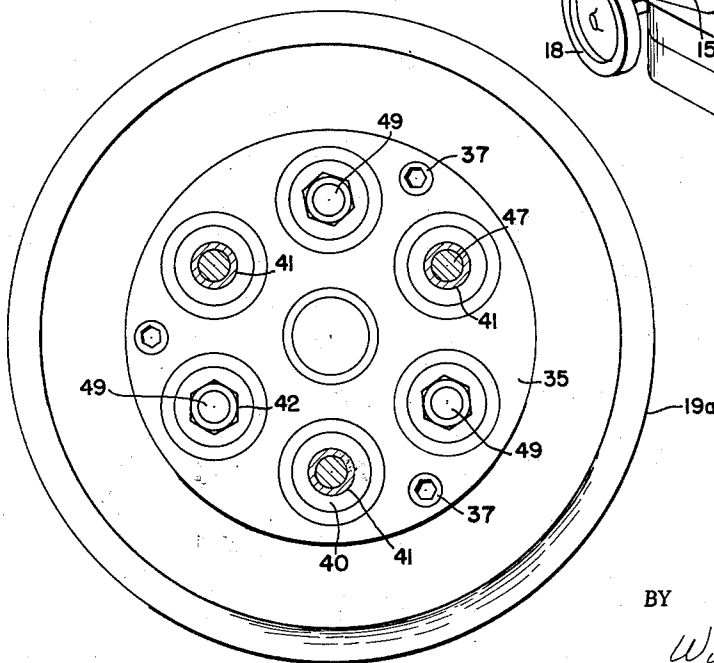


FIG. 1

FIG. 4



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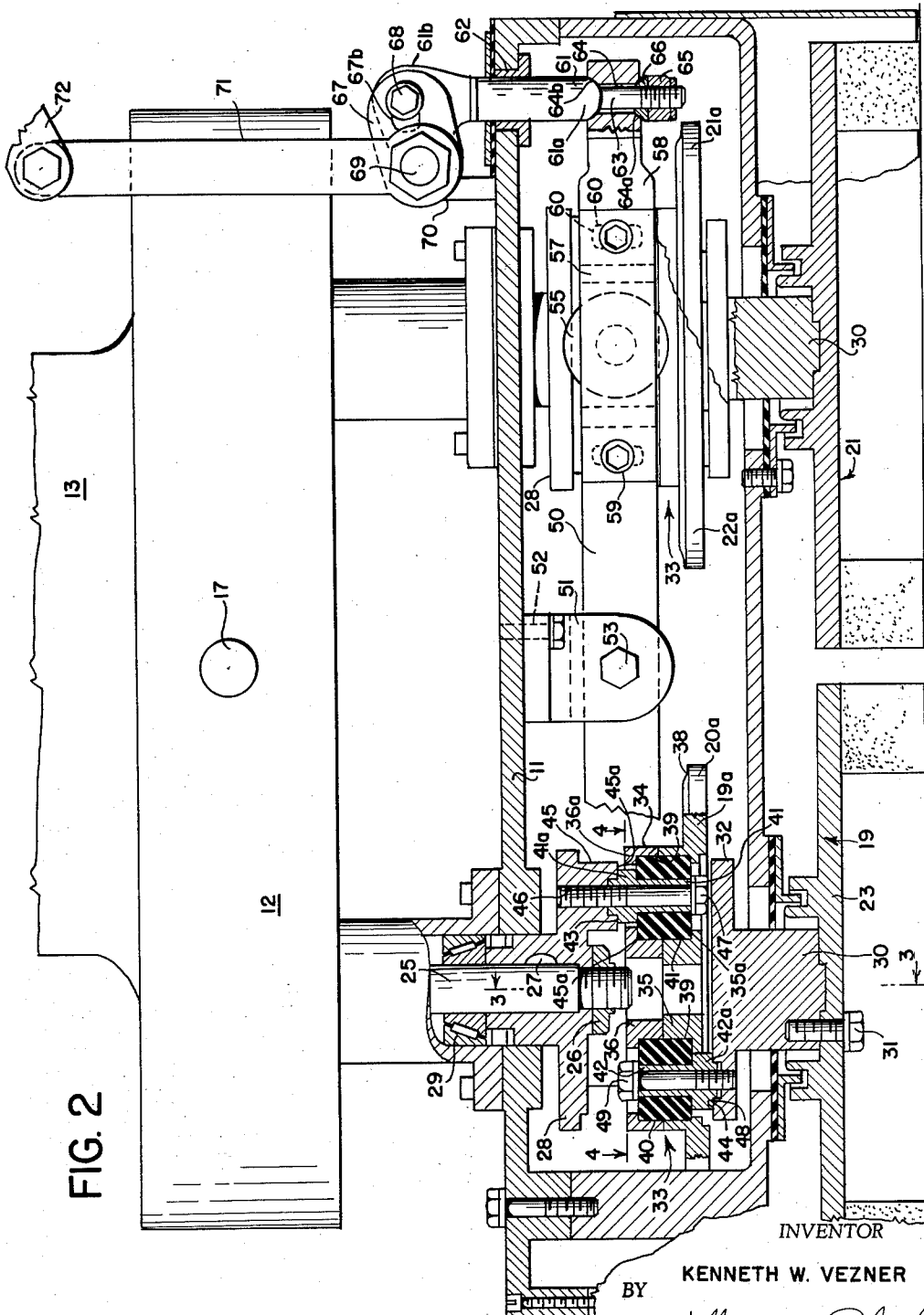
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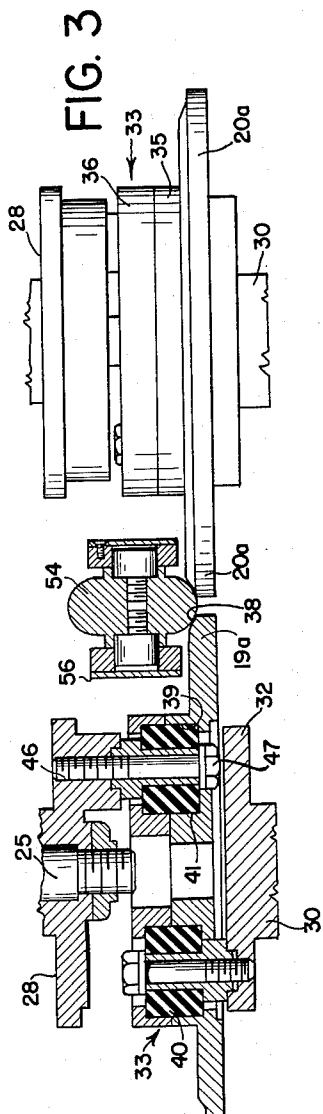
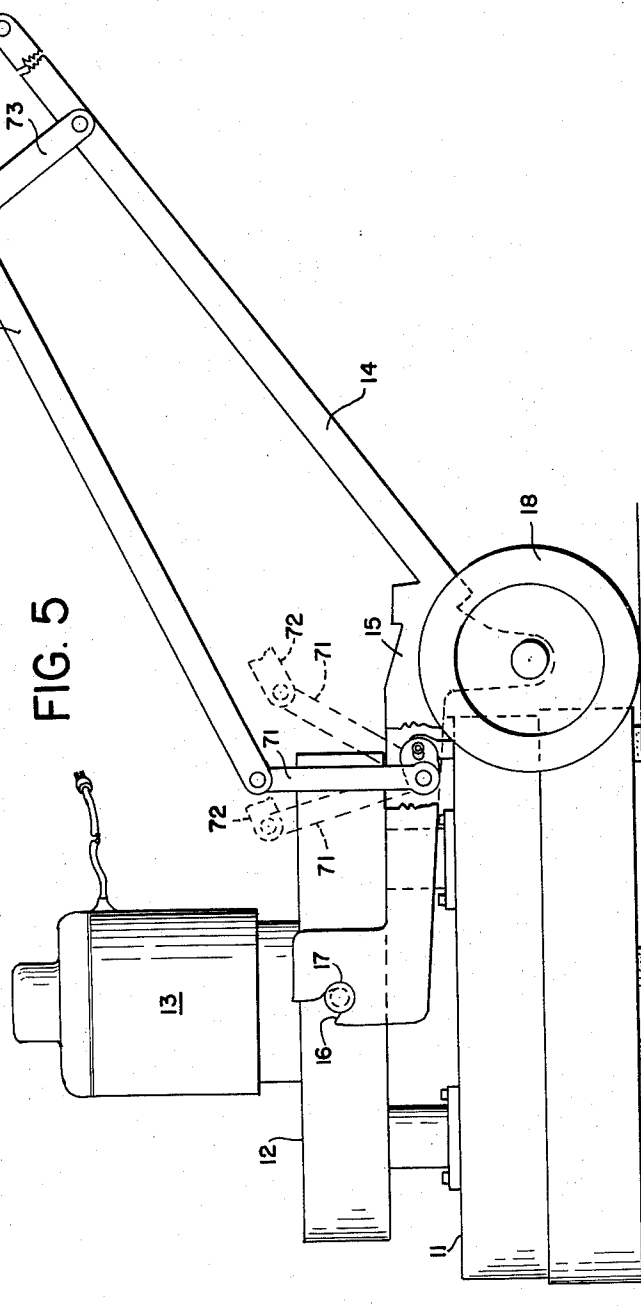
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3 Sheets-Sheet 3



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TERRAZZO GRINDING MACHINE

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13 Claims. (Cl. 51-177)

This invention relates to a floor-treating machine and more particularly relates to a machine for grinding, smoothing, finishing and polishing terrazzo floors and the like.

Although terrazzo floor-grinding machines have been known in the past, difficulties have been experienced in connection with apparatus for propelling such machines over the floor. Because the weight of such machines is of substantial magnitude, and because substantially all of the weight of the machine is actually carried on the floor-engaging and grinding rotors, maintenance becomes a material and substantial factor in the operating cost of such machines unless the machine is provided with adequate safeguards to prevent or minimize undesired mechanical oscillations and vibrations, the effect of which, when added to the actual weight of the machine, greatly compounds the wear exerted on even the strongest of parts.

An object of the invention is to provide a new and improved floor-treating machine of relatively simple and inexpensive construction and operation.

A further object of the invention is to provide in a floor-treating machine of the type employing floor-engaging rotors revolving on upright axes, new and novel apparatus for tilting such rotors for producing propulsion of the machine along the floor.

A still further object of the invention is to provide in a multiple rotor terrazzo floor-grinding machine, apparatus for producing sufficient tilting of certain of the rotors as to produce propulsion of the machine along the floor while preventing any desired grooving or gouging of the floor.

A still further object of the invention is to provide novel and improved apparatus in a terrazzo floor-grinding machine for controlling propulsion of the machine along the floor and for allowing tilting of the grinding block-carrying rotors to an accessible position to permit changing of the grinding blocks.

These and other objects and advantages of our invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

FIG. 1 is a perspective view of the machine;

FIG. 2 is a detail longitudinal section, partly broken away showing the interior detail of the machine;

FIG. 3 is a detail transverse section taken approximately at 3-3 in FIG. 2 with portions of the apparatus shown in section and other portions shown in elevation;

FIG. 4 is an enlarged detail section view taken approximately at 4-4 in FIG. 2;

FIG. 5 is a side elevation view of the machine; and

FIG. 6 is a perspective view of the machine in tilted position for changing the blocks.

One form of the present invention is shown in the drawings and is described herein.

The floor treating machine is indicated in general by numeral 10 and comprises in general a machine for grinding and polishing terrazzo floors during construction thereof.

The machine includes a rigid frame 11 to which is rigidly secured a gear housing 12 with a motor 13 affixed thereto. A handle 14 is affixed to a yoke structure 15 having slots 16 therein for receiving and supporting the

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rigid studs 17 at opposite sides of the machine, and by which the frame structure 11 and the other portions of the machine are lifted. The yoke structure 15 has support wheels 18 carried thereon which are utilized primarily when the frame portion 11 is to be tilted upwardly as hereinafter more fully described.

The machine is provided with two pairs of cooperating floor-engaging and grinding rotors 19, 20, 21 and 22, all of which are substantially similar to each other and an understanding of one together with its operating mechanism will suffice for an understanding of all of the rotors. The forward pair of rotors 19 and 20 revolve in opposite directions as indicated by the arrows and the rearward pairs of rotors 21 and 22 also revolve in opposite directions. It will be noted that each of the rotors includes a spider 23 having outwardly protruding lobes adapted for removably mounting floor-grinding blocks 24 thereon. The spacing between the pair of rotors 19 and 20, and rotors 21 and 22 is such as to cause the floor-grinding blocks to revolve in overlapping orbits.

Each of the spiders of the rotors is disposed below and in substantial axial alignment with a corresponding drive shaft 25 which is driven in the proper direction by the gear mechanism within gear housing 12 from the source of rotary power or motor 13. The shaft 25 is affixed by nut 26 and key 27 to a rotary drive member 28, and the shaft 25 and rotary drive member 28 are journaled on a vertical axis as by roller bearing 29.

It will be understood that the axis of rotation of the spider 23 is also substantially vertically aligned with the rotation axis of the rotary drive member 28. A mounting and driving hub 30 is affixed to the spider 23 as by bolts 31, and has a flange 32 thereon.

Flexible coupling apparatus, indicated in general by numeral 33 is provided for transmitting rotary power to the rotor spider 23 from shaft 25 and for permitting and actually causing limited tilting of the rotor with respect to the drive member 28. Said apparatus 33 includes a symmetrical rigid element or housing 34 which as hereinafter seen is flexibly coupled to both the flange 32 of the rotor hub and to the rotary drive member 28. The rigid housing 34 includes an integral rigid base 35 and a cap 36, both of which are generally circular in shape as seen in FIG. 4 and which are affixedly interconnected with each other as by Allen-head screws 37. The several bases 35 of the flexible coupling apparatus associated with the several rotors have flat and substantially planar circular rings 19a, 20a, 21a and 22a formed integrally thereof and oriented concentrically and transversely of the rotation axes of the several rotors. Each of the several rings are identical and it will be seen that the upper surface of ring 19a has a recessed outer peripheral portion 38.

The base 35 and cap 36 cooperatively define a plurality, and at least six, open-ended and substantially cylindrical chambers or compartments 39 which are spaced equally from each other and symmetrically arranged with respect to the rotation axis.

Each of the chambers 39 confines a generally cylindrical and resilient yieldable annulus or biscuit 40. The biscuits 40 are clamped at their outer peripheries by means of lips 35a and 36a in fixed relation within the rigid housing 34. The annuli or biscuits 40 are formed of durable rubber and are vulcanized at their inner peripheries to rigid sleeves 41 and 42. It will be seen that the sleeves 41 have spacer flanges 41a at their upper ends, and the sleeves 42 have spacer flanges 42a at their lower ends and it will further be seen that the sleeves 41 are provided in three of the biscuits 40 in symmetrical relation about the rotation axis and that the other biscuits 40 carry the sleeves 42 therein. The upwardly facing shoulder surfaces 43 of the flanges 41a are machined to fine tolerances

so as to precisely lie in a common plane which extends normal to the axis of the ring and housing 34; and the downwardly facing shoulder surfaces 44 of the spacer flanges 42a similarly are machined to lie precisely in a plane normal to the axis.

The rotary drive member 28 has depending bosses 45 which are aligned with the corresponding sleeves 41 and have machined bottom surfaces 45a lying in a common plane which are abutted by the surfaces 43 of the flanges 41a. The bosses 45 are provided with threaded apertures 46 aligned with the interior of sleeves 41, and the sleeves 41 are affixed to the rotary drive member by screws 47. It will therefore be seen that each of the sleeves 41 and the inner peripheries of the corresponding resilient biscuits are affixedly secured to the rotary drive member 28 and that the several biscuits associated with the sleeves 41 provide a flexible coupling between the rigid element or housing 34 and the rotary drive member 28.

Similarly the flange 32 of rotor hub 30 is provided with machined surfaces 48 abutting the machined surfaces of flanges 42a, and the sleeves 42 are affixed to the flange 32 by screws 49, thereby affixing the inner peripheries of the several biscuits associated with sleeves 42 to the rotor hub. The rotor and hub is thereby flexibly coupled to the rigid element or housing 34.

It should be particularly noted that whenever the ring 19a and rigid housing 34 is tilted or is disposed obliquely with respect to the rotary drive member 28 or with respect to the rotor, the inner and outer peripheries of the rubber biscuits 40 are displaced endwise in relation to each other. Because the drive member 28 and the hub flange 32 are each connected to the rigid housing 34 by at least three symmetrically positioned biscuits 40, at least two of the three biscuits has the inner and outer peripheries thereof endwise displaced with respect to each other at all times when an oblique angle exists between the rigid housing 34 and the other rigid part, whether it be the drive member 28 or the rotor hub 30. As a result, during a tilted condition of the rotor, the rigid housing 34 will remain substantially stationary, though tilted, with respect to both the hub 30 and the drive member 28.

It should be understood that where, herein, tilting of the rotors is mentioned, that such tilting is ordinarily extremely small in magnitude, and will not ordinarily exceed an angle of more than two to three degrees. However, as hereinafter more fully pointed out, such tilting is important to the operation of the machine, because the tilting of the rotors will produce progressive travel of the machine along the terrazzo floor being ground and will also allow for irregularities in the surface being ground. It should be understood that during the initial stages of the grinding operation, the surface being worked upon has the appearance of a rough-troweled concrete floor and is therefore quite irregular.

It will be noted in FIG. 3 that the rings 19a and 20a are disposed in substantially edge-to-edge, but slightly spaced relation, and similarly the rings 21a and 22a are disposed adjacent each other in substantially edge-to-edge but slightly spaced relation.

Means are provided for applying pressure on the rings 19a, 20a, 21a and 22a for vertically displacing the adjacent portions of such rings whereby to tilt the rings and produce tilting of the corresponding rotors, and in the form shown, such pressure-applying means includes a rigid bar or arm 50 extending in a fore-and-aft direction above the several rings and pivotally mounted on a pair of ears 51 which are secured to the frame 11 by screws 52. A shoulder bolt 53 extends through aligned apertures in the ears 51 and through a mounting aperture in the bar 50 to thereby permit substantially vertical swinging movement of the opposite fore-and-aft ends of the bar 50.

The pressure applying element or bar 50 is provided with bearing means adjacent its fore-and-aft ends for engaging with a minimum of friction, the several flat

rotating rings in order to produce the desired tilting of the rotors, and in the form shown, such bearing means include rollers 54 and 55 which are respectively journaled on bifurcated brackets 56 and 57 which form a part of bar 50.

It will be seen that the roller 54 is disposed above the adjacent peripheral edge portions of rings 19a and 20a so as to press said adjacent portions of the rings downwardly when the bar 50 is correspondingly tilted, and thereby causes tilting of the rings 19a and 20a at oblique angles with respect to each other. Similarly, the roller 55 is disposed above the adjacent portions of rings 21a and 22a for oppositely tilting these rings. It will be understood that when either pair of adjacent rings, 19a and 20a, or 21a and 22a, are oppositely tilted, pressure is applied onto the corresponding rotors to similarly oppositely tilt the corresponding pair of rotors. Such opposite tilting of the forward rotors 19 and 20 will produce forward travel of the machine along the terrazzo floor being ground. Because the direction of rotation of rotors 21 and 22 is opposite to that of rotors 19 and 20, such tilting of rotors 21 and 22 will produce rearward progressive travel of the machine along the floor. It should be noted that in the present machine, only one pair of rotors is intentionally tilted at any one time to produce progressive travel of the machine, and further when such tilting of either pair of rotors is produced, the additional downward pressure applied against the floor is located in the area between the centers of rotation of the tilted pair of rotors. This is particularly advantageous in the grinding of terrazzo floors so as to grind the terrazzo as to bring out the metallic strips oftentimes laid in the floor for ornamental purposes. While one pair of the rotors is tilted, the rotors in the other pair remain flat on the floor without any tilting being intentionally produced. It should be understood that irregularities in the floor may produce tilting of the rotors at any time, whether a pair of rotors is being intentionally tilted when the irregularity is encountered or whether the rotors are substantially flat against the floor. In the event that an irregularity in the floor is encountered by the rotors being intentionally tilted, through tilting of the rings induced by pressure applied by the corresponding roller, the rubber biscuits in the flexible coupling apparatus 33 which connect the rigid disc and housing 34 to the rotor hub 30 will additionally yield or flex so as to allow independent tilting of the rotor with respect to the rigid disc and housing 34.

The pressure applying bar 50 has an extension portion 58 on the rear end thereof for controlling the tilting of the bar. The roller mounting brackets 56 and 57 are adjustably secured by Allen head screws 59 to the bar 50 and extension portion 58 through slot apertures 60 as seen in FIG. 2. By slightly vertically adjusting the position of brackets 56 and 57, the sensitivity of control may be varied so as to either increase or decrease the magnitude of swinging movement of bar 50 which is necessary to produce tilting of the rings and rotors.

A pivot rod 61 is slidably mounted in a bushing 62 which is affixed to the frame 11 and has a lower depending stem portion 63 which extends through an aperture 64 in the extension portion 58 of the pressure-applying bar 50. The stem 63 is secured by a nut 65 which urges washer 66 against the extension portion 58. The washer 66, as well as the surface portion 64a, are rounded and somewhat spherically shaped so as to permit limited swinging oscillation of the bar 50 with respect to the slidable pivot rod 61. Similarly the lower end portion 61a of rod 61 as well as adjoining surface portion 64b of the extension part 58a are somewhat spherically shaped so as to also permit limited swinging oscillation of the bar 50 with respect to pivot rod 61. The upper end portion 61b of pivot rod 61 is flattened and is swingably connected to a bifurcated link 67 by an Allen head screw 68 extending through slot apertures 67b in the opposite sides of the bifurcated link 67. Link 67 is affixed to a rocker shaft

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69 which is journaled in suitable bearings 70 on the frame 11. The opposite ends of shaft 69 have upstanding control arms 71 affixed thereon to which the control links 72 are pivotally connected. The rigidly interconnected control links 72 are secured to the control handle 14 by swinging links 73 so as to allow for fore-and-aft substantially sliding movement of the links 72 to the several positions shown.

In the disclosed embodiment of the machine wherein the rotors are revolved in the direction indicated, movement of the link 72 in a forward direction will produce forward progressive travel of the machine along the floor, and rearward shifting of the link 72 will produce rearward progressive travel of the machine along the floor.

When it is desired to change the stones or blocks 24 on the several rotors, the rear end of handle 14 is swung downwardly toward the floor, causing the forward portion of the machine to be swung upwardly and supported on wheels 18. The frame 11, together with motor 13 and gear box 12 will tilt at the studs 17 so that the rotors and blocks 24 will be fully exposed to facilitate changing of the blocks. During this tilting and swinging of the frame 11, the link 72 will be drawn forwardly as necessary, and when the machine is again lowered to the position of FIG. 1, the control link will again assume the position shown.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of our invention which consists in the matter described herein and set forth in the appended claims.

What is claimed is:

1. A terrazzo floor-grinding machine, comprising a frame with a control handle connected thereto,
 - a source of rotary power on the frame and including a pair of side-by-side rotary drive members journaled on the frame on vertical axes, said source rotating said members in opposite directions,
 - a pair of substantially rigid, flat and circular rings disposed below and aligned with respective drive members and oriented transversely and concentric of the axes thereof in adjacent and substantially edge-to-edge relation with each other, said rings having substantially horizontal upwardly facing surfaces in substantially common planes,
 - a pair of rotors having downwardly facing floor-engaging and grinding blocks thereon, said rotors being disposed on upright axes respectively aligned with said rotary drive members and each of said rotors having rotary means connected with the corresponding ring for rotation therewith and cooperative tilting therewith oblique to the axes of the corresponding drive member,
 - a pair of flexible couplings each connecting a respective drive member with the rotary means of the corresponding rotor and permitting tilting of the ring and rotor with respect to the drive member,
 - a roller disposed above adjacent portions of said rings for engaging and applying pressure downwardly against said surfaces and causing tilting of the rings and oppositely rotating rotors and producing progressive movement of the machine along the floor, and controllable means mounting said roller for selective downward and upward movement to apply and relieve pressure on the rings and thereby controlling progressive movement of the machine along the terrazzo floor during grinding thereof.
2. A floor treating machine, comprising a frame with a control handle connected thereto,
 - a source of rotary power on the frame and including a pair of side-by-side rotary drive members on vertical axes, said source rotating said members in opposite directions,

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- a pair of substantially flat and circular rings each disposed below and being substantially aligned with a respective rotary member and oriented transversely to the axis thereof,
 - a pair of floor-engaging and treating rotors on upright axes each in alignment with a respective rotary member and each having rotary means connected with the corresponding ring for rotation therewith whereby tilting of the ring produces tilting of the rotor,
 - a pair of flexible couplings each connecting a respective drive member with the rotary means of a corresponding rotor for transmission of rotary power to the rotor and to permit limited tilting of the rotor with respect to the corresponding drive member,
 - roller means above and in confronting relation with adjacent portions of said rings for applying pressure downwardly thereon and causing tilting of the rotors,
 - a mounting carrying said roller means and connected to the frame for movement toward and away from said rings,
 - and control means for moving said mounting and thereby applying pressure against the rings for tilting the oppositely rotating rotors and thereby causing propulsion of the machine along the floor.
3. A floor treating machine, comprising a frame with a control handle connected thereto,
 - a source of rotary power on the frame and including a pair of side-by-side rotary drive members journaled on the frame and on vertical axes, said source rotating said members in opposite directions,
 - a pair of substantially flat circular and rigid rings adjacent each other and each disposed below and aligned with a respective drive member and oriented transversely and concentric of the axis thereof, said rings having substantially horizontally oriented surfaces,
 - a pair of floor-engaging and treating rotors on upright axes aligned with said drive members and each of said rotors having rotary means connecting the rotor with the corresponding ring for rotation therewith and for cooperative tilting therewith oblique to the axis of the drive member,
 - a pair of flexible couplings each connecting a respective drive member and the rotary means of the corresponding rotor to transmit rotary power to the rotors and permit limited tilting of the rotors with respect to the drive members,
 - roller means confronting the horizontal surfaces of adjacent portions of said rings for engaging and applying pressure thereagainst to tilt the rings and the oppositely rotating rotors and thereby produce propulsion of the machine along the floor,
 - and controllable means carrying said roller means and connected to the frame for moving said roller means toward and away from the horizontal surfaces of the rings thereby producing tilting of the rings and rotors.
 4. A floor treating machine, comprising a frame with a control handle connected thereto,
 - a source of rotary power on the frame and including a pair of depending side-by-side rotary drive members journaled on the frame on vertical axes, said source rotating said members in opposite directions,
 - a pair of substantially rigid flat and circular rings disposed below and aligned with respective drive members and oriented transversely of the axes thereof in substantially edge-to-edge relation with each other, said rings having substantially horizontal surfaces,
 - a pair of floor-engaging and treating rotors on upright axes respectively aligned with said rotary drive members and each of said rotors having rotary means

connected with the corresponding ring for rotation therewith and cooperative tilting therewith oblique to the axis of the corresponding drive member,

a pair of flexible couplings each connecting a respective drive member with the rotary means of the corresponding rotor for transmitting rotary power to the rotor and permitting tilting of the ring and rotor with respect to the drive member,

a roller confronting the horizontal surfaces of adjacent portions of said rings for applying pressure thereagainst and causing tilting of the rings and oppositely rotating rotors for producing progressive travel of the machine along the floor,

a mounting carrying said roller and connected to the frame for substantially vertical movement toward and away from said rings whereby to apply and relieve pressure against the rings for tilting the rotor, and controllable means for moving said mounting.

5. A floor treating machine, comprising a frame with a control handle connected thereto,

a source of rotary power on the frame and including a pair of side-by-side rotary drive members journaled on the frame on upright axes, said source rotating said drive members in opposite directions,

a pair of substantially flat rigid and circular rings disposed below and in alignment with respective drive members and oriented transversely of said axes in adjacent and edge-to-edge relation with each other,

a pair of floor-engaging and treating rotors on upright axes respectively aligned with said drive members and having rotary means connecting each of the rotors and each of said rotors having rotary means connected with the corresponding ring for rotation therewith and for tilting therewith and with respect to said drive member,

a pair of flexible couplings each connecting a respective drive member with the rotary means of the corresponding rotor for transmitting rotary power to the rotor and permitting limited tilting thereof with respect to the drive member,

a pressure applying element movably mounted on the frame and confronting the substantially horizontal surfaces of adjacent side-by-side portions of said rings to produce tilting of the rings and of the oppositely rotating rotors to thereby produce progressive travel of the machine along the floor, said pressure applying element having a bearing for engaging said rings and permitting rotation of said rings with respect to said element, and controllable means for moving said element and applying pressure to the rings.

6. A floor treating machine, comprising a frame with a control handle connected thereto,

a source of rotary power on the frame and including a pair of side-by-side rotary drive members journaled on the frame on vertical axes and rotated in opposite directions,

a pair of flexible couplings connected with respective drive members,

a pair of floor-engaging and treating rotors on upright axes in substantial alignment with said respective flexible couplings and drive members,

each of said rotors having rotary means including a rigid member connecting said flexible coupling to said rotor, said rigid member having a peripheral surface concentric of the rotor and extending toward the center of flexing of said coupling,

bearing means confronting each of said peripheral surfaces of said rigid members for applying pressure thereagainst in a direction normal to said surface,

support means on the frame and carrying said bearing means for movement toward and away from

the peripheral surfaces of said rigid members, whereby to tilt the rotors and produce progressive travel of the machine along the floor.

7. A floor treating machine, comprising a frame with a control handle connected thereto,

a source of rotary power on the frame and including a pair of depending side-by-side rotary drive members journaled on the frame on vertical axes, said source rotating said members in opposite directions,

a pair of floor-engaging and treating rotors on upright axes, each in alignment with a respective rotary member,

a pair of rotary symmetrical rigid elements adjacent each other and each being substantially coaxially aligned with a respective drive member and the corresponding rotor,

a first pair of flexible couplings each connecting a respective rotary drive member with the corresponding symmetrical element for transmitting rotary power to said element and allowing limited tilting of the element with respect to the drive member,

a second pair of flexible couplings each connecting a respective rotor to the corresponding symmetrical element and transmitting rotary power to the rotor, said second pair of flexible couplings including resiliently yieldable means transmitting tilting movement of the symmetrical element to the rotor for tilting the rotor and also allowing limited independent tilting of the rotor with respect to the symmetrical element as the rotor is tilted by irregularities in the floor surface,

and means tilting said symmetrical drive elements obliquely with respect to each other to thereby oppositely tilt said oppositely rotating rotors and produce progressive movement of the machine along the floor.

8. The invention set forth in claim 7 wherein said symmetrical elements include rigid rings disposed concentric and transversely of the rotation axes and in substantially side-by-side relation with each other, said rings having portions of the periphery disposed adjacent each other,

and said means for tilting the rigid elements including apparatus identically vertically displacing said adjacent peripheral portions of the rings simultaneously to oppositely tilt the rings and symmetrical elements and thereby produce opposite tilting of the oppositely rotating rotors and producing progressive travel of the machine along the floor.

9. The invention set forth in claim 8 wherein said rings are substantially flat and are disposed in substantially co-planar relation with each other,

and wherein said apparatus includes a single roller movable in a vertical direction for engaging and vertically displacing said adjacent peripheral portions of the ring for oppositely tilting said rings and oppositely revolving said rotors and producing progressive travel of the machine along the floor.

10. The invention set forth in claim 7 wherein each flexible coupling of said first and second pairs of flexible couplings includes at least three generally cylindrically shaped and resiliently yieldable annuli disposed in symmetrical and spaced relation with the rotation axis and having the outer peripheries thereof affixedly secured to said symmetrical element, the inner peripheries of the annuli of said several couplings being respectively affixed to the drive members and rotors, the inner and outer peripheries of said annuli being endwise displaceable with each other,

and at least a pair of said annuli in each flexible coupling having the inner and outer peripheries endwise displaced during tilting of the rotors to thereby minimize vibration during tilting.

11. A floor treating machine,
comprising a frame with a control handle connected thereto, said frame having opposite ends,
a first pair of rotors at one end of the frame and disposed in side-by-side relation with each other on vertical axes and having endwise facing floor-treating surfaces for engagement with the floor,
a second pair of rotors disposed at the other end of the frame in side-by-side relation with each other on vertical axes and having endwise facing floor-treating surfaces for engagement with the floor,
a plurality of rotary drive members each journaled on the frame above and in substantial alignment with a respective rotor,
a plurality of flexible couplings each connecting a respective rotor with the corresponding drive member for transmitting rotary power between said drive members and the corresponding rotors and permitting limited tilting of the rotors with respect to the drive members,
a source of rotary power on the frame and connected with said rotary drive members to revolve the rotors in each pair of rotors in opposite directions, and means producing identical vertical displacement of adjacent portions of the rotors in said first pair of rotors for producing progressive travel of the machine along the floor while said second pair of rotors remain flat on the floor and produce normal treating thereof.
12. A floor treating machine,
comprising a frame having fore-and-aft ends and having a control handle connected thereto,
a first pair and a second pair of rotors respectively disposed adjacent opposite ends of the frame on vertical axes, said rotors having endwise facing floor-treating surfaces engaging the floor, the rotors in each pair of rotors being disposed in side-by-side and adjacent relation with each other, each rotor being also disposed in substantial fore-and-aft alignment with an adjacent rotor of the other pair of rotors,
a plurality of rotary drive members journaled on vertical axes on the frame and each of said rotary drive members being disposed in substantial alignment with a respective rotor,
a plurality of flexible couplings each connecting a respective drive member with the corresponding rotor for transmitting rotary power and permitting limited tilting of the rotor with respect to the corresponding drive member,

- a source of rotary power on the frame and rotating said drive members to revolve each rotor oppositely of the rotors adjacent thereto,
means for alternately and selectively tilting the first and second pairs of rotors by applying vertically directed pressure on adjacent portions thereof to produce progressive travel in selected fore-and-aft directions while allowing the other pair of rotors to remain flat on the floor.
13. A floor treating machine having a frame with fore-and-aft ends and a control handle connected thereto, first and second pairs of rotors respectively disposed at opposite ends of the frame on vertical axes and having endwise facing floor treating surfaces in engagement with the floor, the rotors in each pair of rotors being disposed in side-by-side and adjacent relation with each other, each rotor being also disposed in substantial fore-and-aft alignment with an adjacent rotor of the other pair of rotors,
a plurality of rotary drive members journaled on the frame on vertical axes, each of said members being disposed in substantial alignment with a respective rotor,
a plurality of flexible couplings each connecting a respective rotor with the corresponding drive member for transmitting rotary power therebetween and permitting limited tilting of the rotors,
a source of rotary power on the frame and rotating said drive members to revolve each rotor oppositely of the rotors adjacent thereto,
and means simultaneously tilting both pairs of rotors by identically vertically displacing the adjacent portions of the rotors in each pair of rotors and thereby facilitate production of progressive travel of the machine along the floor by tilting the frame in a fore-and-aft direction through operation of the control handle and thereby alternately relieve and increase pressure exerted by the pairs of rotors on the floor while treating the same.

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