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2,869,442

FLOATING AND TROWELING MACHINE

Filed Nov. 29, 1956

4 Sheets-Sheet 1

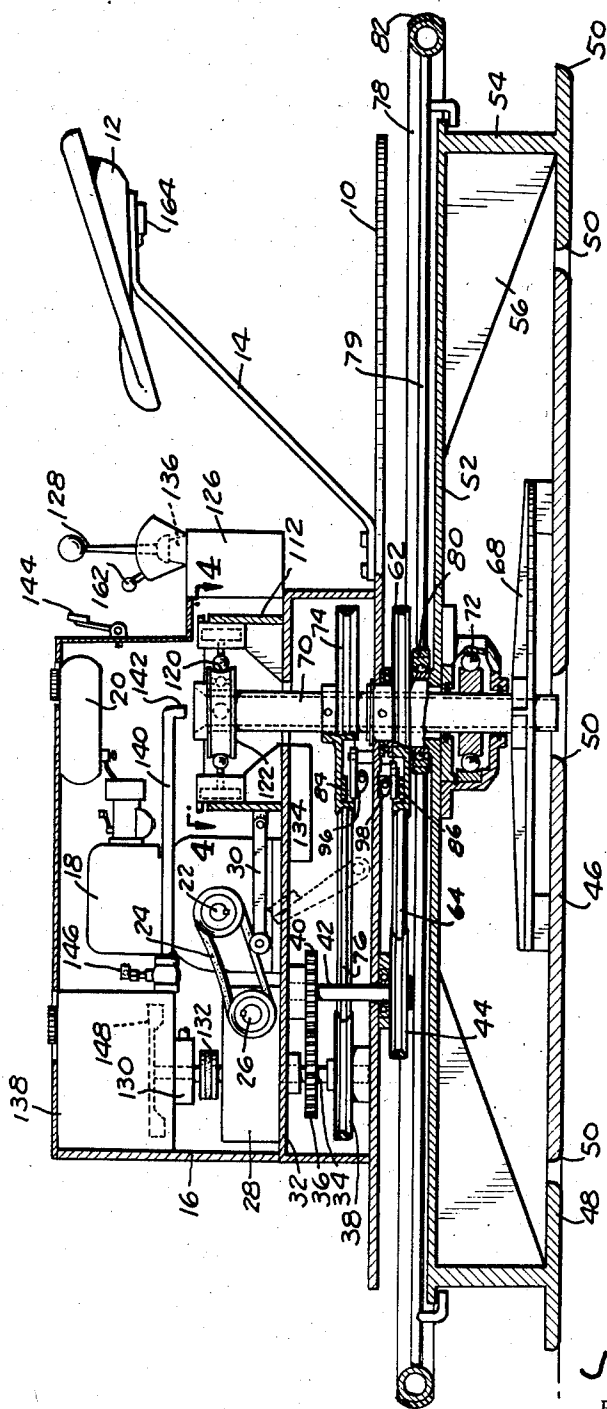


FIG. 1

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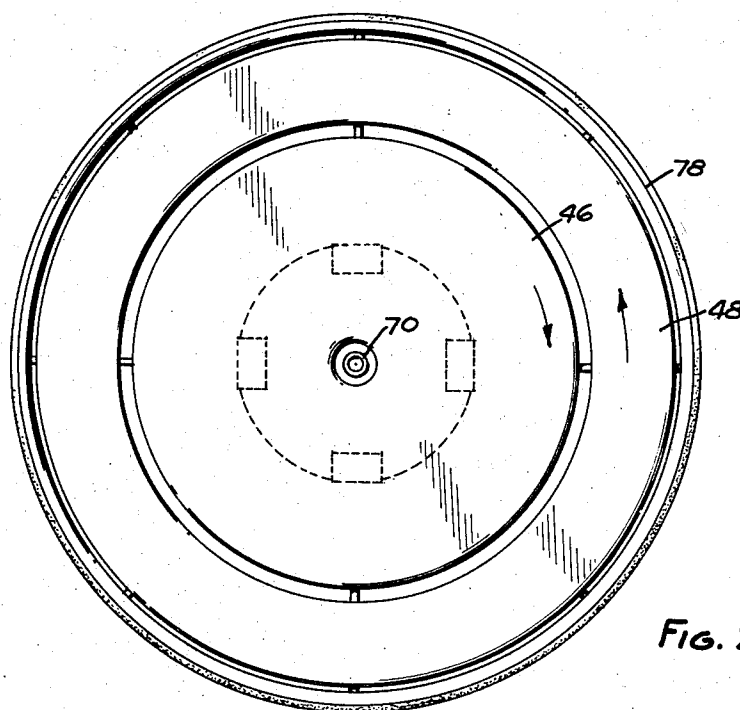


FIG. 2

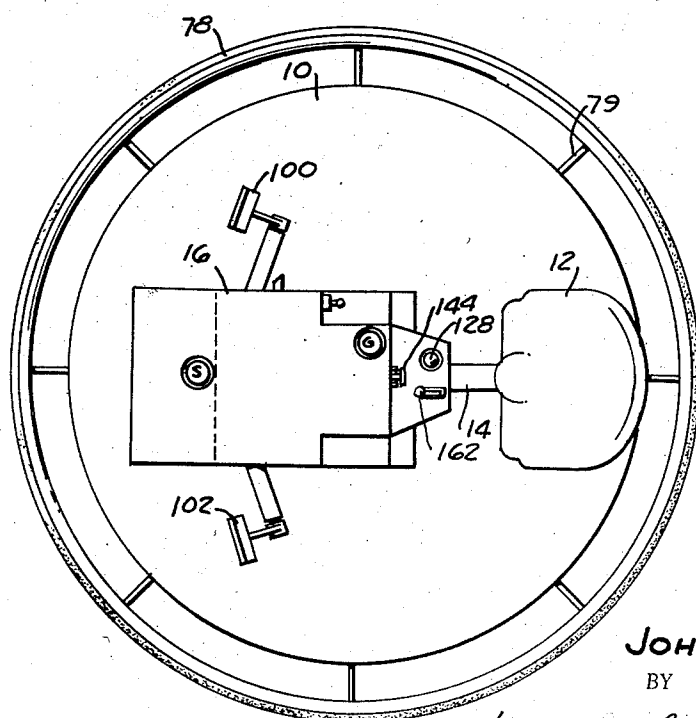


FIG. 3

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FIG. 4

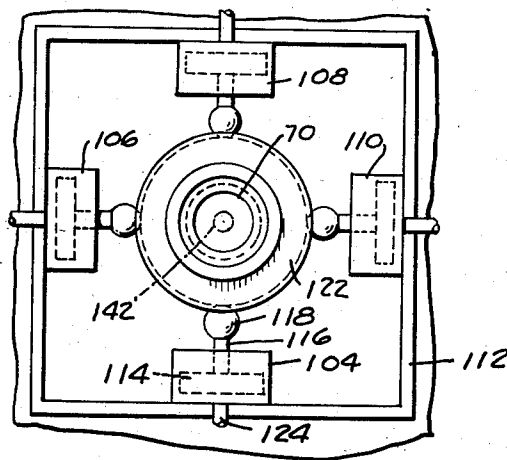


FIG. 7

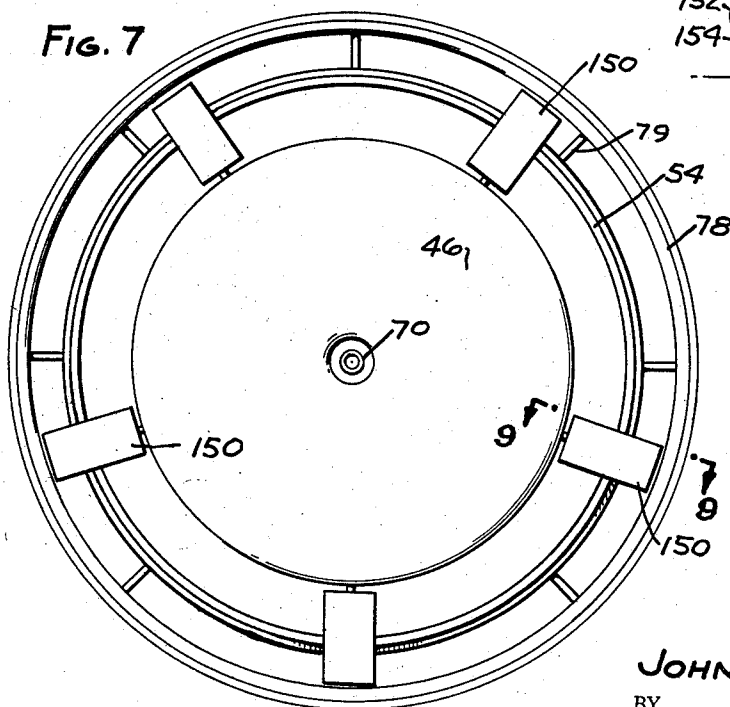


FIG. 8

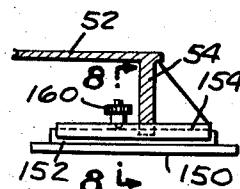
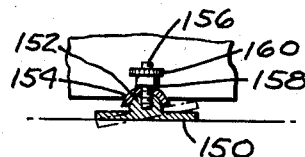


FIG. 9

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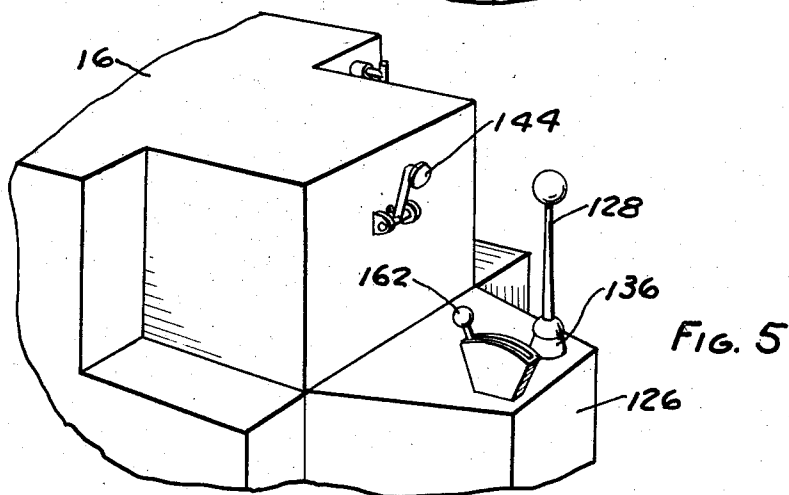
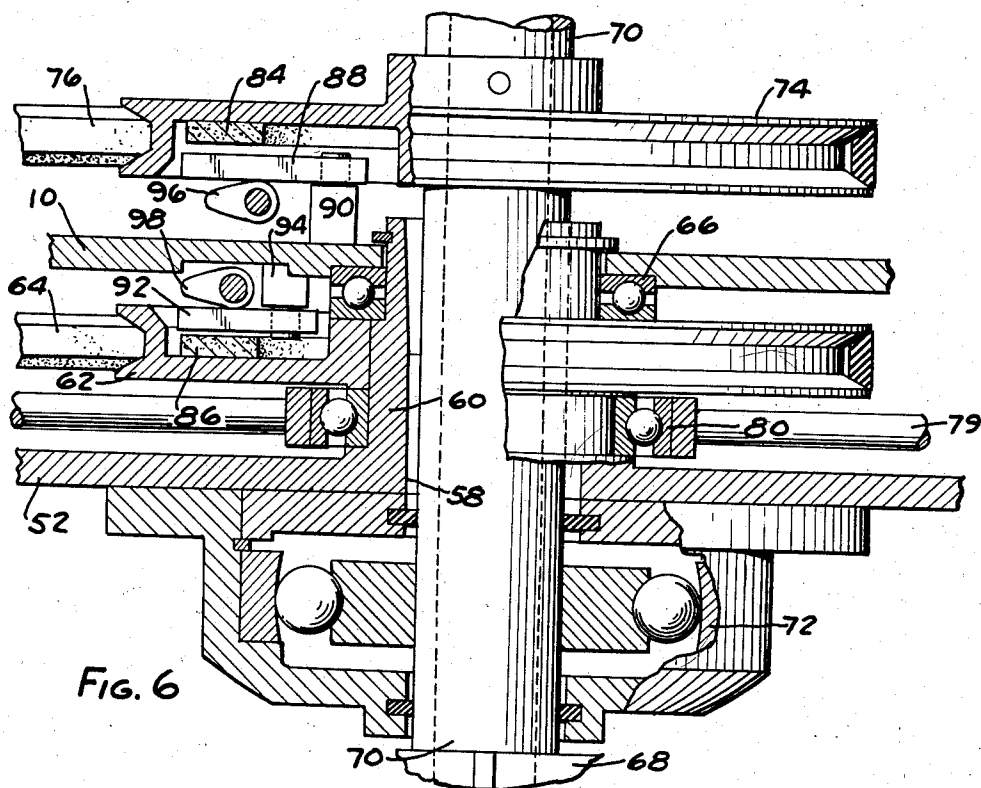
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4 Sheets-Sheet 4



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2,869,442

FLOATING AND TROWELING MACHINE

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Application November 29, 1956, Serial No. 625,105

10 Claims. (Cl. 94—45)

This invention relates to apparatus for finishing plastic floors such as concrete and the like and has to do more particularly with a self-propelled machine which serves to both float and trowel the plastic material from which the floor is being constructed.

In my prior joint patent with Henry F. Wieger, No. 2,208,801, dated July 23, 1940, there is disclosed a power-driven combined floating and troweling machine for finishing plastic floors. The machine of my prior patent included a pair of concentrically spaced rings having co-planar bottom surfaces mounted on a frame and driven by a motor on the frame. The machine was arranged to be guided along the floor surface by means of a handle gripped by the operator who walked behind the machine over the floor being finished. The machine of my prior invention represented a substantial advance in the art of finishing floors because, as pointed out in said patent, it enabled the use of a concrete mixture of low water content and a relatively coarse aggregate which results in a floor having the best wearing qualities and the highest possible strength. It also represented a substantial saving in cost as compared with the hand finishing of floors. However, the machine of my prior patent was rather cumbersome with respect to guiding it manually; and in some cases, the footprints of the operator required hand finishing subsequent to the machine finishing.

The machine of my present invention represents an improvement over the machine shown and described in said prior patent in that the machine of the present invention is self-propelled.

Thus, it is an object of the present invention to provide a combined floating and troweling machine for finishing plastic floors which is constructed so that it can be controlled by an operator seated on the machine.

A further object of the invention is to provide a machine of the type referred to wherein novel means are provided so that the operator seated on the machine can guide the machine in any direction over the floor surface being finished.

In the drawings:

Fig. 1 is a view partly in side elevation and partly in vertical section of a machine constructed in accordance with the present invention.

Fig. 2 is a bottom view of the machine shown in Fig. 1.

Fig. 3 is a top plan view of the machine.

Fig. 4 is a sectional view taken generally along the lines 4—4 in Fig. 1.

Fig. 5 is a fragmentary perspective view of the machine showing the manually operable controls therefor.

Fig. 6 is an enlarged fragmentary sectional view of the machine.

Fig. 7 is a bottom view of a machine according to the present invention provided with a modified form of troweling arrangement.

Fig. 8 is a sectional view along the lines 8—8 in Fig. 9.

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Fig. 9 is a sectional view along the lines 9—9 in Fig. 7.

Referring more particularly to Fig. 1, the machine of the present invention includes a frame that comprises a circular platform 10 on which an operator's seat 12 is mounted as by the spring arm 14. A housing 16 on platform 10 encloses the drive and other components of the machine. The motive power for the machine is supplied by a gasoline engine 18 which receives its supply of fuel from a tank 20. The outlet shaft 22 of motor 18 is connected as by a belt and pulley drive 24 with the input shaft 26 of a speed reducing gear box 28. A clutch which may be manually actuated or a centrifugal clutch, not shown, operates an arm 30 for applying tension to belt 24 and thus establish a driving connection between shafts 22 and 26 when manually actuated in the case of a manually controlled clutch or when the speed of motor 18 exceeds a predetermined value in the case of a centrifugal clutch. Motor 18 and gear box 28 are mounted on a support frame 32 within housing 16. Gear box 28 has an output shaft 34 extending downwardly therefrom with a gear 36 and a pulley 38 mounted thereon. Gear 36 meshes with a smaller gear 40 on a countershaft 42. The lower end of countershaft 42 is provided with a pulley 44.

Pulleys 38 and 44 are arranged for driving a pair of floating and troweling rings 46 and 48, respectively, in opposite directions. Inner ring 46 comprises an inner trowel while ring 48 comprises an outer trowel. These rings are formed from suitable hardened steel so that they will wear uniformly and for a relatively long time. It will be observed that rings 46 and 48 have their inner and outer edges rounded as at 50. The bottom faces of these rings are substantially co-planar so that a smooth, uniformly flat finish is provided to the floor being worked on.

Ring 48 is mounted on the underside of a disc 52 as by annular support 54 and reinforcing brackets 56. At the center thereof, disc 52 is provided with a central opening 58 around which is welded an upstanding sleeve 60. A pulley 62 is fixedly secured to the upper end of sleeve 60, and a belt 64 provides a driving connection between pulley 62 and pulley 44 on countershaft 42. A thrust bearing 66 is arranged between the upper end of sleeve 60 and platform 10. Thus, when countershaft 42 is rotated, outer ring 48 is rotated relative to platform 10 through the drive described.

Inner ring 46 is mounted as by the spider 68 at the lower end of a vertically extending hollow shaft 70. Shaft 70 is mounted on disc 52 for rotation and limited universal pivotal movement by means of a spherical bearing 72. Within housing 16, a pulley 74 is keyed to shaft 70 and a belt 76 provides a driving connection between pulley 38 and pulley 74 so that when pulley 38 is rotated, inner ring 46 is likewise rotated relative to platform 10 and in a direction opposite to the direction of rotation of outer ring 48. A tubular frame 78 having radial arms 79 is rotatably supported on sleeve 60 by means of a bearing 80. Frame 78 is arranged between platform 10 and disc 52. Around its periphery, tubular frame 78 is provided with a rubber bumper element 82.

With the arrangement thus far described, it will be appreciated that when clutch lever 30 is manually actuated or when motor 18 operates at a sufficiently high speed to establish a driving connection between shafts 22 and 26 in the case of a centrifugal clutch, rings 46 and 48 will rotate in opposite directions, each of these rings rotating relative to platform 10. However, it is quite likely that the resistance to rotation of these rings will not be the same for each ring; and therefore, platform 10 might tend to rotate in either one direction or the

other. Means are provided to prevent such rotative movement of platform 10. These means are preferably in the form of a braking arrangement for pulleys 74 and 62.

Referring more particularly to Fig. 1, pulley 74 is provided with an annular brake lining 84 on the underside thereof and pulley 62 is provided with a similar brake lining 86 on the top face thereof. A brake shoe 88 is floatingly supported on platform 10 for vertical movement toward and away from brake lining 84 on a pin 90. A similar brake shoe 92 is supported for floating movement toward and away from lining 86 on a pin 94. Brake shoe 88 is urged in a direction away from lining 84 by gravity and brake shoe 92 is urged in a direction away from lining 86 by means of springs, not illustrated. Adjacent brake shoe 88, there is rotatably mounted a cam 96 and adjacent brake shoe 92, there is rotatably mounted a cam 98. These cams are arranged to be actuated by brake pedals 100 and 102, respectively (Fig. 3). When pedal 100 is depressed, cam 96 is actuated to urge shoe 88 into contact with lining 84 and thus cause platform 10 to tend to rotate in the direction of rotation of pulley 74. When pedal 102 is depressed, cam 98 is actuated to bring shoe 92 into contact with lining 86 and thus cause platform 10 to tend to rotate in the direction of rotation of pulley 62. Thus, any tendency of the platform 10 to rotate in either one direction or the other can be inhibited by depressing the proper one of the two brake pedals 100, 102.

The guiding movement of the machine either forwardly, rearwardly, to the right or to the left is controlled by tilting upright shaft 70 slightly so that ring 46 is cocked slightly relative to the floor surface being finished; and thus, the increased pressure between a localized area of disc 52 and the floor being finished will provide a propelling action to the machine. The means for tilting shaft 70 comprise four cylinders 104, 106, 108 and 110. These cylinders are spaced 90° apart circumferentially around the upper end of shaft 70 and are mounted on supporting brackets 112. Within each cylinder, there is arranged a piston 114 having a piston rod 116. The free end of each piston rod is provided with a spherical abutment 118 engaging within an arcuate groove 120 formed around the periphery of a bushing 122 fixed at the upper end of shaft 70. Cylinders 104, 106, 108 and 110 are connected by conduits 124 with a valve structure 126 that is controlled by a handle 128. A hydraulic pump 130 connected with the output shaft of gear box 28 by a coupling 132 is arranged to supply oil under pressure from a reservoir 134 to cylinders 104, 106, 108 and 110 as controlled by valve structure 126. Handle 128 is pivotally supported as at 136 for movement from a central upright position either forwardly or rearwardly or to either one side or the other. Handle 128 is connected with valve structure 126 so that as the handle is moved forwardly from the position shown in Fig. 1; and assuming clockwise rotation of ring 46, oil under pressure is supplied to cylinder 104 and is exhausted from cylinder 108 to tilt upright shaft 70 to the right of the machine as viewed by the operator on seat 12 and thus propel the machine forwardly. Likewise, the arrangement is such that when handle 128 is tilted rearwardly, the shaft 70 is tilted such as to propel the machine in a rearward direction, etc.

In finishing plastic floors such as concrete, it invariably happens that at certain areas or at certain stages of setting of the concrete, additional slurry or water is required to be applied in order to produce the required smooth finish. Thus, in the machine of the present invention, there is provided a slurry tank or water receptacle 138 having a discharge conduit 140, the outlet 142 of which is located over the open upper end of shaft 70. A handle 144 controls a valve 146 for discharging slurry or water from tank 138 down through the center of upright shaft 70 to a location at the center of ring 46

where it can be troweled at the desired spot on the floor being finished that requires additional slurry or water. If desired, a paddle structure 148 driven by the output shaft of gear box 128 may be arranged in tank 138 for maintaining the slurry in continual agitation.

In the modified arrangement shown in Figs. 7, 8 and 9, in place of the outer ring 48, disc 52 supports a plurality of steel trowels 150. These trowels are spaced equally circumferentially around inner disc 46. Trowels 150 are preferably supported so that they can tilt and thus behave in much the same manner as does a trowel that is manually manipulated. Each trowel is provided with a generally cylindrical enlargement 152 on its upper face which interfits with a semi-cylindrical sleeve 154 at the lower end of support 54. Each trowel is held in assembled relation with sleeve 154 by means of a stud 156 projecting through an arcuate slot 158 in sleeve 154 and a lock nut 160.

It will thus be appreciated that the machine described herein is admirably suited for floating and finishing floors formed of a plastic material. The machine is arranged to support the operator; and, by driving rings 46 and 48 in opposite directions and providing the controls described herein, the machine can be guided by the operator in any direction desired. This eliminates entirely the necessity for an operator to walk behind the machine. The entire finishing operation can be accomplished while the operator is seated on the machine even to the extent of supplying additional slurry where required. In addition, the machine can be controlled entirely by the seated operator. Thus, a throttle control 162 is arranged within the operator's reach and a safety switch 164 for grounding the ignition circuit and stopping motor 18 is arranged beneath seat 12. It will be observed that the overall height of the machine is of a minimum dimension. This is very desirable. It enables the machine to be turned on end; that is, supported on tubular frame 78 and wheeled through doorways of conventional size. Frame 78 also provides a convenient means for lifting the machine when required.

I claim:

1. A combined floating and troweling machine for finishing plastic floors comprising a frame having means thereon for supporting an operator, a pair of inner and outer troweling members journaled on said frame for rotation in a generally horizontal plane below said frame about a vertical axis, said outer-troweling member having an enlarged vertically extending sleeve fixed thereon at the axis of rotation and the inner member having a vertically extending shaft fixed thereon and projecting upwardly through said enlarged sleeve, a motor on said frame, a driving connection between said motor and said sleeve and between said motor and said shaft for rotating the sleeve and shaft in opposite directions and means for tilting said shaft within said sleeve for tilting the inner troweling member relative to the outer troweling member.

2. The combination set forth in claim 1 including means for varying the speed of rotation of said troweling members relative to each other.

3. The combination set forth in claim 1 including means for momentarily varying the speed of rotation of said troweling members relative to each other.

4. The combination set forth in claim 1 wherein said last mentioned means comprises four abutments on said frame engaging said shaft adjacent the upper end thereof and spaced apart 90° circumferentially of the shaft and means for selectively moving said abutments radially of the shaft.

5. The combination set forth in claim 4 wherein said last mentioned means comprises a plurality of hydraulic piston and cylinder assemblies operatively connected one with each of said abutments, valve means for directing hydraulic fluid under pressure selectively to said piston

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and cylinder assemblies and a manually controllable member for operating said valve means.

6. The combination set forth in claim 1 wherein said shaft is hollow and including a receptacle on said frame for water or slurry and means under the control of an operator on said frame for releasing the contents of the receptacle from said receptacle and discharging the same down through said hollow shaft.

7. The combination set forth in claim 1 including a pair of discs fixed one to each of said troweling members and rotatable therewith and means on said frame under the control of an operator on said frame for applying a frictional braking effect between said frame and either of said discs.

8. The combination set forth in claim 7 wherein said last mentioned means comprises means forming a frictional surface on each of said discs, a pair of plate members non-rotatably mounted on said frame one adjacent each of said discs and movable toward and away from said disc and a pair of actuating members, one for each of said plate members for moving said plate members into frictional engagement with said friction surfaces.

9. A combined floating and troweling machine for finishing plastic floors comprising a frame having a horizontal supporting platform, means on said platform for supporting an operator, a vertically extending sleeve journaled for rotation on said platform, a shaft extending upwardly through said sleeve and rotatably supported therein, the lower end of said sleeve having fixed thereon

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a troweling member, the lower end of said shaft having fixed thereon a second troweling member, said troweling members having finishing faces generally aligned in the same plane perpendicular to the axis of rotation of said sleeve and shaft, a motor on said frame, means interconnecting said motor with said sleeve and shaft to rotate the sleeve and shaft in opposite directions and means on said frame for tilting said shaft within said sleeve to thereby tilt the finishing face of one of the troweling members out of the plane of the other traveling member.

10. The combination called for in claim 9 including a brake mechanism mounted on said platform, said brake mechanism being operably connected with said sleeve and said shaft for optionally applying a force to said sleeve or shaft tending to prevent rotation of said sleeve or shaft relative to said platform.

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