May 28, 1957 L. M. LOMBARDO 2,793,476

TERRAZZO FINISHING MACHINE

Filed June 28, 1956 2 Sheets-Sheet 1

FIG. 1.

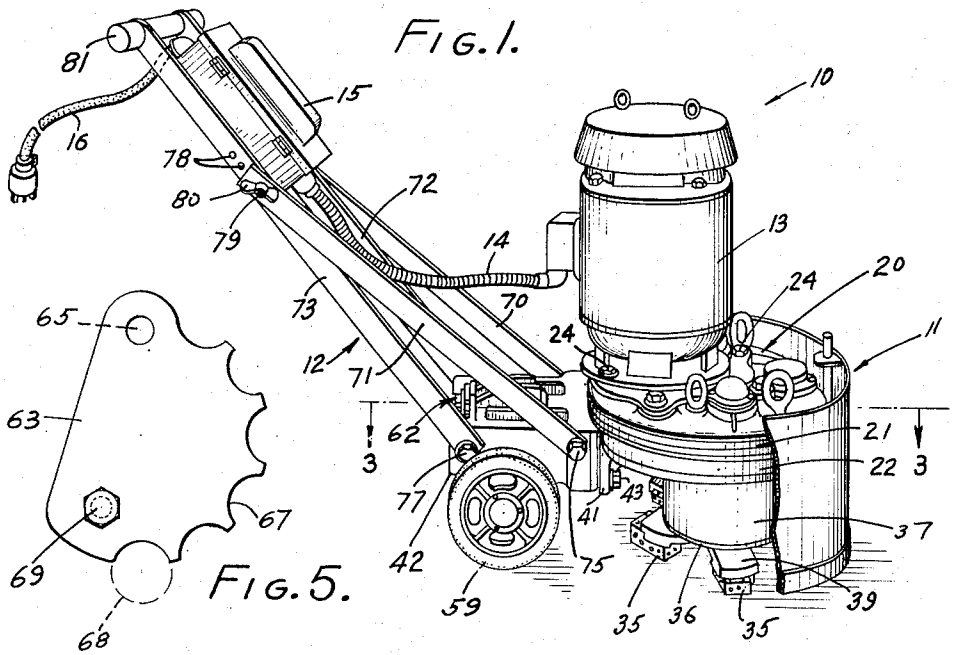

FIG. 5.

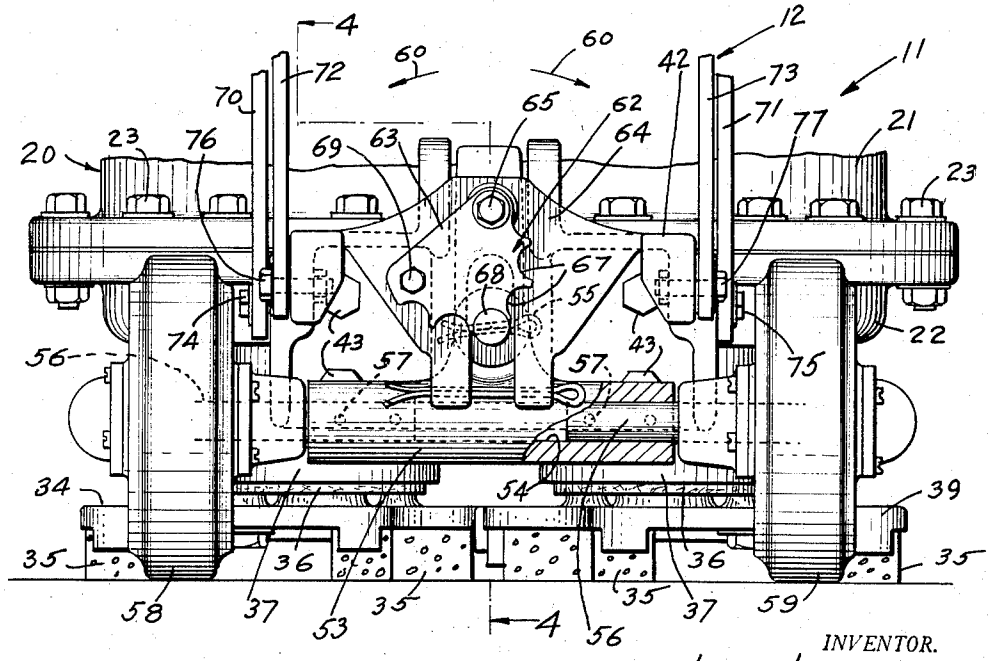

FIG. 2.

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TERRAZZO FINISHING MACHINE

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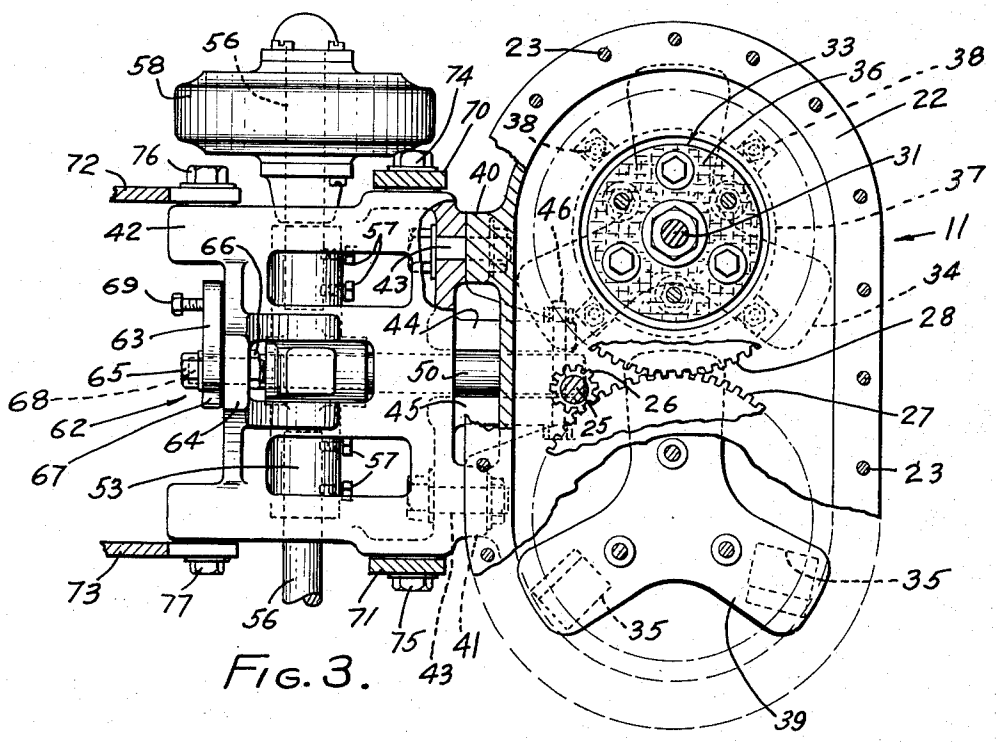

FIG. 3.

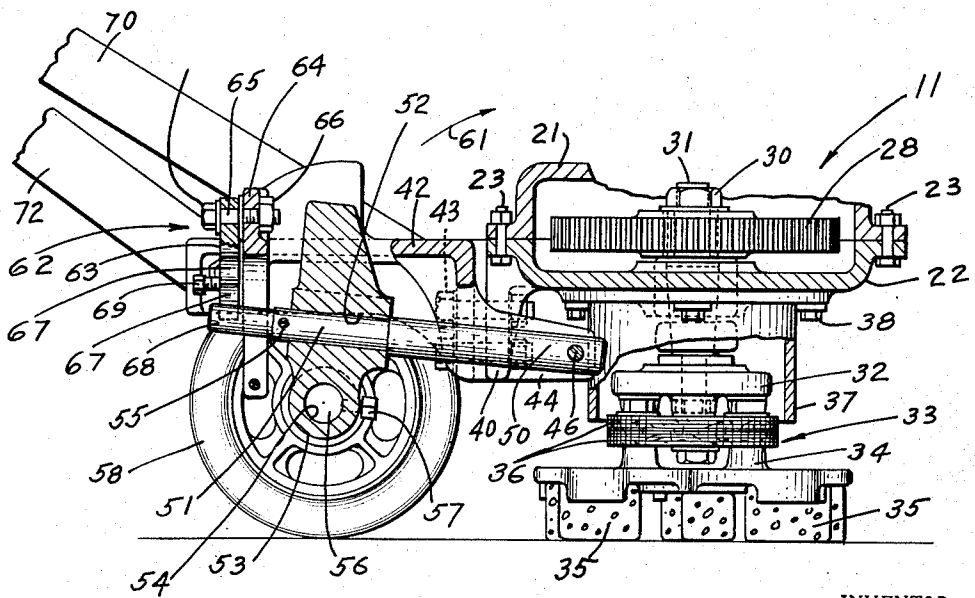

FIG. 4.

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TERRAZZO FINISHING MACHINE

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8 Claims. (Cl. 51—177)

This invention relates in general to floor surfacing machines, and is concerned more particularly with machines of the type used in the finishing of terrazzo tile floors.

Terrazzo Veneziano floors, more commonly known simply as terrazzo, are laid with small chips of marble set irregularly in cement. It is customary after the cement has set to grind off the roughness that occurs and to finish-polish the floor with a floor surfacing machine adapted to that purpose.

To that end the machines of the prior art have comprised an electric motor driving a rubbing block, or a pair of contra-rotating blocks, through a speed reduction transmission. The motor and gear case are usually disposed vertically above the rubbing blocks so that substantially all of the weight of the machine bears on the grinding stones (known in the trade as "rubs") during the surfacing operation.

These machines usually have disposed to the rear thereof a wheel or wheels to assist in the mobility of the machine during the surfacing operation. Likewise, to manipulate the machine, it is provided with a handle on the end of risers which extend rearwardly outwardly and upwardly from the machine frame or housing.

During the surfacing operation, it will be seen that attrition of the rubs occurs, hence the machine gravitates toward the floor. In order to maintain the rubbing block or blocks substantially parallel to the floor, it is customary to have a universal joint or joints disposed between the driving and driven shafts immediately above the rubbing blocks. This is necessary since the wear of the rubs causes the machine to tilt somewhat on a radius centered at the contact line of the wheels with the floor.

At least one of the machines of the prior art has attempted to compensate for machine tilt by providing an adjustable wheel carriage which can be raised or lowered by means of a handwheel and jackscrew arrangement. However, the arrangement is not entirely satisfactory since the jackscrews and operating handwheel must of necessity be positioned in a location which is awkward at best and not easily adapted to ready manipulation while the machine is running. Another disadvantage of such an arrangement is that the jackscrew mechanism must be lubricated at regular intervals; but the dust, chips and other muck occasioned by the surfacing operation tend to collect and adhere to the lubricant and lubricated surfaces, and must be cleaned off frequently or the jackscrew will jam.

The machine of the present invention overcomes the disadvantages of known floor finishers and provides other advantages not hitherto incorporated in terrazzo finishing machines.

It is therefore an object to provide a terrazzo finishing machine having a wheel carriage which is simple of structure and so arranged with respect to the machine that the wheels are easily and quickly raised while the machine is running in order to compensate for wear of the

rubs. It is a further object to provide a structure wherein the wheel carriage is mounted on an arm whose one end is pivotally secured to the machine and whose other end is adapted to be adjustably engaged by a notched cam on the machine, the cam notches being disposed at variable distances from the center of cam rotation whereby the height of the wheels with respect to the machine may be adjustably varied. It is another object to provide a stud means outstanding from the cam and adapted to be "toed" by the machine operator without having to remove his hands from the machine while it is running.

It is a still further object to provide the wheel carriage with a journal bore wherein a portion of the arm is received for providing at least limited rotation of the carriage and wheels about the arm in order to compensate for an uneven floor during the initial grinding thereof.

A particular object is to provide a wheel carriage and bracket assembly with the arm pivot and arm adjusting means forming a part of the bracket. In such a structure the handle risers may likewise be secured to the bracket. The particular advantage from such an arrangement is that the whole assembly is thus adaptable to being secured to various sized machines. In this connection it might be noted that most manufacturers of this type of machine usually offer them to the public in three or four sizes of 1½ to 5 horsepower. Thus, by being able to provide a single major assembly for all sizes, production and tooling costs are sharply reduced and the public benefits thereby.

It is a still further object to provide a machine of this type with handle risers which are securable to each other in various positions whereby the handle height above the floor is readily and easily adjustable to the convenience of the operator.

Other and further objects and advantages will be apparent to those skilled in the art upon review of the following description when taken in connection with the drawing, wherein:

Fig. 1 is a side perspective view of the machine of the present invention, with a portion of the muck guard broken away;

Fig. 2 is an enlarged rear elevation view of the lower part of the machine with part of the wheel carriage broken away to show the wheel axle;

Fig. 3 is a top view taken on the line 3—3 of Fig. 1;

Fig. 4 is a side view taken on the line 4—4 of Fig. 2; and

Fig. 5 is a detail view of the notched arm mechanism employed in the height adjusting means.

Referring to the figures in the drawing, there is shown a terrazzo floor surfacing machine **10** comprised of two main assemblies, namely the surfacing apparatus **11** and the handling control **12**. In general, the apparatus **11** includes a power means such as an electric motor **13** arranged to be supplied with electric power through a flexible conduit **14** under control of a switch box **15** from a rubber covered cable **16** adapted to be connected to a source of supply (not shown).

The apparatus **11** further includes a frame **20** comprised of upper and lower gear housing members **21** and **22**, respectively, secured together by bolts **23**. The motor **13** is of the vertical type secured to the upper housing **21** by means of bolts **24**. The end of the shaft **25** of the motor **13** (Fig. 3) extends into the upper housing member **21** and has secured thereto a driving pinion **26** arranged to engage a driven gear **27** which is in mesh with a like gear **28**.

A nut **30** securies the gear **28** on the upper end of a shaft **31** which is revolvably fixed in the lower housing member **22**, as best shown in Fig. 4. The lower end of the shaft **31** has secured thereto the upper driving half **32** of a universal joint **33**, the lower driven half **34** of

which comprises the spider or rubbing disc to the lower side of which the grinding stones or rubs 35 may be secured in the usual manner.

Interposed between the upper and lower halves of the universal joint 33 are the flexible discs 36 which serve to transmit power from the motor 13 to the rubs 35 in the usual manner. An open ended housing 37 secured to the bottom side of the lower gear housing member 22 by bolts 38 serves to protect the joint 33 and the bearing member for the shaft 31 in the lower housing member 22 against the muck created by the grinding of the rubs 35 on the terrazzo floor.

The other driven gear 27 has a driving connection with a rubbing spider 39 in similar fashion to that just described in connection with gear 28 and spider 34, hence need not be detailed as to structure. It will be observed that the spiders 34 and 38 intermesh and are contra-rotating, there being the same number of teeth on the like gears 27 and 28 which drive the rubs.

As thus far described, the surfacing apparatus 11 is conventional in most respects, and represents in its details a design approach to a surfacing machine having the novel features which will be set forth hereinafter.

The back side of the lower housing member 22 is provided with downwardly disposed projections 40 and 41 to which a bracket member 42 is secured by bolts 43. The bracket 42 includes a pair of spaced apart downwardly and forwardly extending portions 44 and 45 whose forward ends are disposed intermediate the open ended housings for the universal joints. The portions 44 and 45 are provided with transversely disposed bores adapted to receive the bolt 46 which comprises a pivot for the arm 50 disposed between the bracket portions 44 and 45.

The arm 50 includes a bearing portion 51 received within the journal bore 52 in the wheel carriage 53 which is also provided with an axle bore 54, the carriage 53 being removably secured on the arm by means of a cotter pin 55. It will be observed that a plane through the axis of either of the aforementioned bores 52 and 54 is normal to the axis of the other bore.

A wheel axle 56 is secured within the axle bore 54 by means of set screws 57, and has secured thereon at either end the freely running mobility wheels 58 and 59. It is now apparent that the wheel carriage 53, together with the wheels 58 and 59, is arranged to swing freely about the arm 50, as indicated by the arrows 60 on Fig. 2. With this arrangement the wheels readily adapt themselves to any lateral unevenness in the floor which is very apt to be present at least during the initial stage of surfacing.

It will also be observed that the assembly including the carriage 53 and the arm 50 is adapted to rotative movement about the pivot bolt 46, as indicated by the arrow 61 on Fig. 4. This feature permits the wheels to contact the floor regardless of the degree of wear of the rubs. In order to fix the angular disposition of the arm 50 so that the wheels may bear their proper share of the weight of the machine during the surfacing operation, there is provided an adjusting means 62 which comprises a cam member 63 secured to a vertically disposed apron portion 64 at the rear of the bracket 42 by means of a stud bolt 65 threaded into the apron and locked by a nut 66, the bolt being spaced from the apron such that the cam 63 is freely swingable thereabout.

The peripheral edge of the cam 63 defines notches 67 unequally spaced from the pivot stud 65, the notches 67 being adapted to receive the end 68 of the arm 50 whereby the angular disposition of the arm with respect to the bracket and hence with the surfacing apparatus 11 may be varied to adjust the wheels 58 and 59 to the plane of the rubs. The cam 63 further includes a stud 69 outstanding toward the rear of the machine 10, which stud is adapted to be "toed" by the foot of the operator by merely lifting up slightly on the handle means now to be described.

In order to manipulate the machine 10 over the floor to be surfaced, the handling control 12 is provided with handle risers 70, 71, 72, and 73 pivotally secured to the bracket 42 by means of bolts 74, 75, 76, and 77, respectively. It is seen that the risers 70 and 71 are secured to the forward end of the bracket at the sides thereof, and the risers 72 and 73 to the rear of the bracket sides.

Intermediate the ends of the risers 72 and 73 there are provided series of spaced apart holes, shown on riser 73 at reference numeral 78, adapted to receive a bolt 79 having a wing nut 80 thereon. The bolt 79 also passes through a hole provided adjacent the end of the riser 71. Risers 70 and 72 are similarly provided with holes and a bolt and wing nut (not shown). Secured on the upper ends of the risers 72 and 73 is the handle 81. By the simple means described it is now apparent that the height of the handle 81 above the floor may be easily and quickly adjusted to suit the convenience of the operator.

It will now be seen from the foregoing description that there has been provided a floor surfacing machine having a bracket including a wheel carriage assembly and handle which is adaptable to various sizes of surfacing machines. Other points of novelty include the structural means for providing swingability of the wheels in a generally vertical transverse plane to adapt the machine to uneven floor surfaces. Another novel feature is the arm and pivotal arm adjusting means, together with the wheel carriage, which provides rotative movement of the wheels in a generally vertical longitudinal plane to provide adjustable height of the wheels as compensating means for wear and attrition of the expendable floor surfacing elements.

A particularly novel feature is the arm adjusting means comprising a notched cam adapted to "toeing" adjustment by the operator while the machine is operating. A still further novel arrangement resides in the adjustable handle riser structure for adapting the machine to operator height convenience.

The foregoing novel features, either singly or in combination as defined by the appended claims, comprise an advance in the state of the art that has found widespread acceptance in the trade through a series of exhaustive tests. It will be understood, of course, that the structure described comprises merely a preferred embodiment, and that changes of structure coming within the word and spirit of the claims will readily come to the minds of those skilled in the art.

I claim:

1. A floor surfacing machine, comprising: a surfacing apparatus including a frame and power means mounted on said frame and arranged to drive expendable floor surfacing element; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said frame and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; arm adjusting means secured on said frame adjacent the other end of said arm and adapted to cooperate therewith for adjusting the angular disposition of said arm about said frame pivot; and a handle on said machine for manipulating the same over the floor to be surfaced.

2. A floor surfacing machine, comprising: a surfacing apparatus including a frame and power means mounted on said frame and arranged to drive expendable floor surfacing elements; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said frame and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels

thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; arm adjusting means secured on said frame adjacent the other end of said arm and adapted to cooperate therewith for adjusting the angular disposition of said arm about said frame pivot; a pair of handle risers pivotally secured to said frame at spaced apart points; means on one of said risers for adjustably securing said one of said risers to the other at various locations thereon whereby the height from the floor of the other end of said risers may be adjustably varied to suit the needs of the operator of said machine; and a handle on one of said risers adjacent the end thereof for manpulating said machine over the floor to be surfaced.

3. A floor surfacing machine, comprising: a surfacing apparatus including a frame and power means mounted on said frame and arranged to drive expendable floor surfacing elements; a wheel carriage having a wheel for imparting mobility to said machine; an arm secured at one end to a horizontally disposed pivot on said frame and adapted to rotative movement thereabout, said carriage being secured to said arm intermediate the ends thereof; notched cam means pivotally secured on said frame with notched portions unequally spaced from the pivot, the notched portions being adapted to cooperate with the other end of said arm for adjusting the angular disposition of said arm about said frame pivot; and a handle on said machine for manipulating the same over the floor to be surfaced.

4. A floor surfacing machine, comprising: a surfacing apparatus including a frame and power means mounted on said frame and arranged to drive expendable floor surfacing elements; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said frame and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; notched cam means pivotally secured on said frame with notched portions unequally spaced from the pivot, the notched portions being adapted to cooperate with the other end of said arm for adjusting the angular disposition of said arm about said frame pivot; and a handle on said machine for manipulating the same over the floor to be surfaced.

5. A floor surfacing machine, comprising: a surfacing apparatus including a frame having a transmission housing with power transmission means therein, and power means mounted on said housing and arranged to drive expendable floor surfacing elements through said transmission means, said frame also having a removable bracket extending outwardly therefrom; a wheel carriage having a wheel for imparting mobility to said machine; an arm secured at one end to a horizontally disposed pivot on said bracket and adapted to rotative movement thereabout, said carriage being secured to said arm intermediate the ends thereof; arm adjusting means secured on said bracket adjacent the other end of said arm and adapted to cooperate therewith for adjusting the angular disposition of said arm about said bracket pivot; and a handle on said machine for manipulating the same over the floor to be surfaced.

6. A floor surfacing machine, comprising: a surfacing apparatus including a frame having a transmission housing with power transmission means therein, and power means mounted on said housing and arranged to drive expendable floor surfacing elements through said transmission means, said frame also having a removable

bracket extending outwardly therefrom; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said bracket and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; arm adjusting means secured on said bracket adjacent the other end of said arm and adapted to cooperate therewith for adjusting the angular disposition of said arm about said bracket pivot; and a handle on said machine for manipulating the same over the floor to be surfaced.

7. A floor surfacing machine, comprising: a surfacing apparatus including a frame having a transmission housing with power transmission means therein, and power means mounted on said housing and arranged to drive expendable floor surfacing elements through said transmission means, said frame also having a removable bracket extending outwardly therefrom; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said bracket and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; notched cam means pivotally secured on said bracket with the notched portions unequally spaced from the pivot, the notched portions being adapted to cooperate with the other end of said arm for adjusting the angular disposition of said arm about said bracket pivot; and a handle on said machine for manipuating the same over the floor to be surfaced.

8. A floor surfacing machine, comprising: a surfacing apparatus including a frame having a transmission housing with power transmission means therein, and power means mounted on said housing and arranged to drive expendable floor surfacing elements through said transmission means, said frame also having a removable bracket extending outwardly therefrom; a wheel carriage having wheels for imparting mobility to said machine, and defining a journal bore whose axis lies in a plane normal to the axis of said wheels; an arm secured at one end to a horizontally disposed pivot on said bracket and adapted to rotative movement thereabout, said arm being provided with a bearing portion received in the journal bore of said carriage intermediate the ends of said arm, said carriage and wheels thereby being arranged to freely swing about said arm to adapt said machine to an uneven floor; notched cam means pivotally secured on said bracket with the notched portions unequally spaced from the pivot, the notched portions being adapted to cooperate with the other end of said arm for adjusting the angular disposition of said arm about said bracket pivot; a pair of handle risers pivotally secured to said frame at spaced apart points; means on one of said risers for adjustably securing said one of said risers to the other at various locations thereon whereby the height from the floor of the other end of said risers may be adjustably varied to suit the needs of the operator of said machine; and a handle on one of said risers adjacent the end thereof for manipulating said machine over the floor to be surfaced.

No references cited.