Nov. 30, 1971 G. LEIFHEIT ETAL 3,623,176

FLOOR-TREATING APPARATUS

Filed Dec. 12, 1969 2 Sheets-Sheet 1

FIG. 1

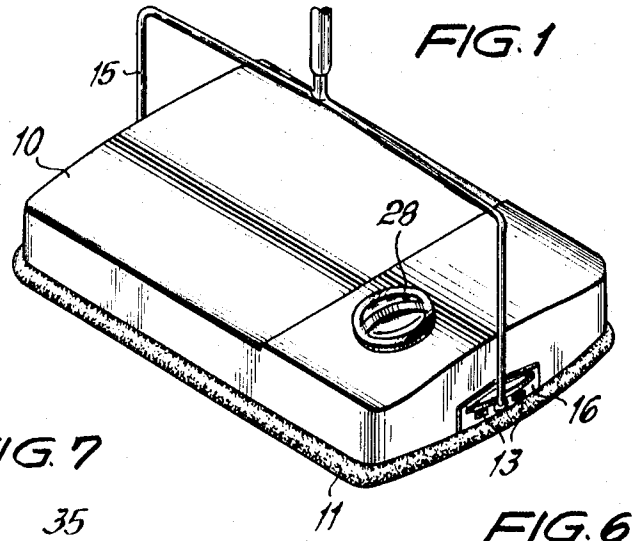

FIG. 7

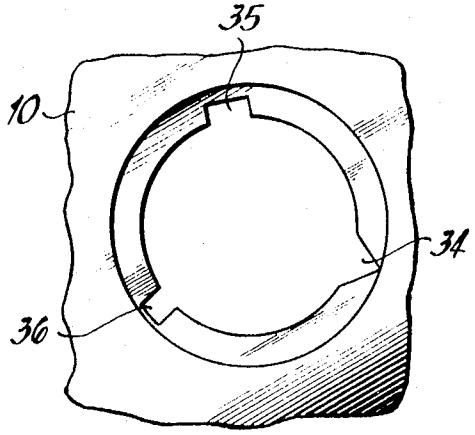

FIG. 6

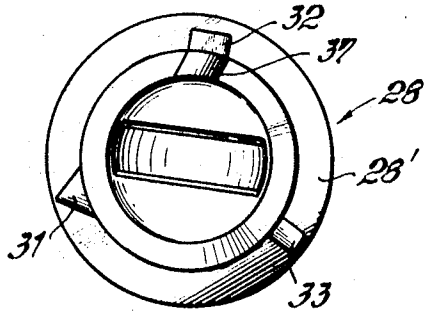

FIG. 8

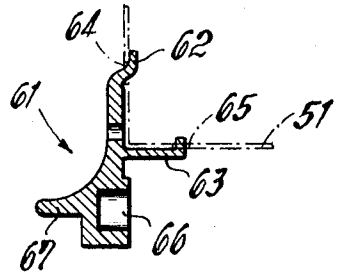

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FIG. 2

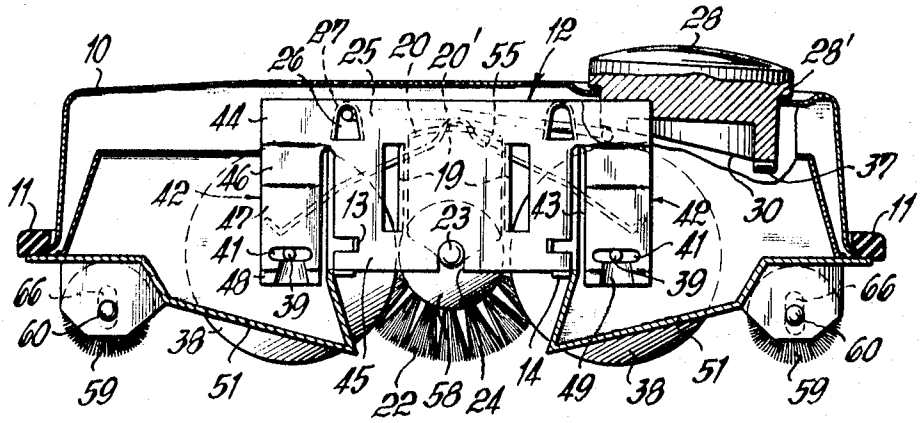


FIG. 3

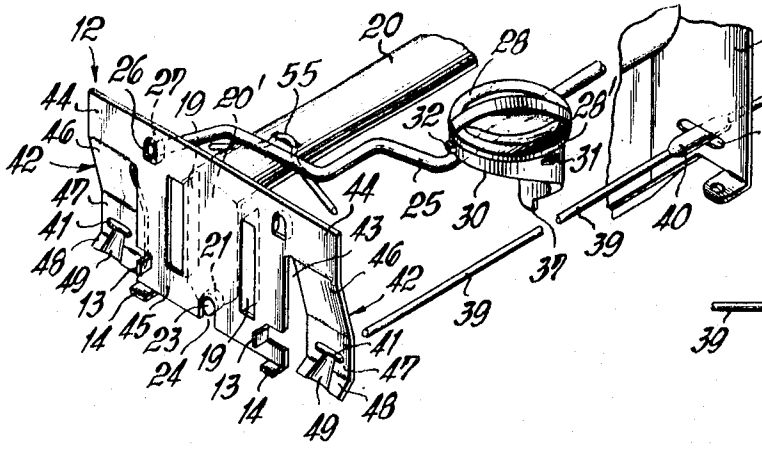


FIG. 4

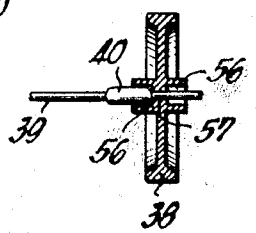
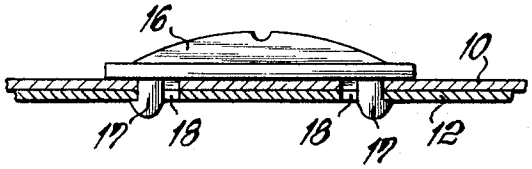


FIG. 5



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FLOOR-TREATING APPARATUS

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Int. Cl. A47l 11/32
U.S. Cl. 15—42 34 Claims

ABSTRACT OF THE DISCLOSURE

Wheels support a housing for movement on a surface to be treated. A brush roller is mounted in the housing for turnably engaging this surface. Mounting means mounts the brush roller with freedom of adjustment between a lower and an upper position with reference to the surface. Biasing means permanently urges the brush roller to one of these positions. A control member is releasably coupled with the housing and has an outer manually engageable portion and an inner contact portion which cooperates with the mounting means. The control member is turnable between two terminal settings in one of which it moves the brush roller to the other of its positions against the opposition of the biasing means. Detent means prevents unintentional turning movement of the control member beyond its terminal settings and precludes axial shifting of the control member.

BACKGROUND OF THE INVENTION

The present invention relates generally to floor-treating apparatus, and more particularly to floor-treating apparatus used for sweeping of rugs, carpets and the like.

Floor-treating apparatus, and particularly carpet sweepers utilizing brush rollers, are already known to be provided with means for adjusting the position of the brush between upper and lower positions so that the brush can be moved closer to or farther from the rug or other floor surface, for instance in dependence upon the height of the nap of the rug which is being treated. However, these known apparatuses require for their construction, particularly to permit the adjustment of the brush between its upper and lower positions, relatively complicated arrangements, which not only makes them difficult to manufacture and assemble, but which accordingly makes them expensive to produce and expensive to sell.

SUMMARY OF THE INVENTION

It is, accordingly, an object of the present invention to provide an improved floor-treating apparatus of the type under discussion.

A more particular object of the invention is to provide such a floor-treating apparatus which is simpler to construct, requires less materials for its construction, and is less expensive than those known from the prior art.

In pursuance of the above objects, and those which will become apparent hereafter, one feature of the invention resides in a floor-treating apparatus which comprises, briefly stated, a housing and wheels which support this housing for movement on a surface. A brush roller is mounted in the housing and adapted to turnably engage the surface. Mounting means mounts the brush roller turnably and with freedom of adjustment between a lower and an upper position with reference to the surface being treated. Biasing means permanently urges the brush roller to one of its positions and a control member is releasably coupled with the housing and has an outer manually engageable portion and an inner contact portion cooperating with the mounting means. The control member is turnable between two terminal settings in one of which it moves the brush roller to the other of its positions against the opposition of the biasing means. Detent means prevents unintentional turning movement of the control member beyond the terminal settings thereof, and precludes axial shifting of the control member.

By utilizing the construction according to the present invention the heretofore necessary separate mounting means for the control member which effects adjustment of the brush roller positions, has been eliminated with a concomitant savings in material, reduction in complexity of construction, and reduction in the cost of manufacturing, assembling and selling the apparatus.

To simplify the construction of the control member and the housing portion with which the control member is coupled it is advantageous to utilize a disconnectable coupling and, in order to prevent undesired separation between them, cooperating projections and recesses provided on the control member and the housing and constituting the coupling are advantageously of different configuration, that is the various projections are different from one another and in correspondence therewith the mating recesses are also different from one another. It is advantageous to provide three projections and corresponding recesses of which two of each are of rectangular and one of triangular outline, with the two rectangular projections and corresponding recesses advantageously either being of different length and/or of different width. This provides for a quick and reliable assembly of the control member to the housing.

Of course, means must be provided for preventing the control member from turning beyond its two terminal settings. This means is advantageously in form of an abutment provided on the control member and an abutment provided on the housing so that the control member can be turned only through a region in which the projections of the control member which serve for coupling the same with the housing, do not come into mating releasable registration with their corresponding recesses. It is further advantageous to provide the control member with a cam track and to provide the abutment directly on the cam track, with the abutment of the housing being provided ono a portion of a pivotable linkage which cooperates with the mounting for the brush roller and effects adjustment in the position of the mounting and thereby of the brush roller. This eliminates the need for a separate abutment. Advantageously, the abutment on the cam track is located intermediate the two opposite end portions of the cam track so as to permit a complete adjustability of the brush roller between its upper and lower positions despite the limitation imposed on the turning movement of the control member.

The housing can advantageously consist of synthetic plastic material, but may also be made of other material. It has two transversely spaced side walls which extend in at least substantial parallelism with the direction of movement of the housing over the surface, that is which extend in direction normal to the axis of rotation of the

brush roller, and in accordance with the invention journal supports are provided on the inner sides of these side walls, with portions of the journal supports serving to connect the same with the respective side walls. This eliminates the need for separately securing the journal supports to the side walls, as is the case in known constructions. A particularly simple and easy to manufacture construction is obtained if the journal supports are provided with stamped-out or otherwise displaced portions which extend at an angle to their general plane and are connected with the respective side walls. These journal supports may also in part serve to hold mounting members for pivotably mounting a bracket which straddles the housing at the exterior thereof and to which a handle —such as a broom handle or the like—can be connected by which the operator effects movement of the apparatus over the surface to be treated. This can be accomplished by connecting the journal members—which are located at the outer sides of the respective side walls—to the housing via at least some of the aforementioned stamped-out projections. It is also possible to provide the journal supports and housing side walls with registering apertures through which connecting portions of the bracket journal mountings extend to connect the journal mountings to the housing side walls.

The mounting means for the brush roller comprises a U-shaped bracket whose lower side faces downwardly, that is towards the surface to be treated. In accordance with the invention portions of the lateral arms of this U-shaped bracket serve for mounting the same and also for mounting the brush roller itself, so that separate mounting means for the brush roller are avoided. This not only results in a significant saving in material but also in a saving of manufacturing time, both with reference to the production of the brush roller and the elimination of the time otherwise needed for providing the separate journalling members, as well as with reference to a saving in the time required for assembling the device. Advantageously the arms of the bracket are directed inwardly towards one another and have a certain limited elasticity, with the brush roller being mounted on the arms under utilization of this elasticity. The journal supports may be provided with upright slots and the bracket mounting the brush roller may be provided with projections which are slidably received in these slots so that the bracket can move between the upper and lower positions mentioned before. Advantageously, these projections are in form of deformed portions of the arms of the bracket whereby separate bolts or other means constituting the projections are eliminated.

The bracket which pivotably straddles the housing and to which the handle for gripping by an operator is connectable, is substantially C-shaped and has arm portions which are pivotably journalled in suitable apertures provided in the journal supports. Advantageously, these apertures are bounded at least in part by marginal portions whose width in direction normal to the general plane of the respective aperture is greater than the thickness of the associated journal support. This can be accomplished by bending marginal portions bounding the respective apertures at a right angle to the general plane thereof, and in this manner wear of the portions of the arms of the C-shaped brackets which extend into these apertures and about which the C-shaped bracket pivots, is prevented even over a very long period of use. In view of the fact that, due to the general construction and to the manner in which the device is used by the operator, the pivot portions of the arms of the C-shaped brackets normally abut against the upper edges of the respective apertures, it is advantageous to have the lower edges be straight and the upper edges be curved. This simplifies the manufacture and assures that the substantially round-cross-section pivot portions have as large as possible an area of contact with the marginal portions bounding the respective apertures.

It is advantageous to construct the journal supports so that they have a center portion and two end portions located at opposite sides of the center portion, with the end portions being inclined towards the center portion and each consisting of a center section, an upper and a lower section. The end portions are slightly spaced from the center portion, springy and connected to the center portion—with which they are of one piece—by a strap section. The end portions are provided with cut-outs into which parts of the axles for the wheels of the apparatus extend. The mounting of the axles can therefore be accomplished in a most simple manner by deflecting opposite end portions of the respective journal supports away from one another, inserting the respective axle into their cut-outs and thereupon letting the end portions assume their normal position. The axles are thus retained reliably in their desired position and they have been assembled to the device without requiring the use of tools or any skill. The axles themselves are preferably of rod-shaped configuration and formed with at least one flattened section which engages in a corresponding slot on a stationary component of the device to thereby prevent the axle itself from turning. This excludes wear and tear on the journalling of the axles themselves and facilitates quick and simple mounting of the axles in non-rotatable condition. The flattened portion can be achieved by applying local deformation pressure to a section of the axle. A further advantage is that axles so constructed may readily be accommodated in storage magazines prior to use.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an apparatus according to the present invention;

FIG. 2 is a cross-section of FIG. 1;

FIG. 3 is a simplified perspective view, partly broken away, illustrating the height-adjustment arrangement of the embodiment of FIG. 1;

FIG. 4 is a fragmentary cross-section illustrating a wheel and a portion of the associated axle of the embodiment of FIG. 1;

FIG. 5 is a partly sectioned detail view illustrating a portion of the embodiment in FIG. 1;

FIG. 6 is a bottom-plan view of the control member of the embodiment in FIG. 1;

FIG. 7 is a plan view of the housing portion with which the control member in FIG. 6 is to be coupled; and

FIG. 8 is a fragmentary section illustrating a further detail of the embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before entering into a detailed discussion of the drawings it is deemed necessary to emphasize that in the various figures only those elements and portions thereof have been illustrated which are thought to be essential for an understanding of the present invention. For example, the receptacles for sweepings picked up by the brush roller are shown only diagrammatically, and in FIG. 1 the handle which is to be gripped by an operator is shown only fragmentarily. These and other omitted elements may be entirely conventional and may be any of the various well known constructions or configurations.

Discussing now the drawing in detail it will be seen that the apparatus illustrated in the drawing comprises a

somewhat box-shaped downwardly open housing **10** having a lower circumferential edge portion which is provided with an elastic bumper **11**, for instance of rubber, synthetic plastic material or generally elastomeric material so as to prevent damage to articles against which the apparatus may "bump" when in use. FIG. 2 shows that at the inner sides of two transversely spaced side walls of the housing **10** there are provided journal supports **12** which are discrete members. The journal supports are provided with stamped-out, cut-out or otherwise deformed tongues or projections **13, 14** which extend through non-illustrated slots in the associated side walls of the housing **10** and are bent over at the outer side of the side walls to thereby connect the journal supports to the side walls. One of these journal supports is illustrated in FIG. 3 where the housing is omitted for the sake of clarity, and the projections **13, 14** of the journal support **12** shown in FIG. 3 are in their starting position, that is in the position which they assume before the journal support **12** is connected to the associated side wall of the housing **10**.

FIG. 1 shows that the upper projections **13** may simultaneously serve to penetrate journal members **16** located at the outer side of the side walls of the housing **10** and serving to pivotably mount a C-shaped bracket **15** to which the handle is connected. In this manner, the projections **13** serve to mount these journal members on the housing **10**.

An alternative possibility is shown in FIG. 5 where the journal members **16** are mounted independently of the journal supports **12**, being provided with connecting portions **17** which extend through registering cut-outs **18** in the housing **10** and the journal supports **12** and abut connectingly against the inner side of the journal supports **12**. The members **16** advantageously but not necessarily are made of synthetic plastic material and the projections **17** will then have the necessary elasticity for their insertion into the registering cut-outs **18**.

The journal supports **12** are provided with guide projections **19** bent inwardly towards one another as shown in FIGS. 2 and 3. Guided by these is a bracket **20** of substantially U-shaped configuration which in turn supports a brush roller **22**. The arms **20'** of the bracket **20** have projections **21** on which the brush roller **22** is turnably mounted. These projections **21** are of one piece with the bracket **20** and preferably taper to a point. Additionally, the projections **21** are outwardly bent or offset in the region of the transition between the projections **21** and the associated arms **20'**, so that the outwardly extending projections **23** formed in this manner extend into slot-shaped recesses **24** of the journal supports **12** without requiring separate elements for this purpose. The bracket **20** constitutes a unit with the brush roller **22** and is movable between an upper and a lower position between the guides **19**. Its upper position is determined by cooperation of the projections **23** with the recesses **24**.

In the illustrated embodiment a member **25** cooperates with the bracket **20**. It extends above the bracket **20** and is pivotably mounted with its ends in openings **26** of the respective journal supports **12**. As shown in the drawing, and particularly in FIG. 3 thereof, the edges **27** of the openings **26** are widened by inwardly bending surrounding edge portions of the journal supports **12** in order to provide a wear-free journalling for the ends of the arms on the C-shaped bracket **25**. It is also possible, however, to weld or otherwise secure additional separate portions to the journal supports **12** in lieu of the inwardly bent marginal portions. The drawing also shows that the upper edges bounding the openings **26** are curved and the lower edges are straight. This not only facilitates cutting and bending of the marginal portions **27**, but also takes into account the fact that at least in the illustrated embodiment the portions of the arms of bracket **25** are maintained in contact with the marginal portions **27** in the upper regions of the openings **26**.

A control member **28** is turnably received in an opening **29** of the housing **10**. A lower portion of the control member **28** is located within the housing and an upper portion without the housing, with the latter being engageable manually by an operator so that the control member **28** may be turned about an upright axis to thereby effect adjustment of the brush roller **22** between its upper and lower positions. To this end a cam track **30** is provided on the inner portion of the control member **28** and abuts the repeatedly off-set member **25**. By turning the control member **28** in one direction of rotation the cam track **30** effects pivoting of the member **25** downwardly, with concomitant downward displacement of the carrier or bracket **20** between the guides **19**. Springs **55** permanently bias the bracket or carrier **20** in upward direction to its upper position.

The control member **28** is provided with an abutment **37** on the cam track **30**, located between the terminal settings of the latter so as not to disadvantageously influence the range of adjustability of the bracket **20**. The arrangement of the abutment **37** with reference to the projections **31, 32, 33** of the control member **28** is such that in opposite directions of rotation of the control member **28** the abutment **37** will engage the member **25** in any position of the latter, before the projections **31, 32, 33** assume with reference to their associated recesses a position in which the control member **28** could become disengaged from the housing **10**. Of course, the projections **31, 32, 33** and the recesses mating with them and provided in the opening **29** of the housing **10** in which the control member **28** is turnably located, could also be of different configuration and/or be arranged at different angles with reference to one another. While there are three projections and corresponding recesses shown, it is possible to provide only two or more than three if desired.

Wheels **38** are provided on which the apparatus rolls over a surface being treated. One pair of these wheels **38** is mounted on one axle **39** and a second paid on a second axle **39**, with both axles **39** extending at opposite sides of the brush roller **22** in parallelism therewith. The axles **39**, with respect to which the wheels **38** are rotatable, are of rod-shaped configuration and provided each with at least one flattened portion **40** which serves to prevent rotation of the axles **39** themselves. Springy portions **42** are provided with cut-outs **41** in which opposite ends of the axles **39** are lodged for rotation. These springy portions **42** are provided by producing slots **43** extending upwardly from the lower edges of the journal supports **12** and in substantial parallelism with the guide projections **19**. Thus, the springy portions **42** remain connected with the center portions **45** of the respective journal supports **12** only by the straps **44**. As mentioned before, the springy portions **42** which constitute end portions located at opposite sides of the respective center portions **45** are composed of three sections which are angled with reference to one another. The upper section **46** is connected via the strap portion **44** with the center portion **45**, and it is inwardly bent with reference to the same. The middle portion **47** extends approximately parallel with the plane of the center portion **45** and is provided in the illustrated embodiment with the opening **41**. The lower portions **48** are outwardly bent or angled. The lines separating the sections **46, 47** from one another and those separating the sections **47** and **48** from one another, extend in parallelism with the upper and lower edges of the journal support **12**. Outwardly formed depressions **49** are provided in the inwardly directed sides of the lower sections **48** extending upwardly from their lower portion to and into the middle sections **47** and to the cut-outs **41**. This facilitates the quick and ready insertion of the opposite end portions of the axles **39** into the cut-outs **41**. Because of the outward angling of the sections **48** with reference to one another, the spacing between them is larger than the length of the respective axles **39** whereas the spacing between the sections **47** of the opposed journal supports **12** is smaller than the length of the axles **39**. Thus, the axles **39** are

simply placed between the transversely spaced sections **48** and pushed upwardly, thereby outwardly displacing the sections **47** until the opposite ends of the axles **39** snap into the cut-outs **41**. The recesses **49** serve as guides during such movement. Of course, the spacing between the oppositely located sections **47** is such that the axles can be removed only by subsequently bending the sections **47** outwardly away from one another.

Receptacles **51** for sweeping picked off the surface by the brush roller **22** are located on the axles **39** adjacent the wheels **38** and extending in parallelism with the brush roller **22**. These receptacles **51** are so arranged that the wheels **38** are located with almost no freedom of axial movement between the portions **42** and the not-in-detail illustrated side walls of the receptacles **51**. The flattened portions **40** are in the illustrated embodiment so arranged that they extend into slots **52** provided in the side walls of the receptacles **51** and, because the latter are fixedly secured, the axles **39** cannot turn. Advantageously the receptacles **51** are secured against movement as illustrated, namely by mounting them on the bracket **20** of the brush roller **22** by means of the springs **55** which, as pointed out earlier, also serve to bias the bracket **20** to its upper position.

The wheels **38** are provided with bores **57** into which the axles **39** extend. They are further provided with enlargements **56** whose diameter corresponds to the width of the flattened portions **40** of the axles **39**. This makes it possible to make the flattened portions **40** so long that even if a small axial shifting of the axles **39** or the receptacles **51** should occur during assembly or subsequently, the engagement of the flattened portions **40** in their associated slots in the receptacles **51** is assured. This is shown in detail in FIG. 4. Furthermore, the wheels **38** are configured symmetrically not only with reference to their axes of rotation but also to their radial central plane so that they can be mounted in any desired orientation and at any desired position with reference to the axles **39**. The diameter of the wheels **38** is such that at the lowest possible position of the brush roller **22** they still roll on the surface being treated and that the wheels located at one side of the apparatus at opposite sides of the brush roller **22** are in motion-transmitting engagement (as shown in FIG. 2) with a drive wheel **58** for the brush roller **22**.

In the illustrated embodiment there are further provided two auxiliary brush rollers **59** as shown in FIG. 2, which can turn freely on the surface being treated and whose diameter is substantially smaller than that of the brush roller **22**. The auxiliary brush rollers **59** have axles **60** which are turnably mounted in mountings **61** provided on the receptacles **51**. The mountings **61** are each provided with two projections **62** and **63** as shown in FIG. 8, with one of these being provided at one margin (the projection **62**) and consisting of two portions one of which is offset laterally with reference to the other portion, whereas the projection **63** extends approximately normal to the general plane of the mounting **61** and is of hook-shaped configuration. The receptacles **51** are provided with openings **64** and **65** into which the respective projections **62** and **63** engage. It is advantageous but not necessary that the mountings **61** and their projections consist of elastically deformable material, such as synthetic plastic, because this facilitates the connection with the receptacles **51**.

Reference numeral **66** (see FIG. 2) identifies slot-shaped openings which extend substantially normal to the surface on which the apparatus moves and which is to be treated, so that the auxiliary brush rollers **59** can move up and down within a limited range of movement. Exterior holding portions **67** are provided on the mountings **61** to make it readily possible to tilt the receptacles **51** about the axles **39** so that their contents may be easily removed.

It should still be emphasized once again that the illustrated exemplary embodiment is not to be considered limiting in any sense. Obviously, a variety of changes and modifications may be effected without in any sense departing from the scope of the present invention. It is thus for instance possible to utilize a control member **28** which is provided with thread means or analogous means cooperating with suitable means provided on the bracket **20** for effecting the height adjustment in this manner. This would eliminate the member **25** without departing from the scope of the invention. A further possibility is to prevent the turning of the axles **39** by providing the flattened portions **40** at their outer axial ends and have them engage the corresponding slots provided in the journal supports **12** rather than in the receptacles **51** as shown. Again, these two modification possibilities are exemplary only, and others will offer themselves to those skilled in the art. Also, the configuration of the housing **10** itself may of course be different from what has been illustrated.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a floor-treating apparatus, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims:

1. A floor-treating apparatus, comprising a housing; wheels supporting said housing for movement on a surface; a brush roller adapted to turnably engage said surface; mounting means mounting said brush roller turnably and with freedom of adjustment between a lower and an upper position with reference to said surface; biasing means permanently urging said brush roller to one of said positions; a control member releasably coupled with said housing and having an outer manually engageable portion and an inner contact portion cooperating with said mounting means, said control member being turnable between two terminal settings, in one of which it moves said brush roller to the other of said positions against the opposition of said biasing means; and abutment means preventing unintentional turning movement of said control member beyond said terminal settings, and precluding axial shifting of said control member.

2. An apparatus as defined in claim **1**; further comprising engageable and disengageable coupling means for coupling said control member to said housing.

3. An apparatus as defined in claim **2**, said coupling means comprising cooperating male and female coupling portions some of which are provided on said control member and some of which are provided on said housing.

4. An apparatus as defined in claim **3**, wherein said male coupling portions are projections, and wherein said female coupling portions are complementary recesses, and wherein at least one male coupling portion is different from the remaining male coupling portions and at least one female coupling portion is different from the remaining female coupling portions.

5. An apparatus as defined in claim **4**, wherein said male coupling portions comprise two substantially rectangular and one substantially triangular projection, and

wherein said female coupling portions are matingly configurated.

6. An apparatus as defined in claim 5, wherein said two substantially rectangular male coupling portions each have a longitudinal and a transverse dimension, and wherein at least one dimension of one of said two substantially rectangular male coupling portions differs from the corresponding dimension of the other of said two male coupling portions.

7. An apparatus as defined in claim 4, wherein said control member is turnable about a predetermined axis, and wherein said male projections and mating female recesses are distributed about said axis at different angular distances.

8. An apparatus as defined in claim 1, said abutment means comprising an abutment provided on said control member and positioned for preventing unintentional turning movement of said control member beyond said terminal settings thereof.

9. An apparatus as defined in claim 8, said mounting means comprising a mounting structure movable between said upper and lower positions, and a linkage connected with said mounting structure and including a section located adjacent said inner contact portion of said control member; said inner contact position being provided with a cam track contacting said section and operated for deflecting said linkage and thereby said mounting structure from said one to the other of said positions in response to turning movement of said control member to said one setting.

10. An apparatus as defined in claim 9, wherein said abutment is provided on said cam track and other of said abutments is constituted by a portion of said linkage.

11. An apparatus as defined in claim 10, said cam track having opposite ends each corresponding to one of said settings, and wherein said abutment on said cam track is located intermediate said opposite ends.

12. An apparatus as defined in claim 1, said housing having two opposite side walls transversely spaced nad extending in at least substantial parallellism with the direction of movement of said housing; and journal supports each associated with one of said side walls and each comprising connecting portions connecting it to the respective side wall.

13. An apparatus as defined in claim 12, said connecting portions being a plurality of projections of one piece with the respective journal support and extending to one side of the general plane of the latter.

14. An apparatus as defined in claim 12; further comprising a movable bracket straddling said housing and including a connecting member for connecting a handle to said bracket, and a pair of arms respectively extending along the outside of one of said side walls; securing means securing said arms to said housing for pivotal movement of said bracket about an axis normal to the direction of movement of said housing and extending through both of said side walls; and connecting means for arresting said bracket in a plurality of pivoted positions relative to said housing.

15. An apparatus as defined in claim 14, wherein some of said connecting portions engage said arresting means and connect the same to said side walls.

16. An apparatus as defined in claim 14, said side walls and said journal supports comprising registering openings and said securing means extending through the respective openings and engaging said side walls and journal supports for securing said arms thereto.

17. An apparatus as defined in claim 16, said journal supports having a predetermined thickness, and the openings in said journal supports being bounded at least in part by journal support portions having a thickness which is greater than said predetermined thickness.

18. An apparatus as defined in claim 17, said journal support portions being marginal portions bounding said openings at least in part and extending transversely to the general plane of the respective opening.

19. An apparatus as defined in claim 17, wherein said openings have straight lower, and curved upper edges.

20. An apparatus as defined in claim 12; further comprising axle means mounting said wheels for turning movement; each of said journal supports comprising a center portion and two springy end portions located at opposite sides of said center portion inclined thereto and connected to said center portion at slight spacing by respective extensions; and wherein said end portions are provided with apertures journalling said axle means for rotation.

21. An apparatus as defined in claim 20, each of said end portions comprising a plurality of mutually inclined sections.

22. An apparatus as defined in claim 21, each of said end portions comprising a center section provided with one of said apertures, and an upper and lower section inclined relative to said center section, said lower section having lower edges and being provided with a channel extending from the respective lower edge to the associated aperture.

23. An apparatus as defined in claim 22, wherein said channels are depressions formed in the respective sections.

24. An apparatus as defined in claim 20, said axle means comprising rod-shaped axles having axle portions located in the respective apertures; and cooperating engaging portions provided on said axles and center portions for preventing rotation of said axles with reference to said journal supports.

25. An apparatus as defined in claim 24, said engaging portions comprising flattened portions provided on said axles, and slots extending radially from said apertures and receiving the respective flattened portions.

26. An apparatus as defined in claim 1, said mounting means comprising a substantially U-shaped bracket having an open side facing towards a surface on which said housing moves, a bight portion extending in substantial parallelism with such surface, and two arm portions extending at opposite axial ends of said brush roller substantially normal to such surface, and wherein said arm portions comprise sections engaging and journalling said brush roller for rolling movement.

27. An apparatus as defined in claim 26, said arm portions having lower portions spaced from and inwardly oriented towards one another, said lower portions tapering in direction away from said bight portion.

28. An apparatus as defined in claim 26, said housing having two opposite side walls transversely spaced and extending in at least substantial parallelism with the direction of movement of said housing; and journal supports each connected with one of said side walls overlying the inner side thereof.

29. An apparatus as defined in claim 28, said journal supports having upright slots extending at least substantially normal to the surface on which said housing moves, and said arm portions having guide projections slidably received in the respective slots and defining by abutment at one end of the latter at least one of said upper and lower positions.

30. An apparatus as defined in claim 29, said guide projections comprising deformations of said arm portions in the region of said sections thereof.

31. An apparatus as defined in claim 1; and further comprising receptacle means for receiving and retaining sweepings which are removed from said surface by said brush roller.

32. An apparatus as defined in claim 31, said receptacle means comprising at least two receptacles located at opposite sides of and extending along said brush roller.

33. An apparatus as defined in claim 32; and further comprising journal members for auxiliary rollers, including mounting projections provided on said journal members and engaged in corresponding recesses provided in

said receptacles for mounting said journal members on the same.

34. An apparatus as defined in claim **33**, wherein each of said journal members comprises two of said mounting projections one of which is hook-shaped and extends substantially normal to the general plane of the respective journal member whereas the other of said two mounting projections extends from a marginal portion of the journal member substantially at right angles to said one mounting projection and comprises two portions one of which is laterally offset with reference to the other.

References Cited

UNITED STATES PATENTS

3,145,405	8/1964	Himes et al.	15—41 R
3,246,353	4/1966	Farnsworth	15—41 R

FOREIGN PATENTS

261,848	5/1968	Germany	15—42
1,529,171	5/1968	France	15—41 R
1,114,881	5/1968	Great Britain	15—41 R

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