

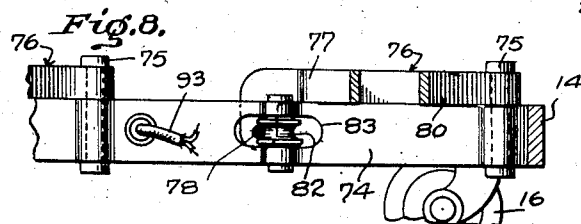
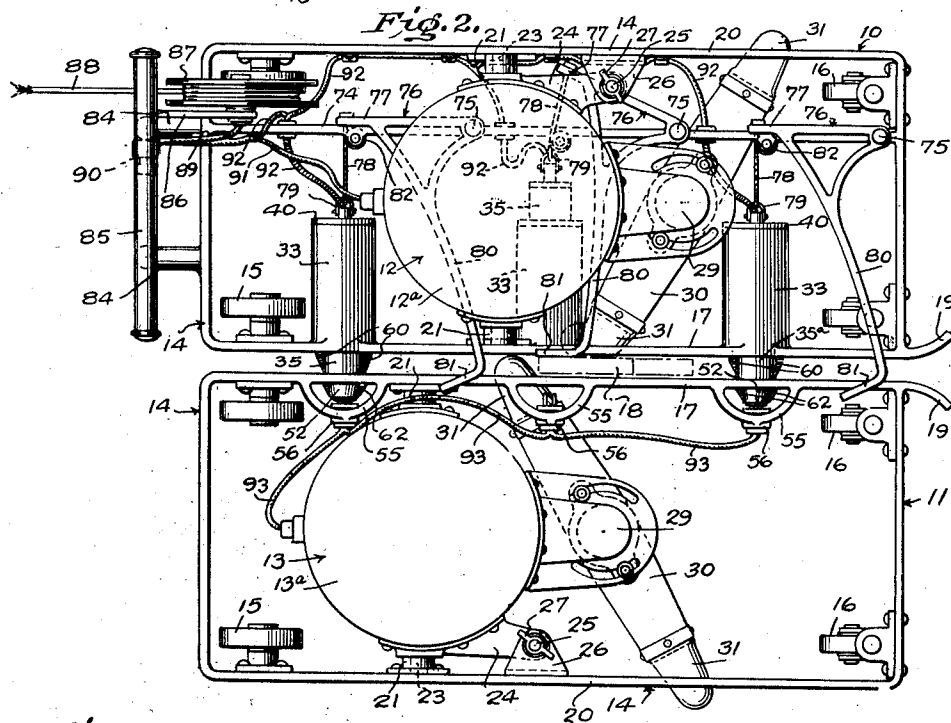
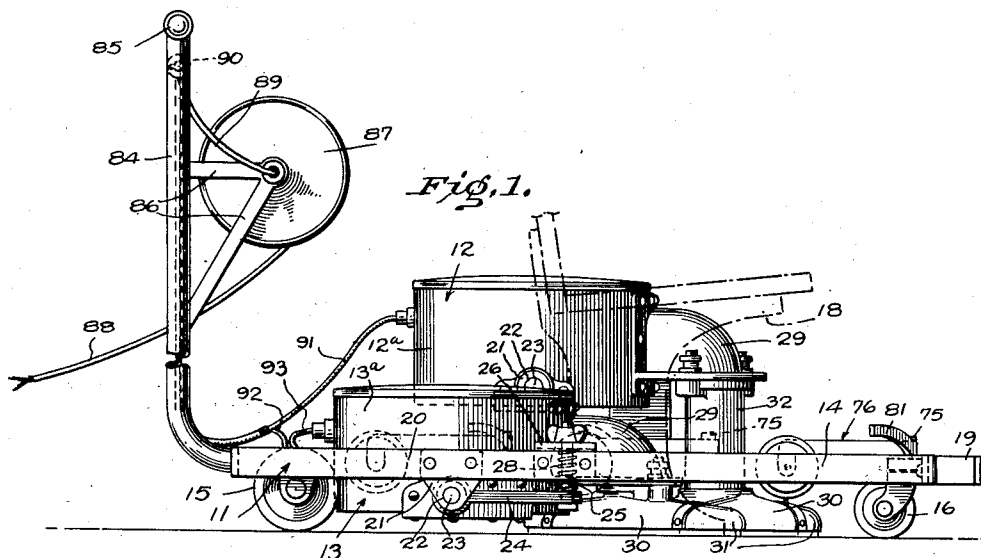
March 30, 1954

V. M. JOHNSON
SIDE COUPLED CARRIERS THAT PASS TO
OPPOSITE SIDES OF OBSTRUCTIONS

2,673,366

Filed April 26, 1951

2 Sheets-Sheet 1



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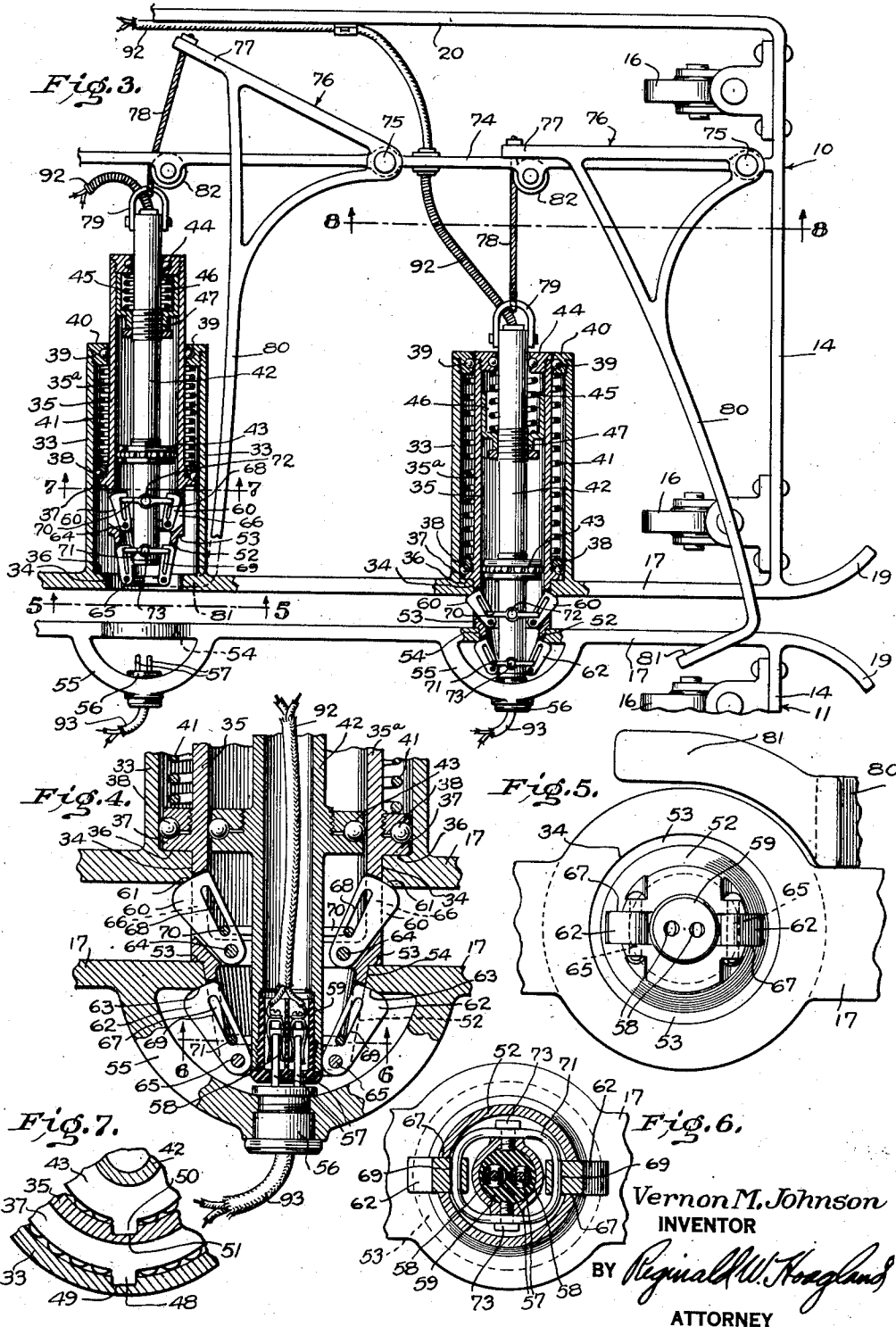
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UNITED STATES PATENT OFFICE

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SIDE COUPLED CARRIERS THAT PASS TO
OPPOSITE SIDES OF OBSTRUCTIONS

Vernon M. Johnson, Olio, Mich.

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8 Claims. (Cl. 15—257)

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The present invention relates to carriers of appliances that clean, sand, and perform other operations to surfaces.

An object of the invention is to provide a carrier of this character capable of supporting and moving appliances for simultaneously effecting operations to floor surfaces on opposite sides of upstanding members attached to a floor, such as desk- and chair-supports in schoolrooms.

Another object of the invention is to provide a carrier having a main unit and an auxiliary unit connected side by side and movable together over a floor surface, said connection between said units being such that the units may be passed by and on opposite sides of members attached to a floor.

A further object of the invention is to provide a carrier as set forth above which supports a floor-surfacing appliance on each of a pair of carrier units connected to each other by a number of couplings constructed and arranged in a manner that when moving one carrier unit in a single general direction across a floor having upstanding members attached thereto, the other carrier unit is moved therewith and may pass to an opposite side of the upstanding members and under structures supported by said upstanding members while both units remain connected together, the couplings being progressively and automatically disconnected and reconnected one at a time by engagement with the upstanding members during the passing of said upstanding members through said couplings.

A still further object of the invention is the provision of a carrier as outlined in the above objects wherein the couplings between different units of the carrier comprise both draft and electrical connections for continually supplying electric current to an appliance on the auxiliary carrier unit as said auxiliary carrier unit is moved over the floor surface by movement of the main carrier unit.

It is also an object of the invention to provide a novel and improved appliance carrier in accordance with the preceding objects which is substantial in construction, economical to manufacture, and thoroughly efficient and practical in use.

These, together with various auxiliary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated, by way of example only, in the accompanying drawings, wherein:

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Figure 1 is a side elevation of the carrier showing electrically operated tank-type vacuum cleaners arranged thereon;

Figure 2 is a plan view of same;

Figure 3 is a fragmentary plan and sectional view showing one coupling in connected position and another coupling in disconnected position;

Figure 4 is an enlarged sectional view through a coupling in connected position;

Figure 5 is a fragmentary face view looking in the direction indicated by the dot-and-dash line and arrows 5—5 in Figure 3;

Figure 6 is a cross section taken on line 6—6 of Figure 4;

Figure 7 is a fragmentary section on line 7—7 of Figure 3; and

Figure 8 is a fragmentary vertical section on line 8—8 of Figure 3.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, attention is directed first to Figures 1 and 2 wherein it will be seen that a main unit and an auxiliary unit of the carrier indicated by the numerals 10 and 11, respectively, are shown coupled together and arranged side by side and each as supporting one of a pair of electrically operated tank-type vacuum cleaners 12 and 13. The cleaner 12 on the main unit 10 is supported differently and is of slightly different construction from that of the cleaner 13 supported on the auxiliary unit 11 for reasons which will be set forth as the description proceeds.

Each of the units 10 and 11 of the carrier is constructed as having a rectangular frame 14 with a pair of plain wheels or rollers 15 rotatably supported at the rear end thereof and a pair of caster-type wheels or rollers 16 mounted at the forward end for free, guided movement of the carrier over the floor surface. The adjacent side members 17 of the two frames 14 are spaced by couplings a sufficient distance apart to permit the passing thereof to opposite sides of upstanding members, indicated by the numeral 18 and shown as desk- and chair-supports by dash-and-dot lines in Figures 1 and 2, while rolling the carrier over the floor surface. To assist in directing the frames 14 to opposite sides of the supports 18, the forward ends of the side members 17 of said frames project forwardly, as at 19, and are curved away from one another, as clearly shown in Figures 2 and 3.

To the side member 17 and opposite side member 20 of each frame 14 are secured brackets 21

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with openings 22 therein which pivotally receive trunnions 23 secured to the body of the appliance, which in the present case is a tank of a vacuum cleaner. The brackets 21 on the side members of the frame of the main carrier unit 10 extend upwardly and support the tank 12^a of the vacuum cleaner 12 on an elevation above the frame 14, while the brackets 21 of the frame of the auxiliary carrier unit 11 are directed downwardly for supporting the tank 13^a of the vacuum cleaner 13 at a lower elevation between the side members 17 and 20. Besides the tanks of the cleaners being at different elevations, the cleaner 12 is arranged slightly in advance of the cleaner 13. Offset to the forward side of one trunnion 23 of each cleaner and movable therewith on the pivotal connections of the trunnions is an arm 24 through which extends a headed rod 25 that also extends through a bracket 26 fixed to the frame side member 20 and has threaded thereon a thumb nut 27 for adjustably raising and lowering the headed end of the rod 25. Between the brackets 26 and arms 24 and around the rods 25 are coil springs 28 yieldably urging the arms downwardly and against the heads on the rods. Thus, it can be seen that the cleaners 12 and 13 may be independently swung on the pivotal connections of their trunnions in one direction against tension of the springs 28, but are held by the adjusted position of the heads on the rods against movement in the opposite direction.

On the forward side of the tanks 12^a and 13^a of the cleaners 12 and 13 are rigidly attached right-angled air conduits 29 that extend forwardly and then downwardly, and to the downward ends are adjustably mounted for horizontal turning movement heads 30 that open onto the floor surface. The heads are elongated, and being adjustable, permit the positioning thereof at angles for overlapping of the floor surface covered by the two heads, resilient end pieces 31 on the heads being provided which are flexed rearwardly upon engagement thereof with the supports 13 attached to the floor. A conduit extension 32 between the conduit 29 and head 30 of the cleaner 12 cares for the greater elevation of the tank 12^a over that of the tank 13^a; otherwise, except for the fact that the cleaners 12 and 13 are rights and lefts, the construction of both is substantially the same.

To the inside of the side member 17 of the frame of the main carrier unit 10 at spaced locations throughout its length are secured by welding or the like one end of each of a plurality of horizontally arranged cylinders 33 that lie parallel to one another and project towards the opposite side member 20 of said frame. Centrally of the cylinders 33, the side member 17 is provided with circular openings 34 through which the forward ends of sleeves 35 slidably mounted in the cylinders 33 are moved to positions projecting through the openings 34. The openings 34 and cylindrical portions 35^a of the sleeves 35 which slide through the openings are of less diameter than the inside diameter of the cylinders 33 producing annular shoulders 36 at the attached ends of the cylinders 33 against which annular flanges 37 on the sleeves 35 abut when said sleeves are at rest in their normal coupled positions with their ends projecting through the openings 34. The cylindrical portions 35^a of the sleeves 35, being arranged in the cylinders 33 and spaced from the walls thereof, are supported at their forward ends and guided during their sliding movement by balls 38 held in recesses in the flanges 37 and engaging the inner

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surfaces of the walls of the cylinders 33, and are supported and guided at their rear ends by balls 39 engaging their outer wall surfaces and located in recesses in ring-shaped closure members 40 threaded into the unattached ends of the cylinders 33. Coil springs 41 located between the walls of the cylinders 33 and slidable sleeves 35 bear at their opposite ends against the flanges 37 and ring-shaped closure members 40 for yieldably forcing the sleeves to positions with the flanges 37 in engagement with the shoulders 36.

Within the slidable sleeves 35 and also arranged for endwise sliding movement are tubular members 42 which are supported and guided in their sliding movement similar to that of the sleeves by the use of ball-supporting flanges and ball-supporting ring-shaped closure members 43 and 44, respectively. The tubular members likewise are yieldably forced in the same direction as that of the slidable sleeves 35 by coil springs 45; but instead of the springs 45 bearing at one end against the flanges 43, they apply pressure to the bottoms of cup-shaped members 46 slidable on the wall of the cylindrical portion 35^a and adjustably attached to the tubular members, as at 47, whereby said cup-shaped members serve the purpose of limiting sliding movement of the tubular members in the slidable sleeves against tension of the springs 45.

As shown in Figure 7, keys 48 are provided on the flanges 37 of the sleeves 35 and are slidably received in slots 49 in the walls of the cylinders 33 for preventing turning movement of said sleeves. Similar keys 50 are also provided on the flanges 43 of the tubular members 42 and are received in slots 51 in the cylindrical portions 35^a of the sleeves 35 for preventing turning movement of these parts with respect to one another.

The forward ends of the sleeves 35 are cone-shaped, as at 52, gradually decreasing in diameter as they extend forward and are of less diameter at their larger end portions than the cylindrical portions 35^a, thereby providing annular shoulders 53 at the ends of the said cylindrical portions. These shoulders are adapted to abut the outer side of the side member 17 of the frame of the auxiliary carrier unit 11 at locations around tapered circular openings 54 in said side member 17 through which the cone-shaped portions 52 project. The openings 54 are spaced the same distances apart as that of the spacing of the cylinders 33 attached to the member 17 of the main carrier unit; and the abutting of the shoulders 53 against the side member 17 of the auxiliary carrier unit spaces the side member 17 of both carrier units parallel to one another and the proper distance apart.

Attached by welding or the like on the inside of the side member 17 of the auxiliary carrier unit 11 are arched reinforcing and supporting bars 55 bridging the openings 54 in said side member. Supported on the arched bars 55 in alignment with the openings 54 are electric plugs 56 having the electricity-conducting prongs 57 thereof directed towards the opening 54 for engagement with spring contacts 58 of electric receptacles 59 housed in the forward ends of the tubular members 42.

Mounted in the forward end of the cylindrical portion 35^a of each sleeve 35 are a pair of positively actuated locking bolts 60 that are extended outwardly of said cylindrical portion and in engagement with angled surfaces 61 on the side member 17 of the main carrier unit 10 and at opposite sides of an opening 34 when coupled

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to the auxiliary carrier unit 11. A similar pair of locking bolts 62 are pivotally mounted in the forward end of the cone-shaped portion 52 of each sleeve 35 and engage like angled surfaces 63 at opposite sides of the tapered opening 54 on the inside of the member 17 of the auxiliary carrier unit 11 when coupled.

The locking bolts 60 and 62 are pivoted, as at 64 and 65, respectively, inwardly of the sleeve 35 and are swung outwardly of the outer surface of the cylindrical portions 35* and cone-shaped portions 52 through slots 66 and 67, respectively, in the walls of said portions. Other slots 68 and 69 are provided in the locking bolts 60 and 62, respectively, and are arranged at angles to the direction of movement of the tubular members 42 in the sleeves, and through said slots 68 and 69 are extended portions of loops 70 and 71, respectively, which are attached to the tubular members 42 by bolts 72 and 73, respectively. Thus, it can be seen that sliding movement of the tubular members 42 with respect to the sleeves 35 extends and retracts the locking bolts 60 and 62. It will also be noted that the locking bolts 60 lock the slidable sleeves 35 against movement with respect to the main carrier unit 10, and that the locking bolts 62 lock the auxiliary carrier unit 11 against movement on said sleeves.

Spaced inwardly of the side member 20 of the frame 14 of the main carrier unit 10 and attached to the end members of said frame is a bar 74 on which are pivoted, as at 75, bell cranks 76 with the arms 77 of each connected by a cable 78 to a bail 79 secured to the rearward end of a tubular member 42, while the other arm 80 of each bell crank 76 extends across the space between the side members 17 of both carrier units for swinging said bell cranks on their pivots when said arms 80 thereof are brought into engagement with upstanding structures, as indicated at 18, during passing of the carrier units to opposite sides of the structures 18. The free ends of the arms 80 are turned rearwardly, as at 81, determining the start of movement and release of the arms 80 by engagement with the supports 18 during forward motion of the carriers and are curved upwardly as they extend rearwardly, as shown in Figures 1 and 3, for movement thereof to positions above the increased width of the side member 17 at the attachment of the cylinders 33 thereto when said arms are swung to their extreme rearward positions to permit passing of the structures 18.

To eliminate side pull on the rearward ends of the tubular members 42 due to curved direction of movement of the outer ends of the arms 77 of the bell cranks 76, grooved rollers 82 are mounted on the bar 74 around which the cables are pulled, the bar being provided with openings 83 through which the cables extend.

To the rear end member of the frame 14 of the main carrier unit 10 are attached the lower ends of a pair of upstanding bars 84 that have a handle bar 85 extending across and attached to their upper ends. It is with this handle bar that the operator pushes the carrier over the floor surface. A bracket 86 is attached to one upstanding bar 84 and rotatably supports a reel 87 upon which a large quantity of extension cord 88 leading from the source of current is wound. Connected to the electric wires on the reel 87 are wires 89 leading to an electric switch 90 mounted on an upright bar 84. From the switch 90 electric wires 91 and 92 extend for supplying current to the electric motors (not shown) of the cleaners 12 and 13, respectively. Electric 75

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wires 93 connected to the cleaner 13 mounted on the auxiliary carrier unit 11 are also connected to all of the electric plugs 56 in parallel, while the electric wires 92 arranged on the main carrier unit 10 and connected to all of the receptacles 59 in parallel will supply current to the cleaner 13 should but one of the plugs 56 be in contact with a receptacle 59. The wires 92 leading from the receptacles 59 extend through the tubular members 42 through the bar 74 and are then connected together in parallel before being connected to the switch 90.

In operation, the carrier is moved over the floor surface and guided during its movement by pressure on the handle bar 85 attached to the main carrier unit 10, the caster wheels 16 permitting turning of the coupled carrier units to guide and to direct the different units to opposite sides of structural members attached to the floor which, as previously stated, will be considered as desk- and chair-supports in a schoolroom. The main carrier unit 10 to which the handle bar 85 is attached is moved down the aisles of the schoolroom with the operator walking therebehind, while the auxiliary carrier unit which supports its cleaner at a lower elevation is moved under the desks and chair. Upon engagement of each arm 80 of a bell crank 76 with a desk- and chair-support, the end 81 of said arm 80 is prevented from moving forward with the remainder of the carrier, and the bell crank is thereby swung on its pivot 75 moving the arm 77 in a direction that applied a pull on the cable 78 attached to the tubular member 42. The coil spring 45 forcing the tubular member in a forward direction, being of less strength than the coil spring 41 holding the sleeve 35 forwardly, yields to the pull on the cable thereby causing an endwise sliding movement of the tubular member 42 in the sleeve 35.

Such relationship of movement of parts retracts the locking bolts 60 and 62 from engagement with the angled surfaces 61 and 63, respectively, before the tubular member reaches the limit of its movement in the sleeve which is terminated by engagement of the cup-shaped member 45 with the ring closure member 44; whereupon the continuing of pull on the cable slides the sleeve 35 rearwardly in the cylinder 33 against tension of the spring 41 separating the electric receptacle 59 from the electric plug 56 and withdraws the end of the sleeve to a position such as that shown at the lefthand side of Figure 3, which clears the way for the coupling to pass the support 18. As soon as the support clears the end of the arm 80, the springs 41 and 45 will return the parts to normal locked positions prior to the engagement of the next arm 80 of another coupling with the support. The spacing apart of the couplings is such that only one coupling is uncoupled at a time, thus providing sufficient draft connection and complete electrical connection at all times of the main carrier unit to the auxiliary carrier unit for efficient operation of the apparatus.

Obviously, the carrier may be employed for supporting and moving appliances other than cleaners over floor surfaces when applying a treatment to the surfaces.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the construction, operation, and advantages of the device will be quite apparent to those skilled in

this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention, various changes may be made without departing from the spirit and full intendment of the invention.

What is claimed is:

1. A carrier for appliances capable of passing to opposite sides of obstructions; comprising a main carrier unit; an auxiliary carrier unit; a number of horizontally spaced couplings connecting and supporting said units spaced relative to one another for movement of both of said units together over a floor surface; each of said couplings consisting of a cylinder fixed to one of said units, a sleeve-like plunger slidably mounted in said cylinder, spring means yieldably extending said plunger into the other of said units, locking bolts movable on said plunger and engageable with the unit into which said plunger is extended, a tubular member slidably supported in said sleeve-like plunger for limited sliding movement relative to said plunger and connected to said locking bolts so as to operate said locking bolts upon sliding movement of said tubular member, and spring means yieldably holding said tubular member in position with said locking bolts in locked position; pivoted arms on said unit having said cylinders fixed thereto for movement into positions engageable with and to be moved by said obstructions during passing of said units to opposite sides of said obstructions; and means connecting each pivoted arm to a tubular member so as to slide said tubular members, disconnect said locking bolts, and retract said sleeve-like plungers upon the engagement of said arms with obstructions; the spring means on the plungers and the spring means on the tubular members providing the source of power to reconnect said couplings and to return their associated arms to their initial positions after passing of the obstructions.

2. A carrier for appliances capable of passing to opposite sides of obstructions, comprising a main carrier unit, an auxiliary carrier unit, a number of horizontally spaced couplings connecting and supporting said units spaced relative to one another, rollers mounted on at least one of said units for movement of both of said units together over a surface, and separate means connected to each of said horizontally spaced couplings which progressively and automatically disconnect and connect each of said couplings upon passing of said units to opposite sides of the obstructions, each of said separate means having a part thereof engageable with and actuated by the obstructions to disconnect its associated coupling and allow said coupling to pass the obstruction, and each of said separate means also having another part thereof that reconnects its associated coupling immediately after its coupling has passed the obstruction.

3. A carrier for appliances capable of passing to opposite sides of obstructions, comprising a main carrier unit, an auxiliary carrier unit, a number of horizontally spaced couplings connecting and supporting said units relative to one another, rollers mounted on at least one of said units for movement of both of said units together over a surface, arms engageable with and actuated by the obstructions during the passing of said units to opposite sides of the obstructions, each arm being operatively connected to a separate coupling so as to disconnect each coupling

during movement thereof past each obstruction, and separate spring means that connect each coupling and return its associated arm to its initial position after the passing of said obstructions.

4. A carrier for appliances capable of passing to opposite sides of obstructions, comprising a main carrier unit, an auxiliary carrier unit, a number of horizontally spaced couplings connecting and supporting said units spaced relative to one another, rollers mounted on at least one of said units for movement of both of said units together over a surface, electrical connections located at each of said couplings and supported in a manner to be disconnected and reconnected upon disconnection and reconnection of said couplings, said electrical connections being wired in parallel, and separate means connected to each of said horizontally spaced couplings which progressively and automatically disconnect and connect each of said couplings and their associated electrical connections upon passing of said units to opposite sides of the obstructions, each of said separate means having a part thereof engageable with and actuated by the obstructions to disconnect its associated coupling and electrical connection to allow passing of the obstruction, and each of said separate means also having another part thereof that reconnects its associated coupling and electrical connection immediately after its coupling and electrical connection have passed the obstruction.

5. A carrier for appliances capable of passing to opposite sides of obstructions, comprising a main carrier unit, an auxiliary carrier unit, a number of horizontally spaced couplings connecting and supporting said units relative to one another, rollers mounted on at least one of said units for movement of both of said units together over a surface, electrical connections located at each of said couplings and supported in a manner to be disconnected and reconnected upon disconnection and reconnection of said couplings, said electrical connections being wired in parallel, arms engageable with and actuated by the obstructions during the passing of said units to opposite sides of the obstructions, each arm being operatively connected to a separate coupling so as to disconnect each coupling and its associated electrical connection during movement thereof past each obstruction, and separate spring means that connect each coupling and its associated electric connection and return its associated arm to its initial position immediately after the passing of said obstructions.

6. A carrier for appliances capable of passing to opposite sides of obstructions; comprising a main carrier unit; an auxiliary carrier unit; a number of horizontally spaced couplings connecting and supporting said units spaced relative to one another for movement of both of said units together over a floor surface; each of said couplings consisting of a spring-urged plunger mounted on one of said units and extendible into the other of said units, locking bolts movable on said spring-urged plunger to positions engageable with the unit into which said plunger is extended so as to attach said units together, and a second spring-urged plunger slidably supported on said first-mentioned plunger for limited movement independent of movement of said first-mentioned plunger, said second-mentioned plunger being connected to said locking bolts and actuating said locking bolts upon the movement thereof relative to said first-mentioned plunger;

and movable arms connected to said second-mentioned spring-urged plungers and engageable with and actuated by the obstructions during the passing of said units to opposite sides of the obstructions so as to slide said second-mentioned plungers, disconnect said locking bolts, and retract said first-mentioned plungers upon the engagement of said arms with obstructions, the spring pressures on said plungers providing the source of power to reconnect said couplings and to return their associated arms to their initial positions after the passing of the obstruction.

7. A carrier for appliances capable of passing to opposite sides of obstructions; comprising a main carrier unit; an auxiliary carrier unit; a number of horizontally spaced couplings connecting said units to one another for movement of both of said units together over a floor surface; each of said couplings consisting of a spring-urged plunger mounted on one of said units and extendible into the other of said units, locking bolts movable on said spring-urged plunger to positions engageable with both of said units so as to attach said units together in spaced relation to one another, and a second spring-urged plunger slidably supported on said first-mentioned plunger for limited movement independent of movement of said first-mentioned plunger, said second-mentioned plunger being connected to said locking bolts and actuating said locking bolts upon movement thereof relative to said first-mentioned plunger; and movable arms connected to said second-mentioned spring-urged plungers and engageable with and actuated by the obstructions during the passing of said units to opposite sides of the obstructions so as to slide said second-mentioned plungers, disconnect said locking bolts, and retract said first-mentioned plungers upon the engagement of said arms with obstructions; the spring pressures on said plungers providing the source of power to reconnect said couplings and to return their associated arms to their initial positions after the passing of the obstruction.

8. A carrier for appliances capable of passing

to opposite sides of obstructions; comprising a main carrier unit; an auxiliary carrier unit; a number of horizontally spaced couplings for connecting and supporting said units spaced relative to one another for movement of both of said units together over a floor surface; each of said couplings consisting of a spring-urged plunger mounted on one of said units and extendible into the other of said units, locking bolts movable on said spring-urged plunger to positions engageable with the unit into which said plunger is extended so as to attach said units together, a second spring-urged plunger slidably supported on said first-mentioned plunger for limited movement relative to said first-mentioned plunger, said second-mentioned plunger being connected to said locking bolts and actuating said locking bolts upon the movement thereof relative to said first-mentioned plunger, and electrical connections on one of said slidable plungers and on said unit engaged by said locking bolts adapted to contact with one another; and movable arms connected to said second-mentioned spring-urged plungers and engageable with and actuated by the obstructions during the passing of said units to opposite sides of the obstructions so as to slide said second-mentioned plungers, disconnect said locking bolts and said electrical connections, and retract said first-mentioned plungers upon the engagement of said arms with obstructions, the spring pressure on said plungers providing the source of power to reconnect said couplings and electrical connections and to return their associated arms to their initial positions after the passing of the obstructions.

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