A. A. GIESEN & H. D. OLSEN.

VACUUM CLEANER DISPLAY DEVICE.

APPLICATION FILED OCT. 11, 1915.

1,174,141.

Patented Mar. 7, 1916.

3 SHEETS—SHEET 1.

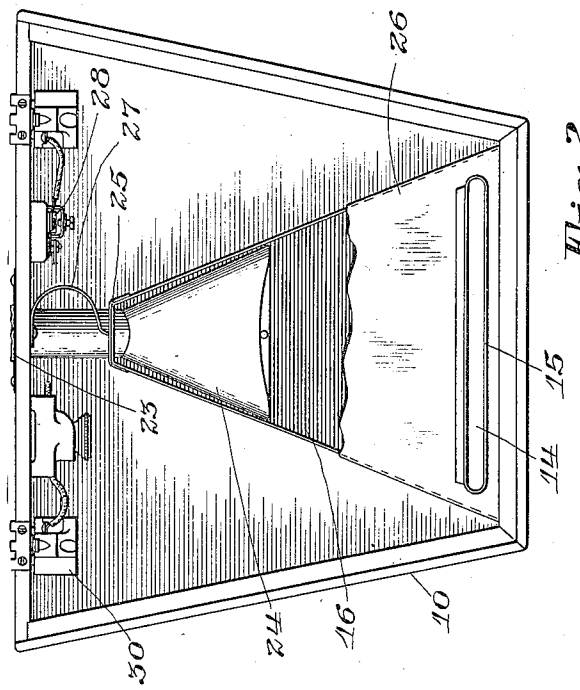


Fig. 2.

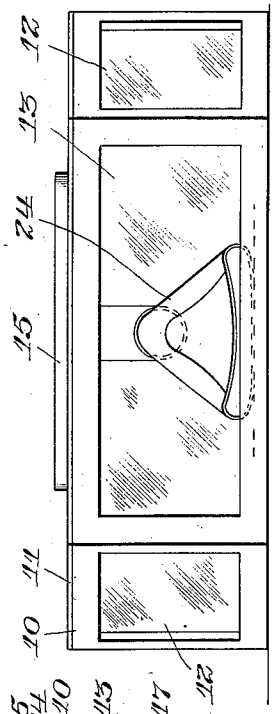


Fig. 3.

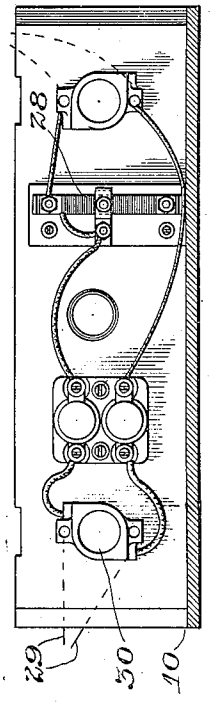


Fig. 4.

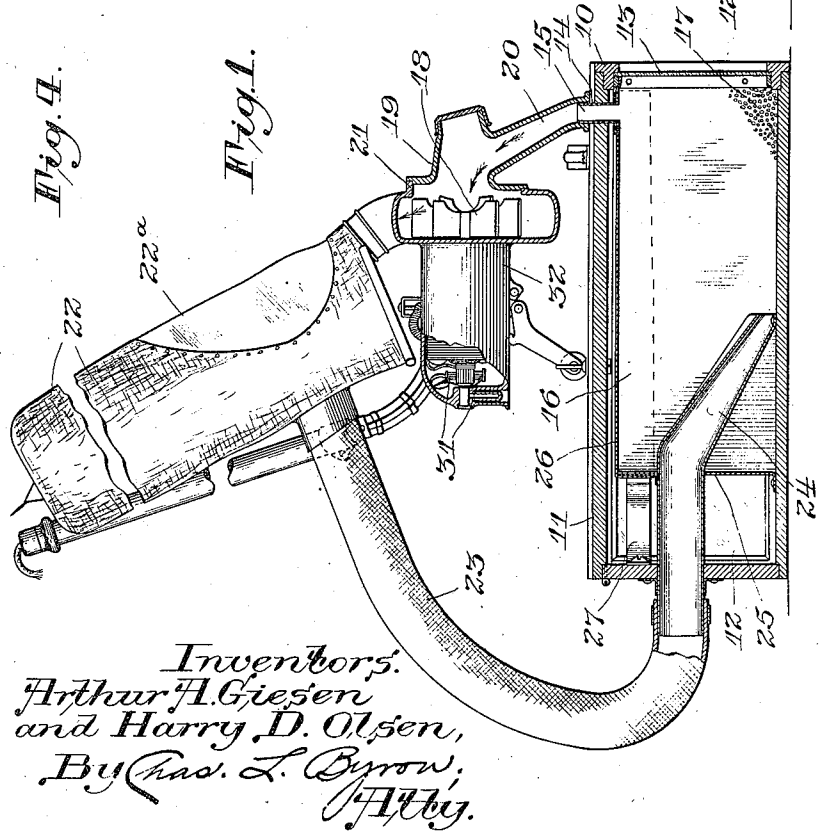


Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 13.

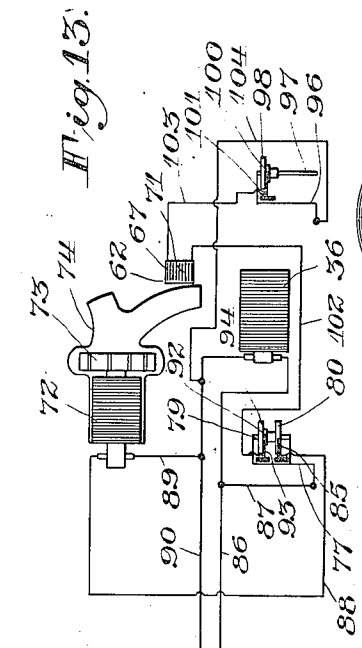
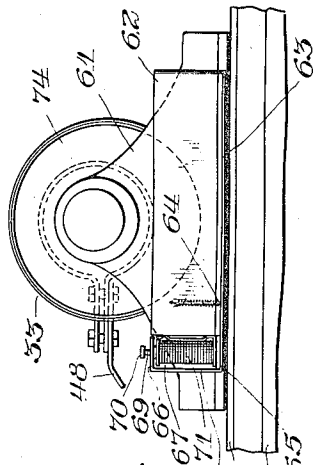


Fig. 8.



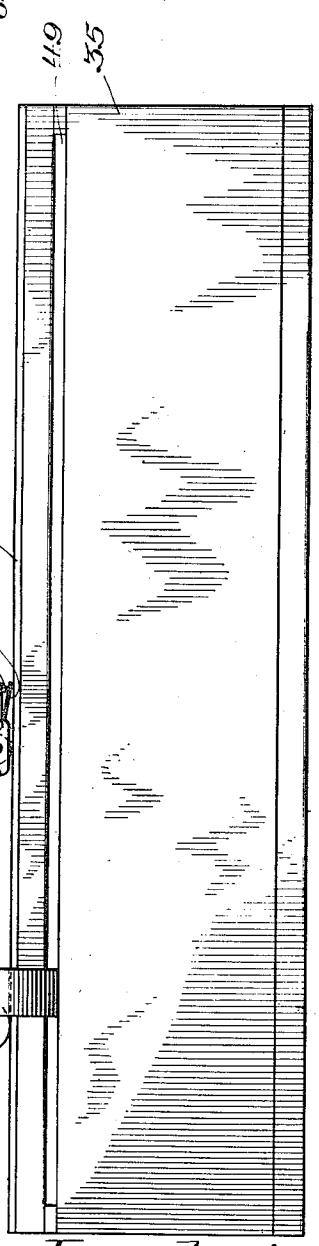
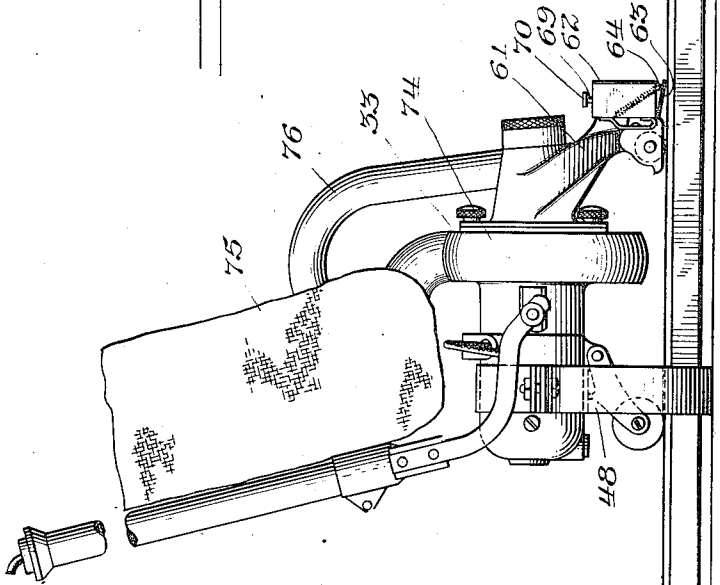


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

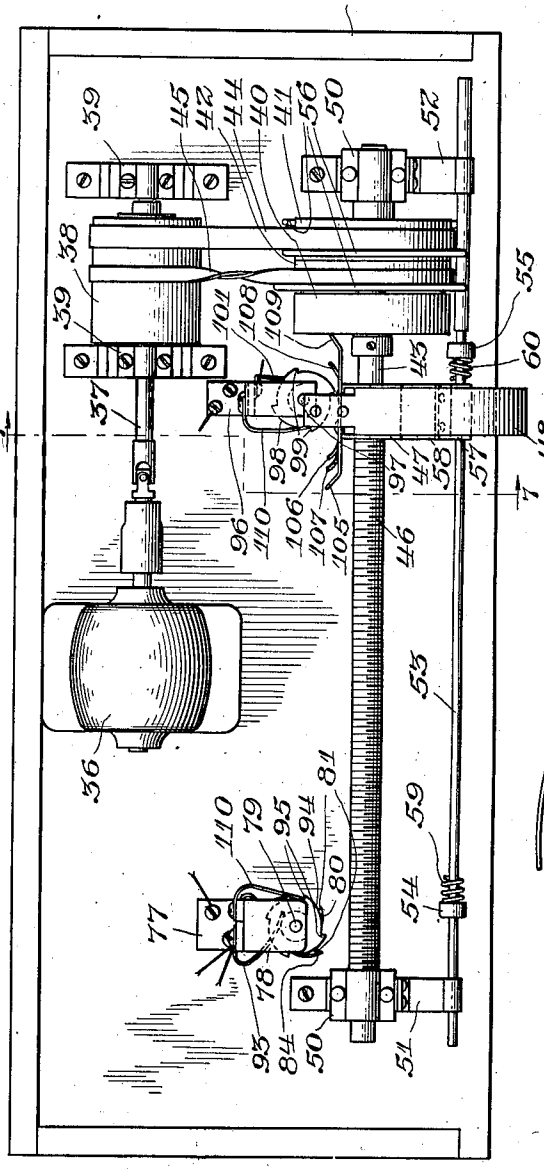


Fig. 11.

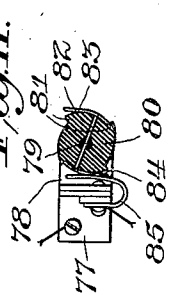


Fig. 12.

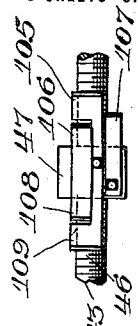


Fig. 10.

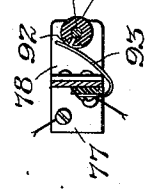


Fig. 9.

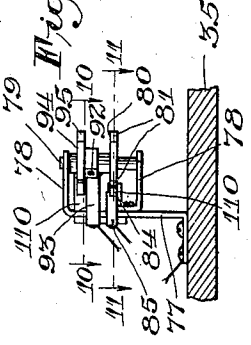
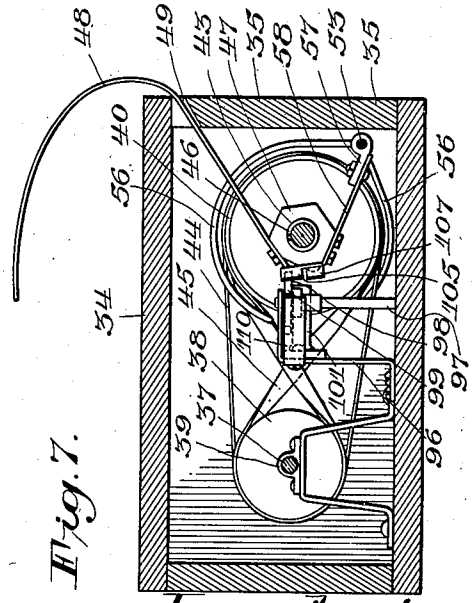


Fig. 7.



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UNITED STATES PATENT OFFICE.

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VACUUM-CLEANER-DISPLAY DEVICE.

1,174,141. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed October 11, 1915. Serial No. 55,363.

To all whom it may concern:

Be it known that we, ARTHUR A. GIESEN and HARRY D. OLSEN, citizens of the United States, and residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Vacuum-Cleaner-Display Devices, of which the following is a full, clear, and exact specification.

This invention relates to vacuum cleaner display devices.

One of the objects of the invention is to show, in an intelligent manner, the true action of a vacuum cleaner.

Another object is to provide a vacuum cleaner display device adapted to meet all of the requirements for successful commercial usage in show windows and the like.

These and other objects are accomplished by providing vacuum cleaner display devices having simple and coöperating parts properly associated to show complete cycles of operation.

The invention is illustrated in the accompanying sheets of drawings, in which—

Figure 1 is a side elevation, parts being in section, of a vacuum cleaner display device embodying our invention; Fig. 2 is a top plan view of the box structure of the device with the cover removed; Fig. 3 is a front elevation of the same box; Fig. 4 is a sectional view taken through the box and showing the electrical connections and control parts of the device; Fig. 5 is a side elevation of a modified form of vacuum cleaner display device; Fig. 6 is a top plan view of the operating mechanism of this modified device with the cover of the box removed; Fig. 7 is a sectional view taken in the plane of line 7—7 of Fig. 6; Fig. 8 is a fragmentary front elevation of the cleaner showing the dust hopper, its door opened, and an electro-magnet for controlling the door; Fig. 9 is a detail side elevation of the timing and contact member shown at the left in Fig. 6; Fig. 10 is a sectional view taken in the plane of line 10—10 of Fig. 9; Fig. 11 is a sectional view taken in the plane of line 11—11 of Fig. 9; Fig. 12 is a detail view of the traveling fingers or timer trip member; and Fig. 13 is a diagram of electrical connection for the display device shown in Figs. 5 to 12, inclusive.

The various novel features of the invention will be apparent from the following description and drawings, and will be particularly pointed out in the appended claims.

In Figs. 1 to 4, inclusive, is shown a display device in which the vacuum cleaner proper remains stationary, while in the other figures of the drawing a display device is shown in which the vacuum cleaner proper travels. Description will be given first of the display device in Figs. 1 to 4. This stationary type of vacuum cleaner display device includes a box 10, having a pivotally mounted top 11, which may have a carpet covering, and transparent sides 12 and front 13, the top 11, in the front portion thereof, having an elongated slot 14 for the reception of an upwardly extending outlet member 15 of a triangularly shaped receptacle 16 secured in the box and adapted to hold dust or cork 17 drawn therefrom by the motor-propelled fan 18 of the vacuum cleaner 19. The dust or cork is drawn upwardly through the outlet 15, cleaner nozzle 20 fitting thereover, fan casing 21, and forced by the fan and gravity through the bag 22, hose 23 and funnel member 24 back into the receptacle 16. The nozzle member 24 extends through the rear of box 10 and through the apex portion 25 of the receptacle 16, said nozzle member extending forwardly and downwardly within the receptacle 16 to deposit the dust or cork properly to prevent its heaping up in the rear of the receptacle, and also to place the same in a convenient and efficient range of the fan 18 so that it can be drawn effectively. By experiment it has been found that the best results are obtained with a triangular receptacle 16 as shown, the fan acting most effectively under these conditions. The cover 26 of the receptacle 16 is held in place by a spring 27 secured to the inside of rear of the box 10. The vacuum cleaner 19 in this case is fixed to the top of the box 10 by any suitable means. The bag 22 may be transparent or have a transparent portion 22ª. The motor driven fan 18 is driven intermittently to emphasize the operation of the display device, the intermittent operation being effected by a standard flasher 28 connected in the electric circuit between the supply mains 29 leading to the plug 30 and the contact brushes 31 of the driving motor 32. By means of this arrangement the action of the vacuum cleaner fan 18 in drawing the dust from any object is clearly pictured.

Attention now is directed to the modified form or the traveling form of vacuum cleaner display device shown in Figs. 5 to 13, inclusive. The vacuum cleaner proper 33 is moved forwardly and rearwardly over the top 34 of a box 35, having a carpet covering, by an electric motor 36 mounted within said box. The driving connection between the motor 36 and vacuum cleaner 33 includes a shaft 37 having a long pulley 38 mounted between the shaft bearings 39. Opposite the pulley 38 are three pulleys 40, 41 and 42, pulleys 40 and 41 being loosely mounted on a shaft 43, the other pulley 42 being fixed to said shaft. An open belt 44 and a crossed belt 45 passing around pulley 38, are respectively adapted to drive the vacuum cleaner forward and backward over the box when passing around tight pulley 42. The shaft 43 is provided with a long threaded portion 46, on which and by the actuation of which a nut 47 travels. Secured to this nut is a bent metal strap 48 which extends out through an elongated opening 49 in the side of the box and is connected to the body of the vacuum cleaner 33 in any suitable manner. Thus, through the connections described, the vacuum cleaner 33 may be driven forwardly and backwardly over the box 35 by the electric motor 36. The shaft 43 is journaled in bearings 50, to the supports of which are secured brackets 51 and 52, in which a belt shifting rod 53 is slidably mounted. Secured to this rod are stop members 54 and 55, by means of which the belts 44 and 45 are shifted by the forks 56 when the slidably mounted member 57 of arm 58 secured to nut 47 compresses the spring 59 or 60 against said stop members 54 and 55, respectively. The springs 59 and 60 are provided to give a snap action in the shifting of the belts. Secured to the front of the nozzle 61 of the vacuum cleaner is a dust or cork containing hopper 62 having a lower hinged door 63 held closed under certain conditions by a suitably supported spring 64. Secured to the door is the bent arm 65 of the armature 66 of an electro-magnet 67, the armature having a vertically extending arm 68, said armature 66 having an opening therethrough for a suitable guiding member 69 having a limiting stop member 70. When the coil 71 of the magnet has an electric current passed therethrough, the magnet is energized and draws its armature 66 down and therefore the door 63 with it, holding the door in opened position against the action of spring 64 as long as current is passing through said coil. The vacuum cleaner has its regular electric motor 72 (see Fig. 13) for driving the suction fan 73 mounted in casing 74.

Mention will be made at this point of the operative movements of the vacuum cleaner so far as the observer can see, and then hereafter we will describe the control parts. On the first forward stroke from left to right over the box 35 of the vacuum cleaner 33, the hopper door 63 will be open to distribute or scatter dust, cork or the like over the surface of the box top 34, it being understood that the electro-magnet 67 is energized during this forward stroke and the fan 73 not in operation. At the end of the first forward stroke the electro-magnet is de-energized and the door 63 thereby closed by the spring 64. On the first backward stroke the dust or cork is displayed. At the end of this first backward stroke electric connections are established to operate the vacuum cleaner fan 73. During the second forward and second backward strokes the fan 73 continues to operate to draw the dust or cork from the top of the box up through nozzle 61, forcing it through the bag 75 and hose 76 back into the hopper 62. At the end of the second backward stroke the fan motor electric connections are broken, thereby stopping the fan 73, and connections are made for energizing the electro-magnet 67 again to open door 63 preparatory to distributing the dust or cork again over the top of the box on the next forward stroke. This cycle of operations gives to the observer a comprehensive and intelligent understanding of the operation and effectiveness of a vacuum cleaner.

Consideration will now be given to control features by means of which the electrical connections are made, broken and timed. Mounted within the box 35, to the left-hand side, is a metal bracket 77 having bearing portions 78 (see Fig. 9) in which a metal shaft 79 is rotatable. To the lower portion of this shaft a fiber disk 80 (see Figs. 9 and 11), with four peripheral teeth 81, is secured by a metal pin 82 passing completely through the fiber disk 80 and metal shaft 79 and making electrical contact with spring metal contact fingers 83 and 84 secured to oppositely arranged teeth 81. These fingers 83 and 84 are adapted to make contact with a stationary contact 85 mounted on but insulated from bracket 77. By means of this arrangement an electric circuit may be made (see Figs. 6, 9, 11 and 13) from one side 86 of a supply circuit through conductor 87, bracket 77, shaft 79, pin 82, contact fingers 83 or 84, stationary contact 85, conductor 88, fan motor 72, through conductor 89 to the other side 90 of the supply circuit for operating the vacuum cleaner fan 73.

The circuit, including the electro-magnet 67, will now be considered. Loosely mounted on shaft 79 and electrically connected thereto, is a contact 92 adapted to make contact with a contact finger 93 (see Fig. 10). This contact 92 is carried by a fiber disk

94 having four teeth 95. The disks 80 and 94 are relatively movable, the disk 80 being fixed to shaft 79 and disk 94 being loosely mounted thereon. At the right-hand end of the travel of nut 47 is another bracket 96, in which is mounted a shaft 97 carrying a fiber disk 98 with four teeth 99, an electrical contact 100 being carried by said disk 98 and being electrically connected to said shaft 97. This contact is adapted to pass into engagement with a contact finger 101. To complete the electric circuit of the electro-magnet, contacts 92 and 93 must be in engagement and contacts 100 and 101 also must be in engagement. This circuit is traced from supply line 86, conductor 87, bracket 77, shaft 79, contact 92, finger 93, conductor 102, magnet coil 71, conductor 103, finger 101, contact 100, shaft 97, bracket 96, conductor 104 to the other side 90 of the supply line.

Electrical engagement between the various electrical contacts and their contact fingers is controlled by five fingers 105, 106, 107, 108 and 109, fingers 105 and 106 being adapted to engage teeth of fiber disk 94 to rotate the same, fingers 108 and 109 being adapted to engage teeth of fiber disk 98 to rotate it, and finger 107 being adapted to engage fiber disk 80 to rotate it. These fingers are carried to the left and right by the traveling nut 47. The disks are provided with specified numbers of teeth and a certain number of coöperating actuating fingers are provided for timing purposes. Pawls 110 are provided to prevent reverse movements of the disks.

The complete operation of the device will now be considered. Let it be assumed that the vacuum cleaner 33 has just moved into its extreme left-hand position, as shown in Fig. 5, the traveling fingers 105 and 106 having consecutively engaged adjacent teeth of disk 94 to move contact 92 into engagement with contact finger 93 to complete the circuit of the electro-magnet, and traveling finger 107 during the same time moving disk 80 one step to separate contact 84 and contact finger 85, thereby breaking the fan motor circuit. From this extreme left-hand position the vacuum cleaner makes its first forward movement to distribute dust over the top of box 35. This means that the hopper door 63 must be open and that the fan motor 72 must not be operating. In other words, the circuit of the electro-magnet is completed, the electro-magnet energized, and the door 63 therefore in open position, while the circuit of the fan motor is broken by both fingers 83 and 84 being out of engagement with stationary contact finger 85. The motor 36 being permanently connected to its source of supply, moves the vacuum cleaner bodily across the top of the box 35, whereupon, during this first forward stroke, the dust or cork falls out of the hopper 62 and is distributed. Near the end of this forward stroke the traveling fingers 109 and 108 consecutively engage adjacent teeth of disk 98, first separating contact 100 and contact finger 101 to break the circuit of the electro-magnet and permitting the spring 64 to close door 63, and then advancing the disk 98 and contact 100 one step further. At about the same time, or a little later, the slidably mounted member 57 passes into engagement with spring 60, and shortly thereafter causes, with a snap action, belt 44 to shift from tight pulley 42 to loose pulley 41 and belt 45 to shift from loose pulley 40 to tight pulley 42 to reverse the motion of the vacuum cleaner.

Upon its first backward stroke, the vacuum cleaner fan motor 72 still not operating, the dust is displayed on the top of the box 35. Near the end of the first backward stroke the traveling fingers 105 and 106 consecutively engage adjacent teeth of disk 94, first separating contact 92 and contact finger 93, making a second break in the circuit of the electro-magnet, and then advancing the disk 94 and contact 92 another step. At the same time traveling finger 107 engages one of the teeth of disk 80 to move contact 83 or 84 into engagement with contact finger 85 (see Figs. 9, 11 and 13), thereby completing the electric circuit of the fan motor 72 to operate the fan 73 to draw the dust from the top of the box 35. At about the same time also sliding member 57 presses against spring 59 to cause, with a snap action, belt 45 to be shifted from tight pulley 42 to loose pulley 40 and belt 44 to be shifted from loose pulley 41 to tight pulley 42. This causes the vacuum cleaner to move bodily on its second forward stroke, during which stroke the fan 73 draws the dust from the top of the box through nozzle 61, forcing it through the bag 75 and hose 76 back into the hopper 62. At the end of the second forward stroke, fingers 109 and 108 again advance disk 98 and contact 100 two more steps, placing contact 100 again in engagement with contact finger 101. The belts also are shifted to reverse the movement of the vacuum cleaner. On the second backward stroke, the fan 73 continues to draw the dust from the top of the box 35, leaving it in a perfectly clean condition. At the end of this second backward stroke traveling finger 107 again forces disk 80 around another step and thereby separates either contact 83 or 84 and contact finger 85, thereby breaking the electric circuit of fan motor 72, and traveling fingers 105 and 106 consecutively advance disk 94 a step each, placing contact 92 again in electrical engagement with contact finger 93, thereby completing the circuit of the electro-magnet to open the hopper door preparatory to again distribute the dust or

cork over the top of the box 35 upon the next forward stroke of the vacuum cleaner, the vacuum cleaner having been reversed in the usual manner at the end of the second backward stroke. This cycle of action gives a comprehensive idea of the effectiveness of a vacuum cleaner, and intelligently displays the action of the same. The operation throughout is automatic.

It is evident that there may be other modifications of our invention than those here particularly shown and described, and it is our intention to cover all such modifications which do not involve a departure from the spirit and scope of our invention as set forth in the following claims.

What we claim as new is:

1. In a vacuum cleaner display device, the combination of means for depositing dust or the like, and a vacuum cleaner for picking up the same.

2. In a vacuum cleaner display device, the combination of means for depositing dust or the like in a path, a vacuum cleaner for picking up such deposit, and means for actuating said vacuum cleaner.

3. In a vacuum cleaner display device, the combination of a vacuum cleaner, means for depositing dust or the like in a path of movement of said vacuum cleaner, and means for actuating said vacuum cleaner in said path.

4. In a vacuum cleaner display device, the combination of a vacuum cleaner, means for depositing dust or the like, means for actuating said cleaner and said means, and means for causing the depositing of dust and the picking up of the same by the vacuum cleaner during their actuation.

5. In a vacuum cleaner display device, the combination of a vacuum cleaner, means for depositing dust or the like, means for actuating said vacuum cleaner and means, and means for causing the depositing of dust during one movement and the picking up of the same by the vacuum cleaner during another movement.

6. In a vacuum cleaner display device, the combination of a vacuum cleaner having a motor, and a dust container associated with said vacuum cleaner for distributing dust or the like, and means for maintaining the motor inoperative while dust is being distributed.

7. In a vacuum cleaner display device, the combination of a vacuum cleaner having a motor, and a dust container associated with said vacuum cleaner for distributing dust or the like, means for maintaining the motor inoperative while dust is being distributed, and means for preventing the distribution of dust when said motor is in operation.

8. In a vacuum cleaner display device, the combination of a dust or like distributer, a vacuum cleaner, and means for controlling the effective action of said distributer and vacuum cleaner.

9. In a vacuum cleaner display device, the combination of a vacuum cleaner, a dust or like distributer, means for reciprocating said vacuum cleaner and distributer, and means whereby dust or the like is distributed during one movement and displayed and then drawn up by the vacuum cleaner during another movement.

10. In a vacuum cleaner display device, the combination of a vacuum cleaner having a motor driven fan, a dust or like distributer, a motor for moving said vacuum cleaner and distributer in a desired path, means controlling the distribution of dust, and means for controlling the actuation of the fan of said vacuum cleaner for picking up the dust.

11. In a vacuum cleaner display device, the combination of a vacuum cleaner, a dust or like hopper connected thereto and having a door, means for moving said vacuum cleaner and hopper in a desired path, means for controlling the opening and closing of said hopper door and the distribution of dust, and means for controlling the sucking action of said cleaner.

12. In a vacuum cleaner display device, the combination of a vacuum cleaner, and a dust or like distributer, said vacuum cleaner and distributer being connected to permit of the continued use of the same display dust.

In testimony whereof we affix our signatures, in the presence of two witnesses.

ARTHUR A. GIESEN.
HARRY D. OLSEN.

Witnesses:
F. W. HOFFMEISTER,
WILLIAM ELLIS.