This invention relates to animated displays and more particularly to such displays wherein the fall of snow or similar natural phenomena is simulated.

Heretofore, it has been most common when furnishing snowfall simulating display devices to provide a blower type apparatus wherein the snow-like particles are caught up in an air current created by a blower air blast and conveyed thereby through a duct work to the top of the display unit where they are separated from the air current and permitted to fall through the display area to the bottom recesses of the unit. Here, the particles are again caught up in the air current and a continuous circulation thereof is effected.

Devices of the foregoing nature are somewhat limited in scope although such limitations are not generally apparent in the smaller size units most often seen in use. For example, separation of the particles from the air current often is not quite complete with the result that the particles are carried downwardly in eddy currents rather than falling freely as desired and most effective in an advertising display.

Furthermore, in those blower type devices having the duct work for guiding the particles upwardly located to one side of the display area, since the particles are carried by an air current and moving with an initial velocity as they enter the display area from the duct work, they do not fall in the display area immediately adjacent to their point of entrance, but rather they take a somewhat parabolic path dependent upon their initial velocity. Here again, the desired free vertical fall of the particles is not achieved.

It is to obviate limitations of the foregoing nature as well as to gain certain desirable advantages that the apparatus of the present invention is provided. Foremost of the attributes of the present invention is that it knows no limitations so far as the width of the display area is concerned. That is, regardless of the width of the area in which the snowfall is to be simulated, an even distribution of falling snow is assured from one extremity of the display area to the other. Moreover, the density of the snowfall is susceptible of ready regulation and control. Also, the snow falls freely without any initial velocity to thereby simulate a snowfall more realistically than if it were propelled as in an air current.

Furthermore, apparatus provided in accordance with the present invention requires a minimum of headroom and side wall space wherein the particles are carried to the top of the display unit. Important in this regard is that the height of the apparatus is in no way dependent on the width thereof or the width of the display area. Rather, for any given height, the width of the display area may be as narrow or as wide as desired.

In carrying out the invention there is provided an endless conveyor trained over a plurality of pulleys located at the corners of the display area. The conveyor itself is divided lengthwise into a series of hopper-like compartments or receptacles which carry the snow simulating particles from the bottom of the display area to the top thereof. As the particle filled compartments reach the top of the apparatus, they are inverted so that their contents may be emptied. The fall of the particles in a cluster from an inverted compartment is prevented by the interposition of a snow distributing orifice plate upon which the particles fall. The plate, which extends across the entire width of the display area, is provided with an opening, or openings, co-extensive therewith through which the particles fall. The partitions or walls which compartmentalize the conveyor engage the upper surface of the orifice plate so that as a compartment traverses the width of the apparatus, one of the partitions forming the compartment pushes the particles dumped therefrom along the orifice plate which permits the passage, and free fall through the display area, of only a limited number of particles per unit of travel. As long as the contents of a compartment are not exhausted by the time the compartment traverses the width of the apparatus, an even distribution of snowfall is effected over the entire display. The free falling snow is collected in the conveyor as it traverses the bottom of the display apparatus, and since the snowfall is evenly distributed, the compartments will be filled substantially equally as they are carried beneath the falling snow. Thus, the snow-simulating particles constantly are in circulation with the result that a simulation of a continuing snowfall is obtained as long as the conveyor is actuated.

Features and advantages of the invention will be gained from the foregoing and the description of a preferred form of the apparatus which follows.

In the drawings:

Figure 1 is a front elevation of an advertising display wherein a snowfall is simulated;

Figure 2 is an elevational view showing the conveyor, with portions broken away to show the particle carrying receptacles;

Figure 3 is an enlarged sectional view taken along line 3--3 of Figure 2 illustrating the fabrication of the conveyor;

Figure 4 is a sectional view taken along line 4--4 of Figure 1;

Figure 5 is an enlarged segmental view of the upper portion of Figure 4 but with the conveyor removed showing the mounting of the snowfall distributing plate;

Figure 6 is a top plan view of the snowfall distributing plate of Figure 6;

Figure 8 is a top plan view of another snowfall distributing plate having a different aperture arrangement;

Figure 9 is a top plan view of still another snowfall distributing plate having a different aperture arrangement;

Figure 10 is a detailed segmental view showing a tensioning device for mounting one of the conveyor pulleys; and

Figure 11 is a view taken along line 11--11 of Figure 10.

In Figure 1 is shown an advertising display as it might appear when using a snowfall simulating device according to the present invention. The display area 20 through which the snow falls is surrounded by a facade 21 which shields the mechanism of the device from the view of one observing the display. The front of the display area may be open or it may be closed by a transparent sheet 22. To the rear of the device and viewed through the display area is an illustrated print 23 which may be in the form of an advertising message or a scenic view as desired. In some cases it may be desired to place the article to be advertised or shown directly in the display area so that the simulated snowfall will impinge on the article for extreme-
ly realistic effects. If the display takes this latter form, the rear surface of the display area may still be a print or it may be of a transparent nature thereby permitting the scene to be back illuminated for added effectiveness. It is thus clear that a display using apparatus according to the present invention lends itself to multitudinous forms of advertising or scenic presentation.

Reference is now made to Figure 2 wherein is shown a conveyor means for providing an uniformly distributed and continuous free-fall curtain of particles over any desired horizontal expanse. The conveyor 24 comprises an endless strip of pliable material 25, e.g., a substantial or heavy fabric or a plastic material, having a trough-like cross section as shown in Figure 3. In spaced relation throughout the length of the conveyor are a plurality of partitions 26 which define the cross-sectional form of the conveyor, but which, more importantly, transform the conveyor into an endless series of compartments or receptacles 27. It is by means of such receptacles that the snow simulating particles are carried from below the display area to a region above the display area.

The conveyor 24 is shown trained over four pulleys 30, 31, 32 and 33 which are journaled in the normal way in the supporting framework for the mechanism. Motion is imparted to the conveyor through the V-belt pulley 34 keyed to the shaft of pulleys 31 and 32 by the electric motor 35 and V-belt 36. A variable speed motor drive or a variable V-belt drive may be used to facilitate changing the speed of travel of the conveyor. After the partitions are secured to the framework 5, 6, 7 and 8 and 9. Additional plates having the same cross-section configuration as plate 53 but without apertures therein are 40.

In Figure 4, the conveyor is shown with its receptacles in both upright position below the display area and in an inverted position above the display area. As previously indicated that portion of the device immediately in front of the display area is of transparent material, e.g., clear glass, so that the advertising message on rear panel 23 may be readily viewed as well as the simulated snowfall which takes place when the particles discharged from the inverted receptacles pass through the display area to be received by the upright receptacles below the display area. A pair of deflectors 52 assure that all of the falling snow-like particles are returned to the conveyor. In such manner, a continuous circulation of the snow-like particles is maintained.

The particles utilized in the snowfall device are formed of a granulated expanded polystyrene plastic. If, instead of simulating a snowfall, it is desired to simulate the fall of rain, the particles may take the form of small pieces of clear cellophane or plastic. If, on the other hand, it is desired to simulate the fall of autumn leaves, small bits of colored paper cut in appropriate shapes may be used.

The means whereby a continuous snowfall is assured, evenly distributed over the width of the display area, will now be disclosed with reference to Figures 2 and 6. The snow-like particles are distributed in each of the receptacles 27 formed in conveyor 24 by partitions 26. After the receptacles carrying particles up the right hand side of the device pass upper right hand pulley 32 and are inverted, the particles carried thereby are immediately dumped from the conveyor. Since the trough-shaped conveyor is now inverted the particles tend to be discharged in one mass. However, immediately below the inverted conveyor is the snowfall distributing plate 53 upon which the particles are dumped. As shown in Figure 6, plate 53 is provided with an aperture 54 through which the particles can pass but which is of restricted dimension so that the particles do pass therethrough at a fairly low rate.

As most clearly shown in Figure 2, the receptacle 27 formed by two adjoining partitions 26 and the plate 53 in effect, form a hopper in which the plate aperture 54, or at least that portion of it between two partitions, is the outlet for the material in the hopper, or in this case, the conveyor receptacle. If each receptacle contains a sufficient number of particles so that a receptacle is not exhausted of particles prior to the completion of its run across the top of the display area, an efflux of particles will take place from one side to the other of the display area thus providing an evenly distributed snowfall. A plate 55 (Figure 6) is secured to the underside of snowfall distributing plate 53 by wing nuts 56 and bolts 58, the heads of which can slide in elongated slots 57 in plate 53. The relative positions between the two plates can therefore be adjusted to control the size of the aperture 54. Since this will regulate the rate of particle efflux from the receptacles, it is clear that the density of the snowfall is thus controlled. Snowfall density control can also be effected by keeping the aperture size constant and varying the speed of the conveyor so that the receptacles traverse the display area either faster or slower than normal operating speed. Speeding up the conveyor speed will decrease the snowfall density, while slowing the speed and fabric of the snow will have the opposite effect of increasing its density.

The snowfall distributing plate 53 is secured to the framework 60 by being screwed to the angle brackets 61 mounted in spaced relation on the front and back framework members. Alternate forms of snowfall distributing plates having different aperture configurations are shown in Figures 8 and 9.

Additional plates having the same cross-section configuration as plate 53 but without apertures therein are
provided for vertical mounting at both sides of the display area. The plates, and particularly that one adjacent to the up travelling conveyor, serve to restrain particles carried by the conveyor in their respective receptacles and prevent their discharge prior to the inversion of the receptacles at the top of the display area. The plate adjacent to the down travelling conveyor retains in the receptacles any particles which may not have been discharged through the aperture of plate 53 as the receptacles traverse the display area.

It is now apparent that displays incorporating the apparatus of the present invention will have no limitations in size and may vary from the smallest window display to outdoor billboard displays. Of course, the relationship of hopper or receptacle size, snowfall distribution plate aperture size and conveyor speed will be affected by the size, i.e., width, of the display and snowfall density desired.

Inasmuch as many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a device wherein a snowfall is simulated by the fall of snowlike particles through a display area, an endless conveyor surrounding said display area for transporting the snow-like particles from below said area to a region thereof, said conveyor being adapted to discharge substantially all of said particles as said conveyor begins its travel above said display area, means located above the display area for receiving the discharged particles, said means being adapted to permit the limited passage of said discharged particles therethrough, and means for sweeping the particles across said last named means whereby the passage of particles therethrough takes place across the width of said means to effect the fall of particles across the entire display area.

2. In a device wherein a snowfall is simulated by the fall of snow-like particles through a display area, an endless conveyor for transporting the snow-like particles from below said area to a region thereof, said conveyor being adapted to discharge substantially all of said particles as said conveyor begins its travel above said display area, means for intercepting the fall of the particles prior to their passage through the display area, said intercepting means adapted to permit the limited passage of said discharged particles therethrough, means for sweeping the particles across said last named means whereby passage of particles therethrough takes place across the width of said means to effect the fall of particles across the entire display area, and means for regulating said intercepting means to control the number of particles passing therethrough to thereby regulate the density of the snowfall.

3. In a device wherein a fall of snow is simulated by the fall of snow-like particles through a display area, an endless conveyor trained around the display area, said conveyor being generally trough-shaped in cross-section and having similarly shaped spaced apart partitions secured therein to form an endless series of receptacles, said receptacles being in an upright position when travelling below the display area to receive the falling snow-like particles and in an inverted position when traversing the top of the device to discharge the particles carried therein, and a snowfall distributing plate extending lengthwise from one side to the other of the display area and located below the inverted conveyor receptacles to intercept the particles discharged therefrom prior to their entrance into the display area, said discharged particles being confined by said plate and the partitions forming the receptacle from which the particles were discharged, said plate being adapted to permit the aforesaid confined particles to pass therethrough in limited quantities as said particles are transported lengthwise along said plate by the movement of the conveyor.

4. The device, as set forth in claim 3, wherein the snowfall distributing plate is provided with a slotted aperture that extends lengthwise of the plate and is of a width less than the width of the conveyor.

5. The device, as set forth in claim 4, wherein the aperture also extends from the back to the front of the plate whereby particles discharged onto said plate will encounter the aperture as they are transported from one end to the other of the plate.

6. The device, as set forth in claim 4, wherein means are provided to vary the width of the aperture and thereby regulate the density of the snowfall.

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