Oct. 12, 1937. D. G. SMELLIE 2,095,456

SUCTION CLEANER ADVERTISING DISPLAY

Filed Dec. 15, 1934 2 Sheets-Sheet 1

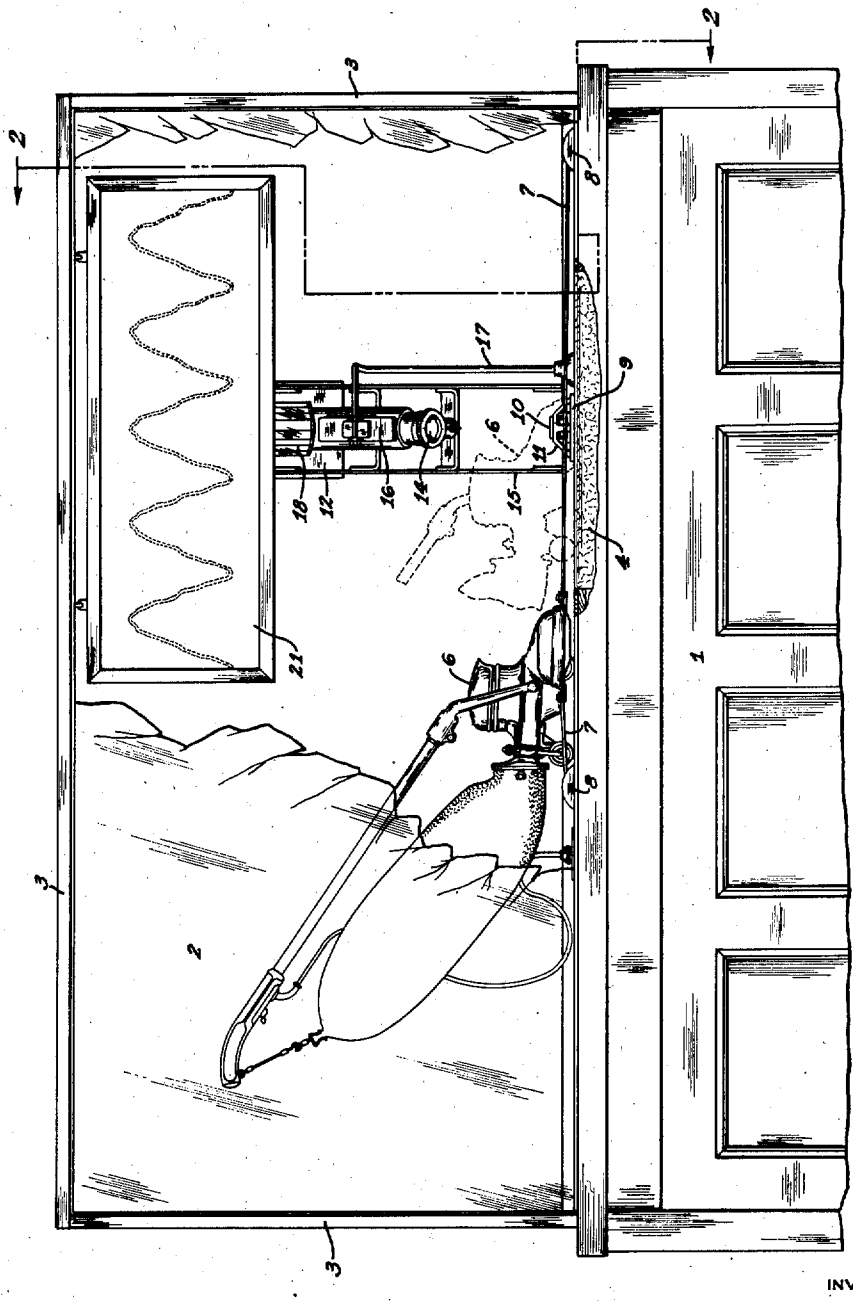


Fig. 1

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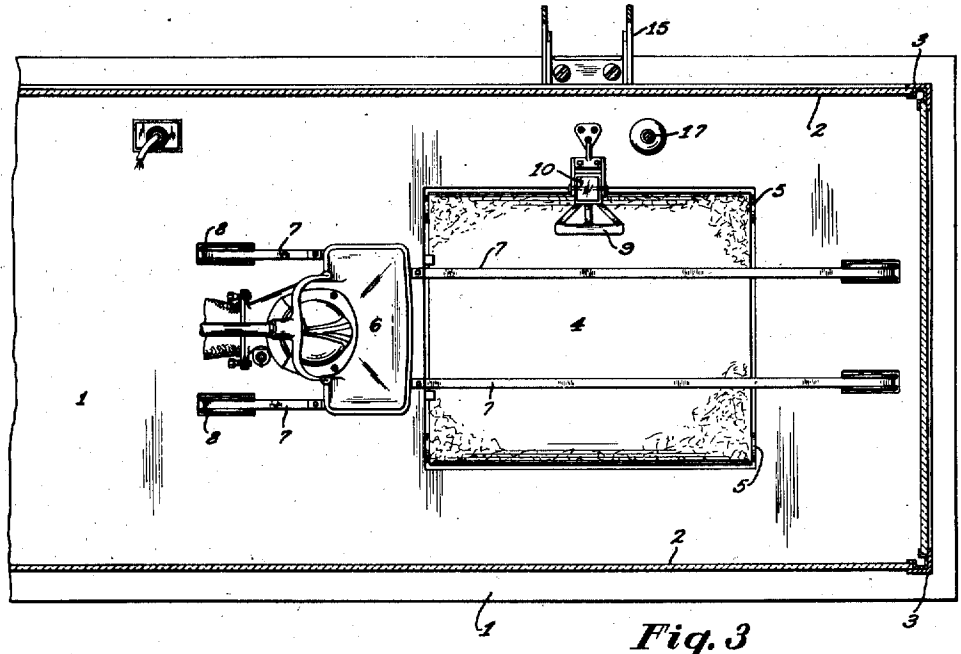


Fig. 3

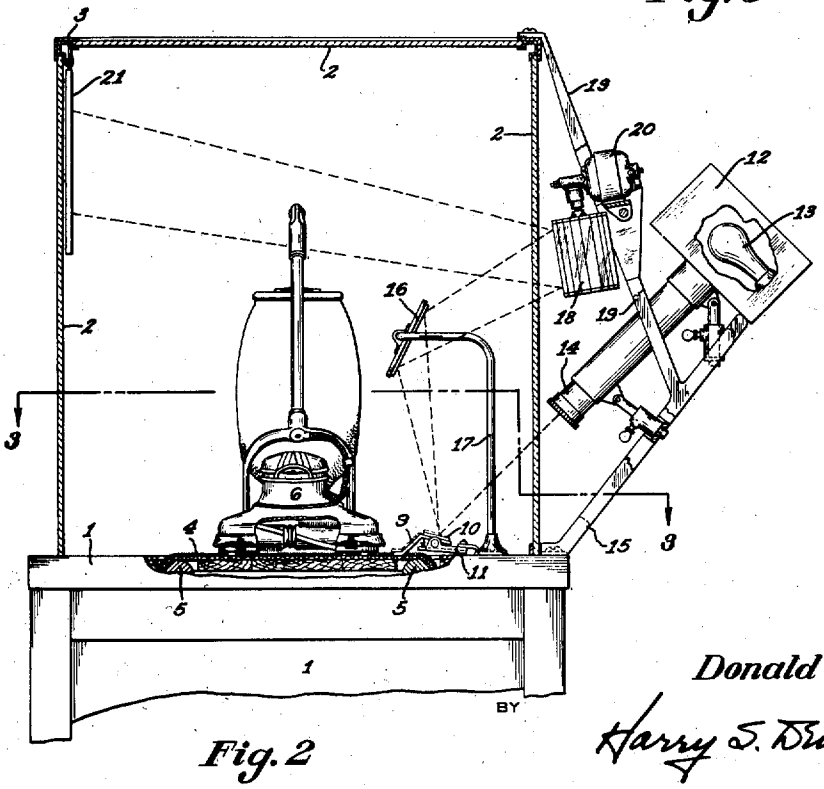


Fig. 2

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UNITED STATES PATENT OFFICE

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SUCTION CLEANER ADVERTISING DISPLAY

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Application December 15, 1934, Serial No. 757,613

6 Claims. (Cl. 35—13)

The present invention relates to the advertising display devices in general and particularly to an improved device to display the surface covering vibration effected during the cleaning of a surface covering.

It is an object of the invention to provide a new and improved visual display device to evidence covering vibration effected during the cleaning of a surface covering by a modern suction cleaner. Another object of the invention is to provide a display in which the surface covering vibration is illustrated diagrammatically. Still another object is the provision in a display device, of a moving suction cleaner, means to measure the vibration of a surface covering cleaned by the suction cleaner, and of additional means to illustrate diagrammatically the intensity and amplitude of that vibration. These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawings in which a preferred embodiment of the present invention is disclosed:

Figure 1 is a side elevation of the display device constructed in accordance with the present invention with certain parts broken away;

Figure 2 is a vertical section through the display device upon the line 2—2 of Figure 1;

Figure 3 is a horizontal section upon the line 3—3 of Figure 2.

In the cleaning of a surface covering by a modern suction cleaner two agencies effect the cleaning. The passage through and over the surface covering of a high velocity stream of air is one of those instrumentalities. The high frequency vibration of the surface covering by the agitating means embodied in the cleaner is the second. The co-operation of these two means effectively removes the embedded foreign matter. The first of these two agencies is old and well known. The second is embodied in only the most advanced cleaners. In the display device constructed in accordance with the present invention means are provided to illustrate diagrammatically the effectiveness of the agitating means embodied in the suction cleaner to effect the second agency of cleaning.

Referring again to the drawings a display table 1 is shown. Upon the top of this table, which is somewhat longer than it is wide, is an enclosure formed by a suitable frame 3 and glass sides 2, 2 etc. Extending transversely across the table top and lying flush with its normal surface is an endless strip of surface covering or carpet 4. This strip passes down into the body of the table over supporting rollers 5, 5, and suitable means which form no part of the present invention, and which may be of any form, may be provided to cause the covering to slide at intervals over the table top. Upon the top of the table and facing in the direction of the length thereof is a modern suction cleaner which is indicated generally by the reference character 6. At the front and at the rear of the cleaner body are attached spaced pairs of flexible straps 7, 7 which pass downwardly into the body of the table over rollers 8, 8 at spaced points upon the opposite sides of the strip of carpet 4. These straps are adapted to exert a moving force to pull the cleaner back and forth across the strip of surface covering 4, and there may be provided within the body of table 1 any suitable means capable of moving and reversing the direction of movement of the straps to accomplish the purpose stated.

At one side of the strip of carpet 4 is positioned a vibration measuring element 9 which includes an upwardly facing mirror 10 and which is pivotally supported by mounting means 11. The forward flat edge of element 9 contacts the carpet 4 between the rollers 5, 5 and closely adjacent the path of the cleaner 6, and any vertical displacement of the covering serves to pivot the element. The element is preferably spring-pressed downwardly into contact with the surface covering. As the cleaner is moved back and forth across the strip 4 by the pulling forces exerted by the straps 7, 7 the vibration imparted to the covering by the rotary agitator positioned within the cleaner nozzle will be received by the element 9. As the cleaner first moves on to the covering the vibrations received by the element 9 will be a minimum and will reach a maximum upon the cleaner agitator being positioned immediately opposite the element. The vibrations received by the element thereafter decrease to a minimum as the cleaner passes to the opposite end of the covering. The sequence is repeated as the cleaner reverses its direction of travel and again passes the vibration receiving element.

To evidence to an observer the vibration which is imparted to the surface covering by the cleaner agitator, means are provided to project a pencil beam of light onto a transparent screen. The light projecting means are indicated generally by the reference character 12 and include an electric light 13 and a suitable projecting lens 14 which restricts the light to a pencil beam

which strikes the surface of the mirror 10. The light creating means 12 are shown carried on the top of the table 1 by mounting means 15 which are attached to the table top immediately outside the enclosure formed by the glass walls 2, 2 and their frame 3. It is entirely within the scope of the invention, however, to position the entire construction within the enclosure.

Above the mirror 10 carried by the vibration responsive element 9 is positioned a second reflecting mirror 16 which is so inclined that the pencil beam of light reflected from the mirror 10 will, upon contacting its face, be deflected again to a point above the projecting lens 14. Mirror 16 is supported in its position by a standard 17 which is located closely adjacent the mounting means 11.

Immediately above the projecting lens 14 outside the enclosure upon the table is provided a reflecting mirror 18 supported by means 19 and formed of a plurality of flat faces arranged as a cylinder which is rotatable about its major axis. An electric motor 20 is suitably connected to the cylindrical mirror and is adapted to rotate it at a constant speed. The angle of inclination from the vertical of the major axis of the cylindrical mirror 18 is such that the light rays reflected from the mirror 16 upon contacting its surface will be again deflected to a position near the top of the opposite side of the enclosure. At that point a transparent screen 21 is provided which is visible from either side of the table as is an image reflected upon it by the mirror 18.

In the operation of the device constructed in accordance with the present invention, the suction cleaner 6 is moved back and forth across the carpet strip 4 by pulling forces exerted through the pairs of straps 7, 7. The carpet strip 4 is moved at intervals to prevent undue wear by the movement of the wheels which support the cleaner. As the cleaner with its agitator passes over the covering the vibration imparted to the covering is measured by the vibration receiving element 9. As the cleaner first reaches the covering the vibrations received by the element will be a minimum, the distance from the cleaner to the element being a maximum. The vibrations registered by the element 9 increase from that minimum to a maximum upon the cleaner agitating element being positioned immediately opposite the element 9, as indicated in dotted lines in Figure 1.

The pencil of light thrown from the light-creating means 12 through the projector 14 upon the vibrating mirror 10 is reflected from it to the mirror 16. The beam of light is reflected at any instance in a line between the limits indicated by the dotted lines in Figure 2. Were the element 9, and so the mirror 10, to remain stationary, the reflection of the light beam upon the mirror 16 would be substantially circular in cross-section. Upon the element 9 being vibrated, the light reflection upon the mirror 16 tends to assume a vertical line, the extent of which is dependent upon the amplitude of the vibrations registered by the element. With the cleaner positioned immediately adjacent the element 9, as shown in dotted lines in Figure 1, the vibrational displacement of the covering will be a maximum and the ray of light will vary between the dotted line limits indicated in Figure 2. From mirror 16 the light ray, whether a stationary circle or a line of light, is reflected to the rotating mirror 18. As this mirror rotates each of its flat faces comes into contact with the light beam and during the time period which the beam contacts it reflects that beam from one side of reflecting screen 21 to the opposite side thereof. As a matter of fact, of course, the image which is thrown upon the screen 21 is not a constant image but is the result of a high frequency reflection of a multiplicity of images at a frequency higher than 16 per second so that a continuous image is recorded by the human eye. The rotation of the flat sides of the mirror 18 serves to break down the image created upon the mirror 16 by the movement of the light ray thereon and records it as a wave formation upon the screen 21. With the element 9 standing still the image upon screen 21 will be a flat line. As the cleaner reaches the edge of covering and the vibration recorded by the element 9 is a minimum the wave recorded upon the screen will be of low amplitude and as the cleaner approaches the element 9 the amplitude of the wave will increase to a maximum as shown upon the screen in Figure 1. The frequency of the waves upon the screen can be varied by altering the relationship between the rotational speed of the rotating mirror 18 and of the vibrating element of the suction cleaner.

I claim:

1. In a display device, an advertising suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering also visible from said position, means to exert a force to pull said cleaner back and forth across said covering, a vibration responsive element positioned on said covering to respond to the covering vibration at its point of contact therewith, a mirror carried by said element and movable therewith, means to throw a pencil beam of light on said mirror, a second mirror positioned to receive directly the light beam reflected from said vibrated mirror, a rotating mirror including a plurality of flat faces arranged to receive the light beam reflected from said second mirror, and a transparent screen to receive the image thrown from said rotating mirror and visible from said position.

2. In an advertising display device, a suction cleaner including vibrating means and visible from a predetermined position, a surface covering undergoing vibration visible from said position, means to reciprocate said cleaner on said covering, and means to indicate by a wave of light the vibration imparted to a part of said covering passed by said cleaner, said means including means to create a beam of light, means to vibratingly deflect said beam in synchronism with the vibrations of said covering, and means to transform said deflected beam into a wave formation having an amplitude dependent upon the amplitude of covering vibration and means visible from said position to receive light from said last mentioned means.

3. In an advertising display device, a visible suction cleaner, a surface covering adapted to receive surface vibrations and visible from a predetermined position, automatic means to move said cleaner over said covering in a predetermined manner, and means to evidence the vibration of said covering which means are also visible from said predetermined position.

4. In an advertising display device, a suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering adapted to be vibrated by said cleaner and also visible from said position, means controlled by said covering and adapted to be vibrated with an amplitude determined by the vibra-

tion of said covering, means to evidence the vibration of said last mentioned means visible from said position, and means to move said cleaner over said covering past said means adapted to be vibrated.

5. In an advertising display device, a suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering adapted to be vibrated by said cleaner and also visible from said position, means controlled by said covering and adapted to be vibrated with an amplitude determined by the vibration of said covering, and means to evidence visually the vibration of said last mentioned means including a vibrating mirror the amplitude of vibration of which is determined by the covering controlled means, means to throw a beam of light on said mirror, means to receive the beam reflected from said mirror and break it down into a wave the amplitude of which depends upon the extent of vibration of said mirror, and a screen visible from said position to receive said light wave.

6. In an advertising display device, a suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering adapted to be vibrated and visible from said position, means to move said cleaner over said covering, an element adapted to be vibrated by the vibration of a part of said covering and including a mirror, means to project a pencil beam of light on said mirror, a rotatable multi-flat-face mirror arranged to receive light rays reflected from said mirror, means to move the flat faces of said rotatable mirror past said reflected light rays at a constant speed, and a screen visible from said predetermined position to receive the image thrown by said rotatable mirror.

DONALD G. SMELLIE.

CERTIFICATE OF CORRECTION.

Patent No. 2,095,456. October 12, 1937.

DONALD G. SMELLIE.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 27, claim 1, strike out the words "In a display device, an advertising", and insert instead In an advertising display device, a; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of February, A. D. 1938.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

tion of said covering, means to evidence the vibration of said last mentioned means visible from said position, and means to move said cleaner over said covering past said means adapted to be vibrated.

5. In an advertising display device, a suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering adapted to be vibrated by said cleaner and also visible from said position, means controlled by said covering and adapted to be vibrated with an amplitude determined by the vibration of said covering, and means to evidence visually the vibration of said last mentioned means including a vibrating mirror the amplitude of vibration of which is determined by the covering controlled means, means to throw a beam of light on said mirror, means to receive the beam reflected from said mirror and break it down into a wave the amplitude of which depends upon the extent of vibration of said mirror, and a screen visible from said position to receive said light wave.

6. In an advertising display device, a suction cleaner including surface vibrating means and visible from a predetermined position, a surface covering adapted to be vibrated and visible from said position, means to move said cleaner over said covering, an element adapted to be vibrated by the vibration of a part of said covering and including a mirror, means to project a pencil beam of light on said mirror, a rotatable multi-flat-face mirror arranged to receive light rays reflected from said mirror, means to move the flat faces of said rotatable mirror past said reflected light rays at a constant speed, and a screen visible from said predetermined position to receive the image thrown by said rotatable mirror.

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