# United States Patent

**Francis**

[15] **3,700,068**

[45] **Oct. 24, 1972**


[54] **NOISE REDUCTION CANOPY DEVICE FOR MACHINERY**


[72] Inventor: **Theodore R. Francis,** 855 Richard Street, Aurora, Ill. 60507



[22] Filed: **Jan. 5, 1972**

[21] Appl. No.: **215,510**

[52] **U.S. Cl.** ..... **181/33 K**

[51] **Int. Cl.** ..... **F02f 7/00,** F01n 1/10

[58] **Field of Search** ..... 181/30, 33 G, 33 K, 33 R



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,962,441 | 6/1934 | Haddock | 181/33 K |
| 3,087,578 | 4/1963 | Reed et al. | 181/33 K |
| 3,395,774 | 8/1968 | Seifert | 181/33 K |
| 3,534,828 | 10/1970 | Iver et al. | 181/33 K |

FOREIGN PATENTS OR APPLICATIONS

| | | | |
|---|---|---|---|
| 1,390,359 | 1/1965 | France | 181/33 K |
| 278,196 | 9/1914 | Germany | 181/33 K |
| 448,552 | 4/1968 | Switzerland | 181/33 K |



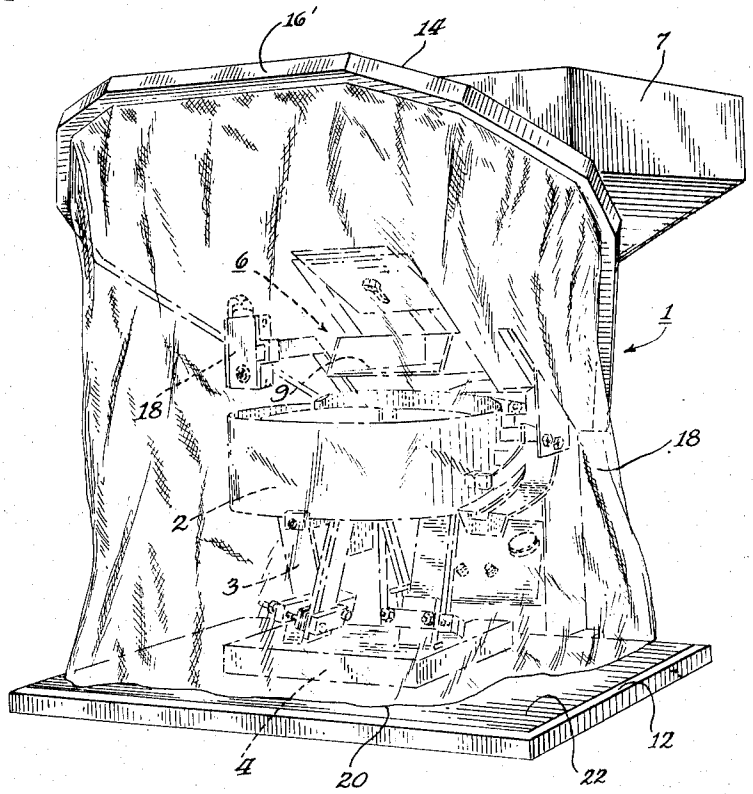
*Primary Examiner*—Robert S. Ward, Jr.
*Attorney*—George H. Gerstman

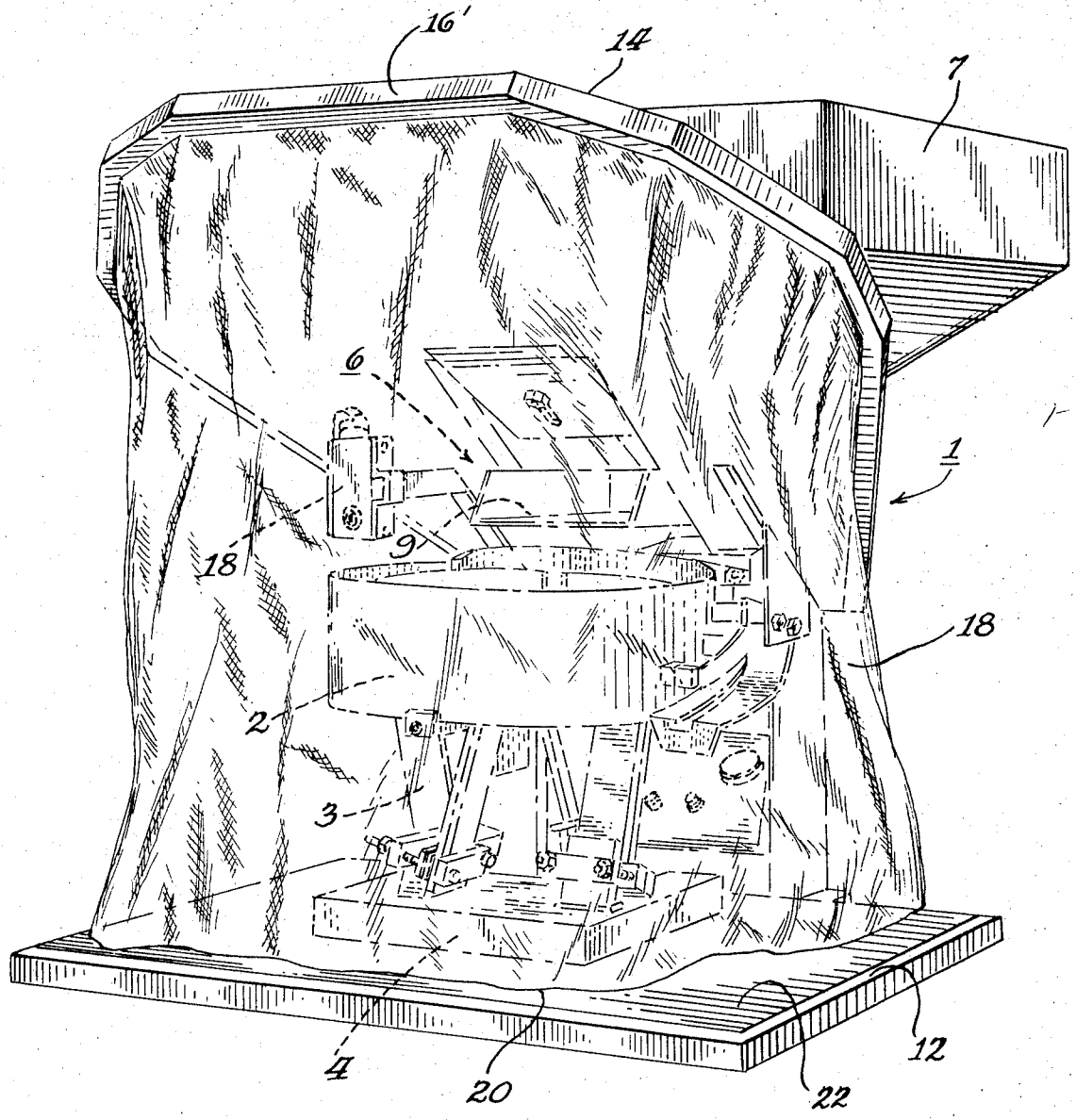


[57] **ABSTRACT**

Sound reduction apparatus for use with a machine, which apparatus includes a rigid sound-absorbing canopy overlying the noise-producing portions of the machine and a curtain formed of flexible light-transmissive, sound-restricting sheet plastic material extending downwardly from the canopy and enclosing the noise-producing portions of the machine with the bottom of the curtain in free-resting relationship upon a surface.


**5 Claims, 1 Drawing Figure**




16'
14
7
6
1
18'
9'
18
2
3
4
20
22
12

# NOISE REDUCTION CANOPY DEVICE FOR MACHINERY

## BACKGROUND OF THE INVENTION

This invention relates to improved apparatus for reducing the sound level of a machine to an operator.

The United States Department of Labor has established sound level regulations with respect to plants subject to the Walsh-Healey Public Contracts Act. It is estimated that the Walsh-Healey Public Contracts Act presently covers approximately 80,000 plants with about 27 million employees.

The Department of Labor regulations limit the sound levels for daily noise exposure, measured on the "A" scale of a standard sound level meter at slow response. For example, maximum permissible noise exposure for 4 continuous hours is 95 dBA (decibels on the "A" scale) while maximum permissible noise exposure for a continuous 8 hours is 90 dBA.

I have discovered an apparatus for reducing the sound level of machinery in operation, which apparatus is simple in construction, easy to adapt to present machinery without substantially altering the construction of the machinery and which reduces the sound level a substantial amount.

Additionally, my apparatus, when attached to the machinery, permits easy access of the operator to the machinery without requiring unfastening of various external fastening members. In actual test utilizing the illustrative embodiment of the present invention, wherein the sound level of a vibratory feeder without my sound-reducing apparatus and with my sound-reducing apparatus was measured, a substantial sound reduction was measured. With a microphone pickup positioned 3 feet from the center of the machine, at an octave band center frequency of 4,000 Hz, a 91 dB sound level without my sound-reduction apparatus was reduced to 75 dB when my sound reduction apparatus was connected to the machine. Likewise, under the same conditions but at an octave band center frequency of 8,000 Hz, a 91 dB sound level without my sound reduction apparatus was reduced to a 70dB sound level when my sound reduction apparatus was connected. On the dBA scale, the sound level under similar conditions was reduced from 96 dBA (without my apparatus) to 83.5 dBA (with my apparatus).

Accordingly, it is an object of the present invention to provide apparatus for substantially reducing the sound level of operating machinery.

A further object of the present invention is to provide sound reduction apparation which is easily and readily connectible to present machinery and is simple to use.

A still further object of the present invention is to provide sound reduction apparatus for use with operating machinery which apparatus is simple in construction and inexpensive to produce.

Other objects of the present invention will become apparent as the description proceeds.

## BRIEF DESCRIPTION OF THE INVENTION

In accordance with the present invention, there is provided sound reduction apparatus for use with a machine to reduce the sound level of the machine. The sound reduction apparatus comprises a substantially non-metallic canopy formed or rigid sound-absorbing material. The canopy is adapted to overlie the noise-producing portions of the machine.



A curtain is provided and is formed of flexible light-transmissive, sound-restricting sheet plastic material. Mans are provided for connecting the curtain to the canopy so that the curtain extends downwardly from the canopy and encloses the noise-producing portions of the machine, with the bottom of the curtain in free-resting relationship upon a surface and being capable of being lifted by the operator to obtain access to the machine.

A more detailed explanation of the invention is provided in the following description and claims, and is illustrated in the accompanying drawing, which illustrates a perspective view of sound reduction apparatus constructed in accordance with the principles of the present invention.

## DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

Referring to the drawing, sound reduction apparatus **1** is shown in use with vibratory feeding apparatus **2**. Vibratory feeding apparatus **2** is of a conventional type and includes a conventional feeder drive unit **3** mounted upon a base **4**, a steel feeder bowl **5**, and conventional storage feeder apparatus **6** including hopper **7**, volume flow switch **8**, and vibrating feeder tray **9**. It is to be understood that the particular machine with which the sound-reducing apparatus of the present invention is used is of no significance to the invention and the vibratory feeder illustrated in the drawing is but an example of an infinite number of machines with which the sound reduction apparatus is useful.

In the illustrative embodiment, sound reduction apparatus comprises a base **10** which supports base **4** and is formed of a rigid sound-absorbing material. An example of satisfactory sound-absorbing material for base **10** is Owens-Corning Fiberglas 1-inch thick 11-pound deluxe board, code number 08482631. Sound-absorbing material **10** is surrounded by a rim **12**, formed of metal, or preferably, a plastic sound-restricting material.

Sound reduction apparatus **1** also includes a canopy **14** which overlies the vibratory feeder **2** and with the exception of surrounding rim **16**, is formed of rigid sound-absorbing material similar or identical to the material forming base **10**. Connected between rim **16** and sound-absorbing material **14**, with a good seal, is a sound reduction curtain **18** formed of flexible transparent, sound-restricting sheet plastic material. An example of a suitable curtain material is 0.014 inch thick clear vinyl plastic sheet. Curtain **18** is connected to the canopy by rim **16** and suitable fastening means so that the curtain extends downwardly from the canopy **14** and encloses the noise-producing portions of vibratory feeder **2** with the bottom **20** of curtain **18** being in free-reseting relationship upon top surface **22** of base **10**.

Utilizing the construction illustrated in the drawing, wherein the sound reduction apparatus includes a canopy formed of a rigid sound-absorbing material and having a sound-restricting, flexible, transparent curtain extending downwardly and resting upon sound-absorbing base **10**, a very significant amount of sound reduction was achieved. It can be seen that the operator has the ability to view the machine in operation through the

transparent curtain, and if access to the machine is necessary, the operator merely has to lift the bottom **20** of curtain **18** to obtain such access.

Although an illustrative embodiment of the invention has been shown and described, it is to be understood that various modifications and substitutions may be made by those skilled in the art without departing from the novel spirit and scope of the present invention. For example, base **10** and canopy **14** could be formed of many different types of acoustical material, while curtain **18**, which is formed of a sound-restricting sheet plastic material, could be clearly transparent or could be translucent if desired, so long as the machine covered by the curtain was visible to the operator.

What is claimed is:

**1**. Sound reduction apparatus for use with a machine to reduce the sound level of the machine to the operator, which comprises: a substantially non-metallic canopy formed of rigid sound-absorbing material, said canopy being adapted to overlie the noise-producing portions of the machine; a curtain formed of flexible light-transmissive, sound-restricting sheet plastic material; means connecting said curtain to said canopy so that said curtain extends downwardly from said canopy and encloses the noise-producing portions of the machine, with the bottom of the curtain in substantially free-resting relationship upon a surface and being capable of being lifted by the operator to obtain access to the machine.

**2**. Sound reduction apparatus as described in claim **1**, wherein said surface comprises a base formed of rigid sound-restrictive material supporting the noise-producing portions of the machine.

**3**. Sound reduction apparatus as described in claim **1**, wherein said sheet plastic material is a vinyl plastic.

**4**. Sound reduction apparatus as described in claim **1**, wherein said connecting means is operative to form a seal between said canopy and said sheet material.

**5**. Sound reduction apparatus for use with a machine to reduce the sound level of the machine to the operator, which comprises: a substantially non-metallic canopy formed of rigid sound-absorbing material, said canopy being adapted to overlie the noise-producing portions of the machine; a curtain formed of flexible light-transmissive, sound restricting sheet plastic material; means connecting said curtain to said canopy so that said curtain extends downwardly from said canopy and encloses the noise-producing portions of the machine; and a substantially non-metallic base underlying said curtain and supporting the noise-producing portions of the machine, said base being formed of rigid sound-absorbing material.

* * * * *