

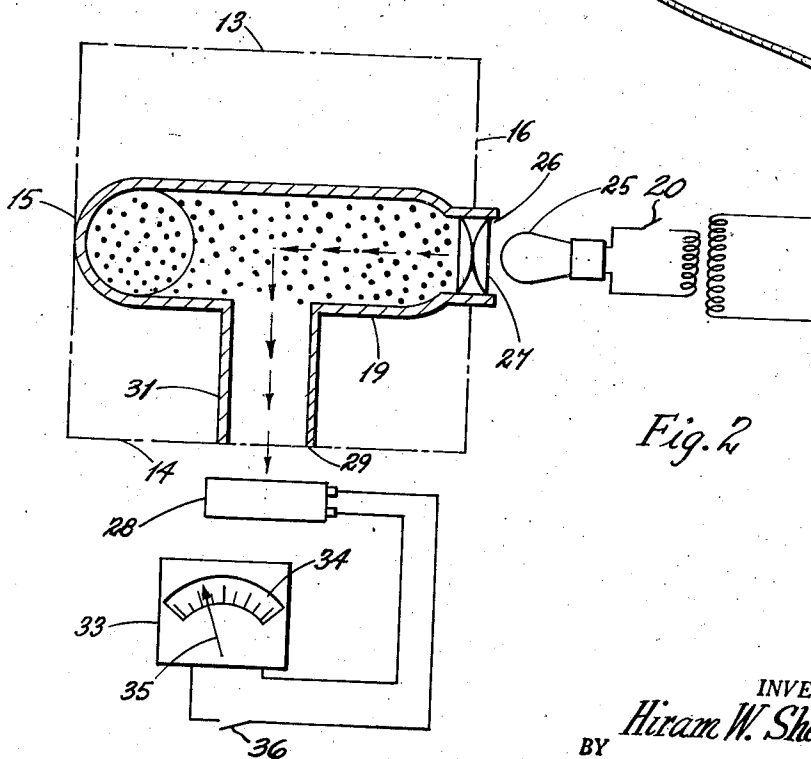
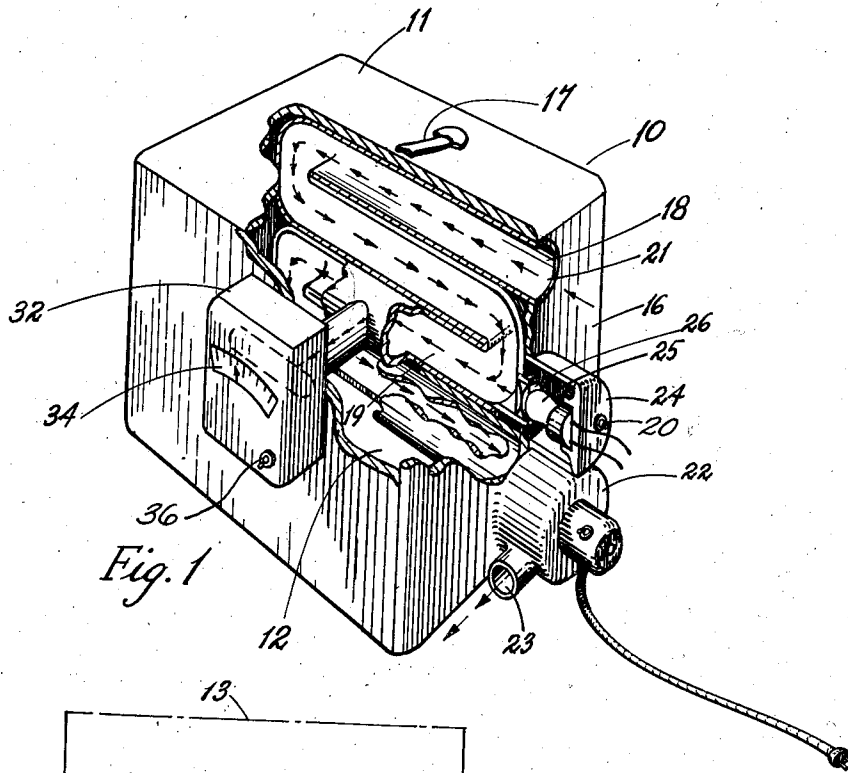
Aug. 27, 1946.

H. W. SHERIDAN

DUST GAUGE

Filed June 19, 1943

2,406,409



INVENTOR.
Hiram W. Sheridan
BY
Manny Brown & Co
Attys

UNITED STATES PATENT OFFICE

2,406,409

DUST GAUGE

Hiram W. Sheridan, Oak Park, Ill.

Application June 19, 1943, Serial No. 491,482

3 Claims. (Cl. 88-14)

1

This invention relates to dust testing devices, and the like.

One of the objects of the invention is the provision of new and improved mechanism for determining the relative amount of dust particles, or other foreign matter, floating in the atmosphere.

A further object of the invention is the provision of new and improved mechanism for continuously indicating the presence of dust particles, or other foreign matter, in still air or air flowing through a predetermined passage, however the current may have been induced.

A further object of the invention is the provision of a new and improved apparatus for indicating the relative amount of foreign particles floating in an atmosphere of gas of any type whatever in which such information is desired.

Other and further objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawing in which

Fig. 1 is a perspective view of the apparatus, with parts broken away, showing the invention more or less diagrammatically; and

Fig. 2 is a diagrammatic illustration of the invention.

In numerous industries a great amount of dust is generated incident to the manufacture of certain products, and in the manufacture of certain material this dust is impalpably fine and of such a nature that a certain percentage in the air renders the mixture more or less explosive, and great damage has been done by the explosions of such mixtures.

In certain other industries the dust created or generated incident to the manufacturing operation is seriously injurious to the health of the operators of the various machines in the plant. In certain other industries the amount of dust in the air is a material consideration in all installations for filtering the air.

In still other industries the nature of the products necessitates the use of air that does not contain a percentage of foreign matter above a predetermined minimum.

In any of these industries, as well as in many others, such as air conditioning for dwellings, offices, and the like, it is desirable to determine the percentage of dust, or other foreign particles, in the air within the plant and introduced in the buildings, in order to properly regulate the air cleaning and filtering apparatuses employed. The conventional apparatus usually employed for this purpose is complicated and more or less expensive.

2

The present invention seeks to overcome these objectionable features by the provision of a simple device that is inexpensive to produce and that is portable, and in which tests may be made by almost any one, even though he be inexperienced, at little time and expense.

Referring now to the drawing, the reference character 10 designates a box or cabinet which comprises a top wall 11, a bottom wall 12, side walls 13, 14, and end walls 15, 16. The cabinet may be provided with a handle 17 on its upper wall for carrying the device. A sinuous passage 18, having at least one straight portion 19, is mounted within the cabinet 10. This passage may be provided in any suitable manner, but is preferably of uniform cross-section throughout its length. The upper end 21 extends to the surface of the end wall 16, and is preferably flush therewith. The lower end of the passage 18 also extends through the end wall 16, and a blower or exhaust fan 22 is mounted over the lower end of this passage, so that when the fan is in operation air will enter the end 21 and pass through the passage 18 into the fan 22 and be discharged from the fan at 23.

The passage 18 is of uniform cross-sectional area so that the air passing through the same will have a uniform velocity, so that the dust particles or particles of foreign matter in the air, entering the passage 18, will be carried into the fan and discharged therethrough.

Mounted on the end wall 16 of the chamber is a casing 24 in which is mounted a source of light, as the lamp bulb 25, for illuminating the straight portion 19 of the passage 18, the lamp being controlled by a switch 20. The axis of the bulb 25 is in alignment with the axis of the straight portion 19 of the passage, and is also opposite an opening 26 in said end wall. Mounted in the opening is a pair of planoconvex lenses 27 for collimating the rays of light passing therethrough from the bulb 25.

The sinuous passage 18 may be of any suitable material, such as Bakelite or a composition of cellulose acetate, or other artificial resin composition; or it may be of metal, if desired. The inner surface of the passage is solid black so as to absorb any light rays entering through the opening 21. The object in making the passage sinuous is to insure that no light rays shall enter the portion 19 of the passage. The number of sinuositites is immaterial so long as means are provided for preventing any external rays from entering the straight portion 19.

Suitable means are provided for measuring the intensity of the light rays from the bulb 25 that

3

are reflected from dust particles in the air passing along the straight portion 19 of the passage 18. An electric eye or photo-electric cell 28 is employed for this purpose. In the form of construction shown, the side 14 of the cabinet 10 is provided with an opening 29, and a tubular member 31 is secured therein and extends through the adjacent wall of the straight portion 19 of the passage 18, as shown more clearly in Fig. 2 of the drawing. The inner end of the tubular member 31 is either integral with or attached to the wall of said straight portion 19, but does not extend into the interior of said portion. However, the photo-electric cell 28 is supported contiguous to the opening 29, and is enclosed by a casing 32 secured to the side wall portion 14 of the cabinet 10. Mounted in the casing, also, is an indicator mechanism 33, having a scale 34 and an indicator hand 35. The indicator circuit includes a suitable switch 36.

In the operation of the device the electric leads are connected to a suitable source of electricity, the two switches 29 and 36 are closed, and after the device has run a sufficient length of time to insure that the stream of air flowing through the passage 18 is a correct sample of the air in the room or building where the tests are being made, the reading of the scale 34 is taken.

During this operation the light rays will be directed through the air flowing along the straight portion 19 of the passage 18, and certain of these rays will be reflected by particles of dust over to the photo-electric cell 28, thus energizing the cell. The resulting current generated in the cell will operate the indicator mechanism for moving the hand 35 for indicating on the scale 34 the relative amount of dust or foreign particles in the air.

Since the details of construction of the source of light 25, and the details of construction of the photo-electric cell 28, constitute no part of the present invention, it is deemed unnecessary to show and describe the same.

It is thought from the foregoing, taken in connection with the accompanying drawing, that the operation and construction of my device will be apparent to those skilled in the art, and that changes in size, shape, proportion and details may be made without departing from the scope and spirit of the appended claims.

I claim as my invention:

1. In a device for indicating the relative amounts of foreign particles floating in the air, a comparatively small portable cabinet having a continuous air passage therein, said cabinet having inlet and outlet openings at the ends of the passage, said passage being sinuous for forming a dark intermediate portion, a source of light for directing light rays along said dark interme-

4

mediate portion for illuminating the same, a fan carried by said cabinet, said fan spanning said passage for causing air containing foreign particles to pass along said sinuous passage from one end to the other, a light meter carried by said cabinet at one side of said intermediate portion, a light passage extending outwardly from said intermediate portion for conducting light reflected from said particles onto said meter for measuring the intensity of the light reflected from said particles for indicating the relative amount of said particles in the air passing along the dark intermediate portion of said passage.

2. A device for ascertaining the amount of dust in the atmosphere of a room comprising a cabinet of portable size having an inlet port and an outlet port, and air passage of substantially uniform cross-sectional area in the cabinet interconnecting said two ports, said passage changing in direction so that a portion thereof is shielded from light exterior of the cabinet, a power driven fan carried by said cabinet for causing air to flow at a uniform rate through said passage thereby to continuously sample the air of the room without changing the dust content of the room, means including a lamp carried by the cabinet for projecting a beam of light into said passage portion, a light meter means carried by said cabinet to one side of said beam to measure light reflected therefrom by dust particles in the passage, and circuit means for energizing said fan from a building circuit.

3. A device for sampling the atmosphere surrounding the device to ascertain the relative amount of dust particles in the air, comprising a cabinet of small portable size, a passage within said cabinet of substantially uniform cross-sectional area interconnecting an intake port and an exhaust port on the exterior of the cabinet, said passage changing in direction so that a portion thereof is shielded from the light at said two ports, a small fan carried by said cabinet for causing air to flow along said passage at a constant velocity, a source of light carried by the cabinet for illuminating said dark portion of the passage, a light-sensitive device spaced substantially from said passage portion, an auxiliary light passage branching laterally from said dark portion of the passage out of the plane of the change in direction of the air flow entering said dark portion, said auxiliary light passage serving to conduct light reflected by said particles to said light-sensitive device for determining the relative values of the reflected light rays for indicating the relative amount of dust particles floating in the air, said auxiliary passage being open at its juncture with said dark passage portion.

HIRAM W. SHERIDAN.