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Davis et al.

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[54] ELECTRICAL FILTERED AIR HEATER

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[51] **Int. Cl.**.....**H05b 3/00,** F24h 3/06, F28f 19/00

[58] **Field of Search** 219/280–283; 219/296–299, 302–305, 308, 359, 360, 373, 379, 380, 328; 239/133, 134, 135, 136; 128/254–258; 165/119

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[57] **ABSTRACT**

An electrical heater to produce clean and dry compressed air comprising a housing in which an electrical heating means is centrally mounted and is surrounded by a coiled tubing to which compressed air is admitted at one end and exited therefrom at the other end, thence passed through a filter and led therefrom to a point of use. The filter serves to remove moisture from the compressed air and has replaceable elements which can easily be changed. A temperature responsive sensing element is provided adjacent the coiled tubing to control the degree of energization of the heating unit and thus the temperature of the compressed air.

1 Claim, 2 Drawing Figures

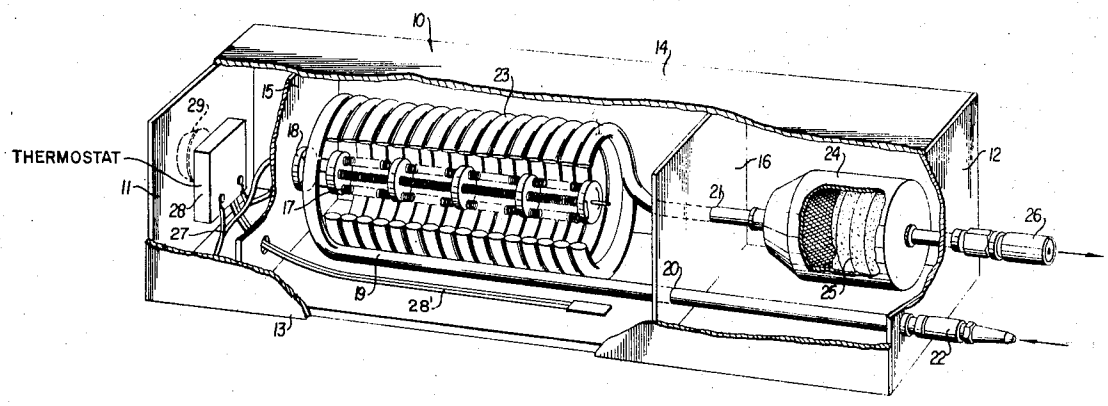


FIG. 1

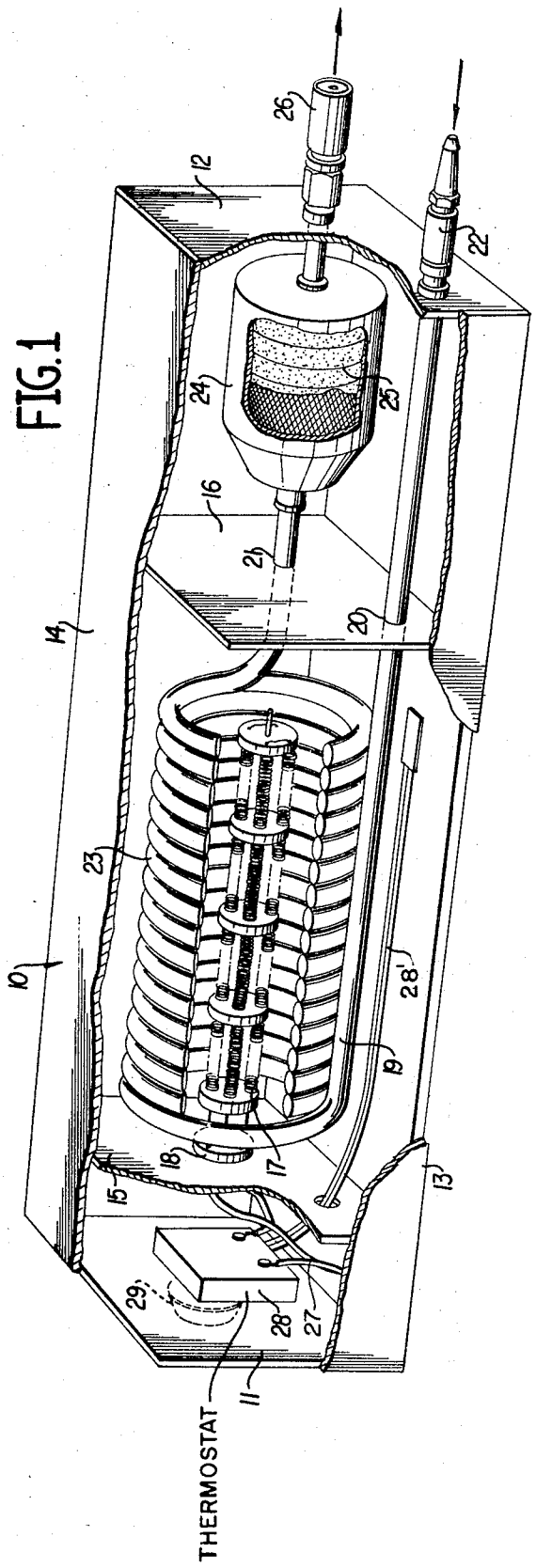
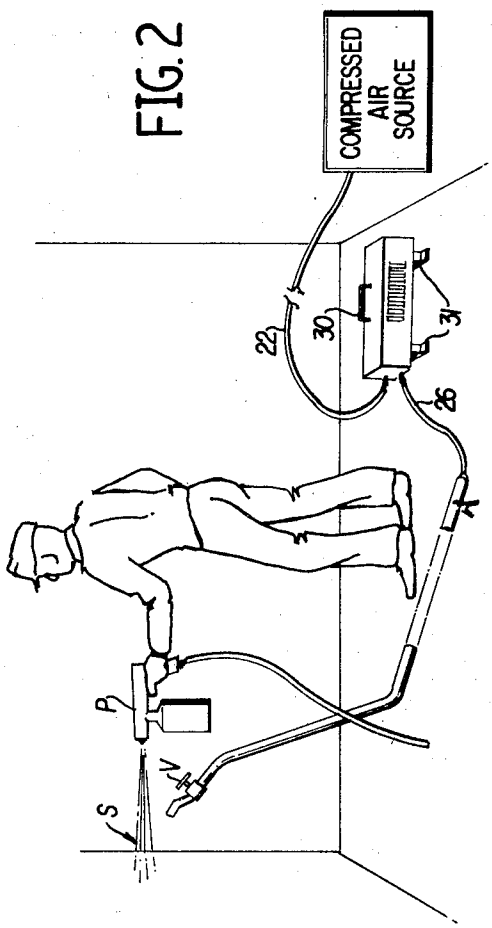


FIG. 2



ELECTRICAL FILTERED AIR HEATER

The present invention relates to improvements in compressed air heaters concerned more particularly with a self-contained electric heating means to which compressed air is admitted and exited therefrom to a delivery point of use.

Heretofore, electric heaters have been generally known but are not suitable in certain specific instances wherein the delivered heated compressed air still contains a deleterious amount of moisture and of impurities.

In its specific aspects, the invention provides a box-shaped container or housing with internal bulkheads or walls so that an electrical unit may be carried thereby and a coiled pipe may surround the heating unit so that compressed air may be admitted at one end of the coil and allowed to exit at the opposite end. Due to the specific nature of the work with which the heated air is to be associated, a filter is secured to the exhaust end of the coil, within the housing or container, before the heated compressed air is led to its point of use. The filter serves to remove moisture from the compressed air by means of easily replaceable filter elements. Ancillary control elements for the heater are also located within the container. One of the control elements being a temperature responsive sensing means located within the housing for controlling the degree of energization of the heating unit and thus the temperature of the compressed air leaving the heater.

The main object of the invention is the provision of an electric heater which will produce hot, clean and dry compressed air to a point of use.

Another object is the provision of a unitary container or housing in which the necessary parts of the invention may be carried as well as necessary controls of the device. Still another object is to render the container portable so that it is readily transported to the point of use.

Other objects and advantages will be apparent from the following detailed description taken in conjunction with the accompanying drawings wherein a preferred embodiment of the principles of the invention has been selected for exemplification.

IN THE DRAWINGS:

FIG. 1 is a schematic perspective view of the invention with parts broken away, and

FIG. 2 is an illustration of the manner in which the invention may be coordinated with a particular use or purpose.

The container **10** is shown in the shape of a box with end walls **11** and **12** and with bottom and top walls **13** and **14**, respectively. It will be understood that the end walls **11** and **12** may be formed of two parts so that either top or bottom of the housing may be removed for access to the inside of the housing. Similarly, any shape of the container other than box shape may be selected if preferred or desirable.

Internal spaced-apart partitions or bulkheads **15** and **16** are provided within the housing for purposes which will appear later.

An electric heating unit designated in its entirety by numeral **17** extends centrally and longitudinally of the housing **10** being secured at **18** at one of its ends to partition or bulkhead **15.** If desired, the opposite end of the heating unit **17** may be secured to partition or bulkhead **16** when rigidity is of the essence. It will be understood that partitions **15** and **16** are removably secured

to the internal surfaces of the container for quick access and/or removal of the contents of the housing.

A copper tubing **19** is coiled around and in close proximity to the heating unit **17** and is suitably braced to the inside walls of the housing if desired as well as by partition **16** which it enters at **20** and leaves at **21.**

The inlet **22** of the pipe **19** is connected to a source of compressed air and leads it to the coiled portion **23** of the pipe where it becomes heated when the heating unit **17** is energized. The exit end of the pipe is connected to a casing **24** containing a series of filter elements **25** which may be replaced as they become clogged or inoperable. It is emphasized that the function of the filter elements is quite important and that their cooperation with the heater described contributes materially to the success of the instant invention. The compressed air issuing from the heated coil **23** still contains moisture and impurities which constitute a drawback in the use of the device in certain circumstances.

From the filter casing **24** the heated dry and clean air is led to a point of use through outlet pipe **26.** The point of use may be a wall surface where its outlet is brought in adjacency to a paint sprayer P, for instance, used to spray the wall surface, as indicated in FIG. **2.** Any other element to be paint sprayed may, of course, consist of any element such as furniture, automobiles, construction materials, or the like. The result sought by means of the device is the cooperative combination of the sprayer and the outlet of the compressed air. By empirical tests, it may be found that the heated compressed dry air may issue directly into the sprayer jet or against the surface beng sprayed or judiciousy located in reference to the paint sprayer as to cause beneficial results in the painting job.

It has been found that when the heater is used without filtering, moisture was causing rough paint jobs or small holes, this result being superinduced by the presence of impurities in the heated air. This condition is particularly vexacious when the ambient air is highly humid or during rainy seasons. The usefulness of the present invention has been constantly demonstrated.

Electric current is fed through a cable **27** leading to a box **28** containing a thermostatic switch suitably secured to the partition **11,** internally of the housing **10** and including a temperature sensing means **28'** extending into the space between partitions **15, 16.** A temperature switch selector **29** is also provided for the purpose of controlling and adjusting the temperature of the compresed air in the coil **23.** The flow of compressed air in the outlet pipe **26** may be allowed or cut off by means of a valve V in proximity to the job.

In order to render the casing **10** portable it is provided with a handle **30** on the top of the housing. Leg or runners **31** are mounted at the bottom side of the housing so that it may suitably rest while the device is in use.

While the invention has been disclosed for use with a paint sprayer, it will be understood that it can also be used for other purposes where dry clean heated compressed air is needed or desirable. For instance, the instant device can be used in the office of a dentist where the air would be blown in the mouth of the patient. It could also be favorably used in a laboratory in insuring heated dry clean air for use against the delicate instruments used in laboratory work. It might further be used in enclosures, cabinets or receptacles wherein heated dry and clean air would maintain a desirable antiseptic

condition. Many other uses of the invention will obviously come to mind in many other conditions. The above-cited uses, therefore, are not limitative of the use of the invention but are set forth for mere purpose of illustration.

The fact that all the elements of the invention are contained in a unitary casing, away from weather conditions, readily portable and immobilized when in use, are considered to be valuable features of the instant device. In addition, it is pointed out that a varied control is provided making it possible to control the temperature of the air in the coil from a mere warming up to a temperature of 500° by merely setting the temperature control **29** at the desired range needed.

It will be noted that the switch control system, the heating unit and the filter are mounted internally of the housing and are rigidly carried by the end walls of the housing and/or by the transverse partitions within the housing as well as by the inherent rigidity of the coil.

It is to be understood that the present invention is not confined to the particular construction herein illustrated and described but embraces all such modifications thereof as may come within the scope of the following claims.

What is claimed is:

1. A heater adapted to provide dry, clean and heated air to a point of use comprising:

a. a housing having end walls and transverse, spaced-apart partitions between said end walls,

b. an electric heating unit located centrally and longitudinally of said housing and at least one end of said heating unit being mounted on one of said spaced-apart partitions,

c. a metallic coiled tubing spaced from and surrounding said heating unit, said coiled tubing having ends which extend through the other of said spaced-apart partitions to maintain said coiled tubing in spaced relationship with said heating unit, one end of said coiled tubing extending through the end wall of the housing,

d. supply means for admitting compressed air to said one end of said coiled tubing,

e. a filter casing positioned within said housing having replaceable filter elements, said filter casing being connected at one end to the other end of said coiled tubing, the other end of said filter casing being connected to exhaust means extending through said end wall to thereby support said filter casing between said other spaced-apart partition and said end wall, said exhaust means carrying the dry, cleaned and heated compressed air to the point of use, and

f. electrical control means mounted between said other end wall and said one of said spaced-apart partitions for controlling the degree of energization of said heating unit in response to the temperature inside said housing, said control including temperature responsive sensing means extending into the space between said partitions.

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