Feb. 11, 1958 C. S. GREER, JR 2,823,016

BASEBOARD HEATER

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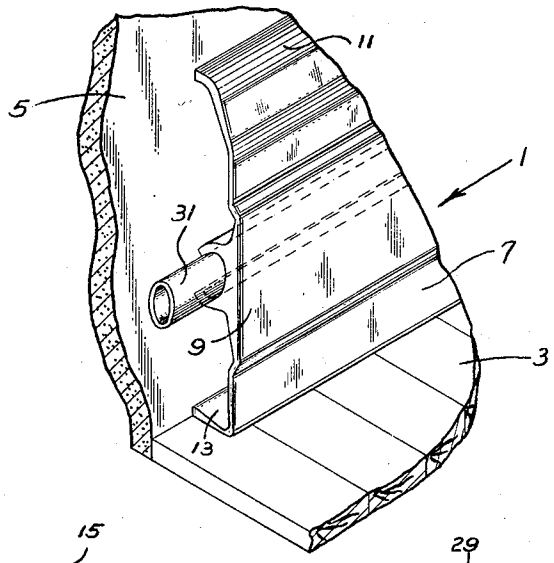


FIG. 1

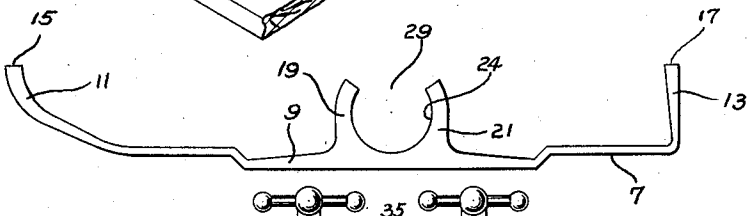


FIG. 2

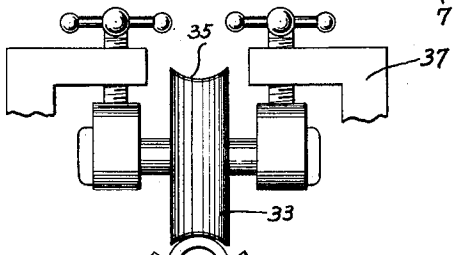
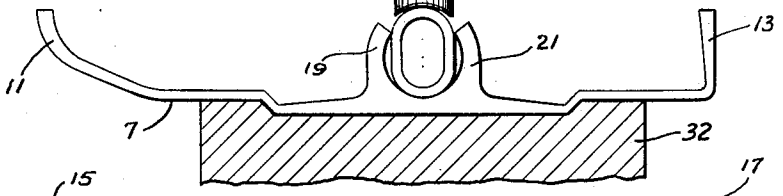


FIG. 3



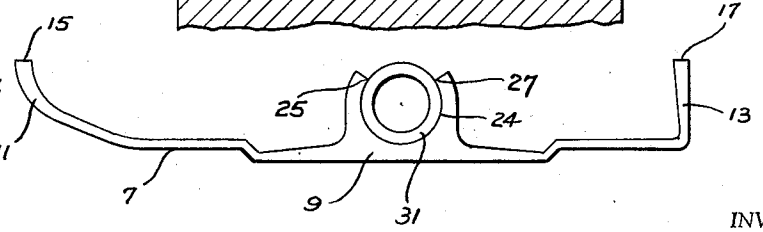


FIG. 4

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BASEBOARD HEATER

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2 Claims. (Cl. 257—133)

My invention relates to heating means for the interiors of buildings, and more particularly to baseboard heating constructions or baseboard radiators.

Heretofore, the art has endeavored to provide baseboard radiator structures which would be inexpensive and easy to manufacture and install, and would at the same time utilize and distribute the heat supplied thereto with a maximum efficiency. It has been known for quite some time to mount heating pipes such as steam pipes or the like along a wall adjacent the floor, and then to hide these pipes behind a baseboard construction. However, this type of installation had the great disadvantage that it was extremely difficult to install, since the pipes had to be fitted and mounted individually in a very confined space, with the mounting brackets and other supports for the pipes cramped together in order to permit addition of the baseboard over the assembly. Needless to say, such an installation was quite expensive. Moreover, it was found that the heating tubes were to some extent insulated by the baseboard, since they were effectively spaced from the baseboard by a gap of dead air. Accordingly, the heat exchange characteristics of this type of installation were exceedingly poor.

In an attempt to overcome the undesirable heat exchange characteristics of these earlier types of baseboard radiators, it was proposed to form a hollow baseboard structure in which heating fluid such as hot air or hot water could be circulated through all portions of the interior. However, it was found that this type of hollow baseboard was even more expensive to construct, since it must needs be formed in separate sections, carefully fitted together, and then welded or brazed to form a fluid-tight conduit. Moreover, it was found that the heat exchange characteristics of this type of hollow baseboard were scarcely improved over the earlier heat exchange characteristics, since the peculiar vertically-flattened shape of the fluid conduit prevented proper circulation of the heating fluid therein and greatly reduced the efficiency of the unit.

Although many attempts were made to overcome the foregoing difficulties and other disadvantages, none, as far as I am aware, was entirely successful when carried into practice commercially on an industrial scale.

Accordingly, it is an object of the present invention to provide a baseboard radiator having greatly improved heat exchange characteristics.

Another object of the invention is to provide a baseboard radiator which can be quickly and easily assembled in simple, preformed sections.

The invention also contemplates providing a baseboard radiator which can be manufactured easily and inexpensively.

It is a further object of the invention to provide a baseboard radiator which will be rugged and durable in use.

The invention further contemplates providing a method for inserting tubes into troughs in such a way that they will be firmly held therein.

It is another object of the invention to provide a method for assembling a circular tube in a confining trough.

Finally, it is an object of this invention to provide a method of making baseboard radiators of simple construction and improved heat exchange characteristics.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a section of installed baseboard heating construction according to my invention.

Figure 2 depicts an end view of the member forming the major portion of my novel baseboard radiator.

Figure 3 depicts an end view of a section of baseboard radiator in process of manufacture according to one embodiment of the method for making the same; and

Figure 4 illustrates an end view of the completed section of baseboard radiator.

Turning now to the drawings in greater detail, I have shown in Figure 1 a baseboard radiator indicated generally at **1**, mounted at the intersection of a floor **3** and base of a wall **5**, by means of any convenient fastening devices such as screws or the like (not shown), and illustrating the installed position and relationship of parts of my novel baseboard radiator in use.

From Figures 2 and 4, it will be seen that my baseboard construction comprises primarily a generally channel-shaped member **7** which may preferably be formed from aluminum or aluminum-base alloys. Member **7** has a centrally disposed, generally planar web portion **9** and a first pair of flanges **11** and **13** disposed at either side of web portion **9** and integral with the lateral edges thereof. It will be noticed that flange **11** curves gradually away from web portion **9**; while flange **13** meets the web portion at about right angles, so as to provide for flat engagement of the heater unit with the floor. It will also be noted that the thickness of the first pair of flanges increases outwardly toward the terminal edges **15** and **17** thereof. Terminal edges **15** and **17** themselves will be seen to lie parallel to web portion **9** and to each other, and to define a plane which in turn is generally parallel to web portion **9**.

Inwardly of its lateral edges, and on the same side as the first pair of flanges, web portion **9** is provided with a second pair of flanges **19** and **21**, which are integral therewith and extend longitudinally thereof as does the first pair of flanges. However, the second pair of flanges does not extend as far as the plane of the first pair of flanges.

Flanges **19** and **21** define between themselves a circular trough **24**. To this end, the interior surfaces of flanges **19** and **21** are provided with a smooth curve of constant radius of curvature from inner terminal edge **25** of flange **19** all the way around to inner terminal edge **27** of flange **21**. Inner terminal edges **25** and **27** define between themselves a mouth **29** of trough **24**; and it will be seen that mouth **29** is of a width less than the greatest width of trough **24**, so that a tube which otherwise would nest nicely in trough **24** could neither be inserted between nor removed past inner terminal edges **25** and **27**.

Nevertheless, my novel baseboard heater includes just such a tube **31**, of circular cross-section as installed in the baseboard assembly and of an outside diameter the same as the greatest width of trough **24**, so that tube **31** is intimately held in trough **24** against displacement.

One method of forming my novel baseboard radiator is as follows:

Channel-shaped member **7** may be produced by extruding a slug or billet of aluminum or aluminum-base alloy or other readily extrudable material to the shape shown endwise in Figure 2. A tube of elliptical cross section is then placed in the trough **24** formed in the

extruded shape, in the manner shown in Figure 3. It will be noted that this elliptical tube has a minor elliptical axis, that is to say, a minor axis of the ellipse comprising the outside contour of the tube as seen in cross-section, which is shorter than the width of mouth **29**. In this manner, the elliptical tube can be inserted into the trough in the position shown in Figure 3. It will also be noted that the major elliptical axis of the tube, that is to say, the major axis of the ellipse comprising the outside contour of the tube as seen in cross-section, is disposed upright in Figure 3, and thus is centered between inner terminal edges **25** and **27**. In this position of insertion, the least width of the elliptical tube is presented for entry between edges **25** and **27**.

In Figure 3, I have shown one method of deforming the elliptical tube to the circular tube **31** shown in Figure 4. As there shown, channel-shaped member **7** has been placed on a base **32** of complementary contour to support member **7** evenly substantially throughout its length. The elliptical tube has been inserted as described above; and superposed roller **33** has been brought into contact with that portion of the tube which projects from mouth **29**. It will be noted that roller **33** has a concaved peripheral contact surface **35**, of which the radius of curvature is the same as the radius of curvature of trough **24**. The roller is mounted in adjustable mounting **37** whereby it may be pressed into contact with tube **31** and vertically adjusted by means of hand cranks or the like. Alternatively, roller **33** could be provided with handles and manipulated in the same manner as a rolling pin.

In order to conform the elliptical tube to circular cross-section, roller **33** is run along the upper edge of the elliptical tube until the downward pressure has plastically deformed the tube within the trough. To this end, the curvature of contact surface **35** assures that a circular contour will be imparted to the tube outside the trough as well as within the trough. It will also be noted that roller **33** is no wider than mouth **29**, so as not to strike flanges **19** and **21** in its lowermost position.

An alternative method of deforming tube **31** to circular shape is by the application of fluid pressure internally thereof. To this end, one end of tube **31** may be closed with a fluid-tight seal and fluid pressure, as air pressure or hydraulic pressure, may be applied to the interior of the tube through the other end thereof by any conventional air or hydraulic pump (not shown). The tube will then fill out so as to have the maximum volume with the least surface; and will thus assume circular cross-section and will be conformed nicely to circular trough **24**.

To the end that tube **31** may readily be plastically deformed, the tube may be formed of aluminum or aluminum-base alloy, or copper, or the brasses or bronzes of good ductility. These materials also possess the advantage of good heat conductivity. A tube of plastic may also be used, and may be inserted by heating it to within its plastic range, expanding it as by fluid pressure within the trough, and then permitting it to cool. However, plastic tubes are not nearly so satisfactory as metallic tubes, since their thermal efficiency and heat conductivity is much lower than that of the suggested metals.

It will thus be seen that I have provided a novel baseboard radiator which may be formed and assembled by the two simple steps of extruding the basic shape and then pressing in a tube. The baseboard thus formed may be made in sections of any desired length and may be cut to any desired length for easy and quick installation. Moreover, the very simplicity of the finished baseboard makes it inexpensive to install in buildings requiring great lengths of baseboard radiator. Furthermore, the fact that the heating fluid such as hot air or steam or hot water which passes through the tube of the baseboard is separated from the outside of the baseboard by only two thicknesses of metal of high heat conductivity, with no dead air spaces between, assures optimum thermal efficiency. Thus, the desirable fluid flow characteristics of a circular conduit are obtained without loss of an attractive baseboard face, and with no loss of thermal efficiency.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications, and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

I claim:

1. A panel radiator comprising in combination a generally channel-shaped member having a web and a first pair of flanges disposed laterally of said web and having terminal edges lying in a plane parallel to said web, a second pair of flanges outstanding from and integral with and extending longitudinally of said web and disposed between said first pair, said second pair of flanges terminating short of said plane, said web in cross section tapering from points adjacent said second pair of flanges laterally in opposite directions toward said first pair of flanges, and a tube between and in contact with said second pair of flanges.

2. A panel radiator comprising in combination a generally channel-shaped member having a web and a first pair of flanges disposed laterally of said web and having terminal edges lying in a plane parallel to said web, a second pair of flanges outstanding from and integral with and extending longitudinally of said web and disposed between said first pair, said second pair of flanges terminating short of said plane and defining between them a trough of circular cross-section of which the greatest width is greater than the distance between the inner terminal edges of said second pair of flanges, said web in cross section tapering from points adjacent said second pair of flanges laterally in opposite directions toward said first pair of flanges, and a circular tube within said trough in intimate contact with said second pair of flanges.

References Cited in the file of this patent

UNITED STATES PATENTS

2,646,259	Powell	July 21, 1953
2,666,981	Sandberg	Jan. 26, 1954
2,693,940	Preisinger	Nov. 9, 1954

FOREIGN PATENTS

499,568	Canada	Jan. 26, 1954