April 1, 1930. R. B. KINGMAN 1,752,670

HEAT ABSORBING MEDIUM

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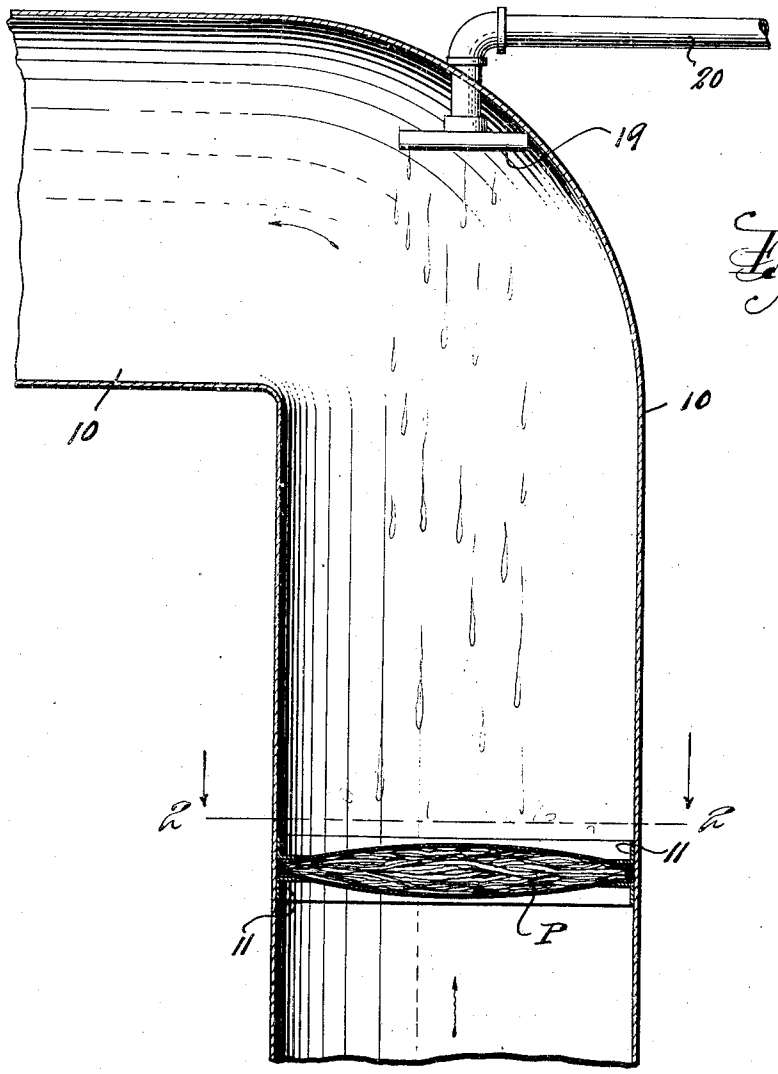


Fig. 1

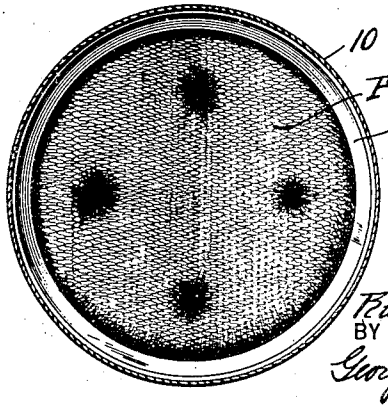


Fig. 2

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Fig. 3

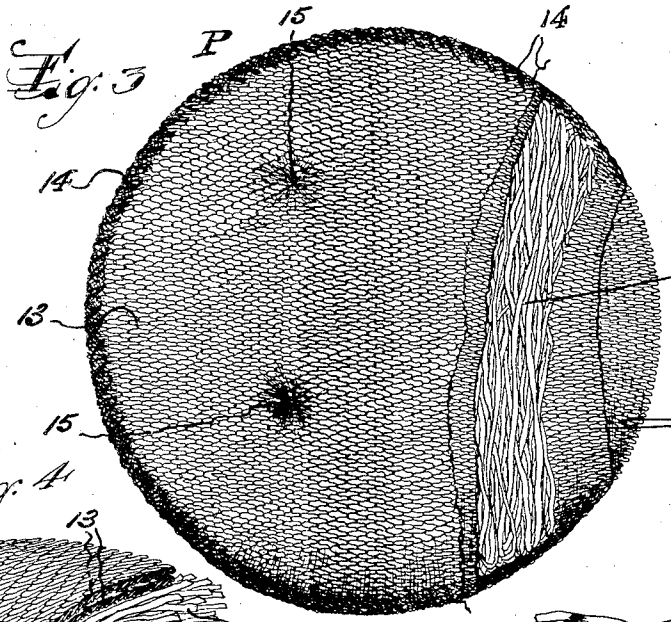


Fig. 4

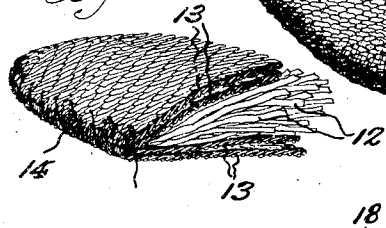


Fig. 5



Fig. 6

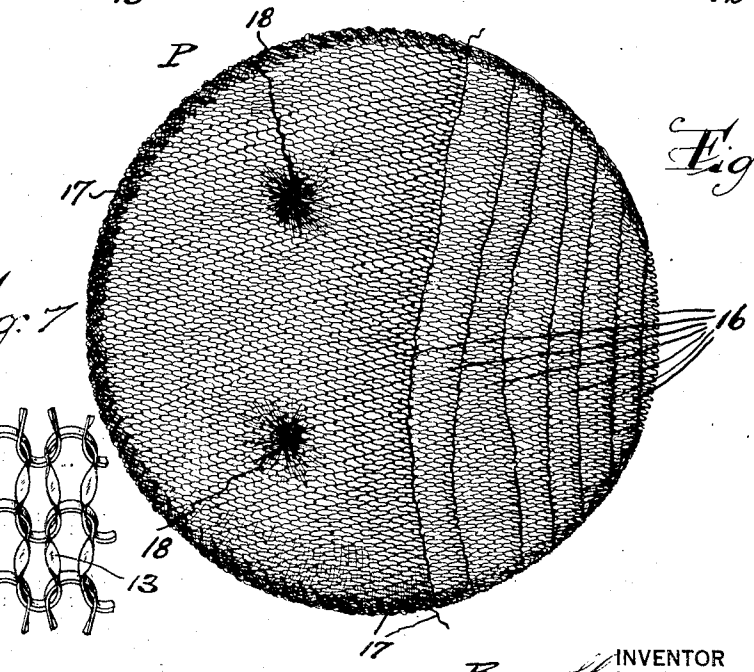
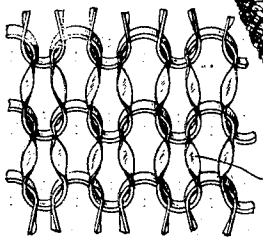


Fig. 7



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UNITED STATES PATENT OFFICE

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HEAT-ABSORBING MEDIUM

Application filed July 1, 1927. Serial No. 202,841.

This invention relates, generally, to an improved form of heat absorbing medium for cooling gases and gaseous fluids.

It is frequently desirable to reduce the temperature of various gases, including air, while controlling the movement thereof, as, for example by passing the same through delivery conduits from one point to another; and with this object in view, the present invention is adapted to provide a novel form and construction of permeable heat absorbing medium through which the gas to be treated may pass, said medium being of such form and material as to provide a large amount of contact surface in connection with a material affording a high degree of conductivity of heat, to the end that the heat units contained in the gas may be readily transferred to the heat absorbing medium, as the former traverses the latter, to effect the desired reduction of the temperature of the gas.

The present invention comprises the provision of a metallic pad or body of substantial mass formed from flat ribbon-like metallic-wire, the preferable metal for such wire being copper. The said pad or body preferably consists either of an entangled mass of flat ribbon-like wire enclosed in cover sections provided by a knitted fabric also made up of flat ribbon-like metallic wire, or of a plurality of superimposed layers of the metallic fabric knit from flat ribbon-like wire; in either case a very porous spongiform mass is furnished, which while easily permeable by the gas, is also adapted to provide a considerable contact surface whereby the transfer of heat from the gas passed in contact therewith is greatly facilitated.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a sectional view of a conduit for the passage of a gas to be cooled, showing within the same the permeable spongiform metallic heat absorbing pad of this invention; Figure 2 is a cross section, taken on line 2—2 in Figure 1; Figure 3 is an enlarged plan view of one form of heat absorbing pad made according to this invention, parts thereof being broken away to illustrate the internal construction thereof; Figure 4 is a fragmentary perspective in part section of a portion of the pad; and Figure 5 is a fragmentary view of the entangled flat ribbon-like wire forming the interior filling of said form of pad.

Figure 6 is a plan view of another form of heat absorbing pad made up of superimposed layers of knitted flat ribbon-like metallic wire, parts thereof being broken away to show the layer disposition and arrangement.

Figure 7 is a fragmentary perspective view, greatly enlarged, of a portion of knitted flat ribbon-like wire providing the knitted fabric entering into the construction of the heat absorbing pad.

Similar characters of reference are employed in the said views to indicate corresponding parts.

Referring to said drawings, I have shown in Figures 1 and 2 one manner of using the novel heat absorbing pad of this invention, whereby a suitable conduit 10 is provided through which the gas to be treated and relieved of its heat may be passed. The novel permeable heat absorbing pad P may be disposed within and across the cross-sectional arm of this conduit 10, the same being secured in place by annular flanges or rings 11, or in any other suitable manner, so as to be opposed to the current of gas moving through said conduit, whereby the gas is caused to pass through the pad in contact with the elements thereof.

In the one form shown in Figures 3 to 5 inclusive, the pad P comprises an interior mass of entangled flat ribbon-like wires or filaments 12 made of a metal which is a good heat conductor, preferably of copper. This interior mass of flat wires or filaments 12 is enclosed between cover-sections 13 made by knitting flat ribbon-like copper wire into a metallic fabric of open mesh. Said cover sections 13 retain the interior mass of entangled filaments in desired loosely compacted relation. The cover sections 13 are engaged over opposite sides of said interior mass, and have their marginal edges brought together and then bound or secured one to the other by wire stitching 14, or other suitable fastening

means. If desired the pad body thus formed may be quilted as indicated at 15.

In another form shown in Figure 6, the pad P comprises a plurality of layers 16 of metallic fabric knitted from flat ribbon-like copper wire, said layers being superimposed and bound together at their margins by wire stitching 17, or other suitable fastening means. The pad body in this latter form may also be quilted as indicated at 18, if so desired.

In either form above described, the pad furnishes a highly porous or spongiform mass which possesses an exceedingly great multiplicity of intercommunicating labyrinthic interstices or passages dispersed throughout the entire body thereof, and presented in bounding relation to such passages are the flat surfaces of the mass of ribbon-like wire, whereby the hot gas caused to traverse the passages in passing through the body of the pad is also caused to contact with the surfaces of the wire thus presented, and in so doing transfers its heat to the latter. The metallic mass is preferably made of copper for the reason that this metal is an especially good heat conductor and readily takes up or absorbs the heat from the gas moving in contact therewith.

It may be desirable in some instances to provide means for lightly showering the pad with cold water to increase its heat absorbing capacity as well as to provide moisture thereupon which by evaporation tends to humidify the gas while cooling the same. Such an arrangement is shown in Figure 1 wherein the conduit 10 is provided, above the pad location, with a spray-head 19 fed by a supply pipe 20.

It will be understood that I do not limit the use of my novel heat absorbing medium to the cross-wise relation to the conduit shown in Figure 1 since other dispositions of the same, wherein it is subjected to contact with the gas moving through the conduit, may be utilized.

The density of the mass forming the heat absorbing medium may be more or less varied, as conditions of use may require, by compressing the mass thereof or superimposed folds thereof more or less tightly together.

It will be obvious that various changes, modifications and adaptations may be made in the detail form, shape and relation of the elements of the medium, as well as in its mode of application to a gas cooling system or apparatus, which will be comprised within the spirit of my invention; consequently the above description and the accompanying drawings of the medium merely show the same in a preferred form and by way of example and are therefore to be considered in an illustrative and not in a limiting sense.

Having thus described my invention, I claim:—

1. A heat absorbing medium permeable to fluids, comprising a spongiform body consisting in a mass of thin ribbon-like metallic filaments the flat faces of which provide a maximum area of contact surface, said mass having enclosing outer cover sections of knitted flat metallic wire, said cover sections being stitched along their marginal edges.

2. A heat absorbing medium permeable to fluids, comprising a spongiform body consisting in a center portion made of entangled thin ribbon-like copper filaments the flat faces of which provide a maximum area of contact surface, outer cover sections of knitted flat metallic wire, and means for securing the margins of said cover sections in enclosing relation to said center portion, said cover sections being quilted at points intermediate their margins.

3. A heat absorbing medium permeable to fluids, comprising a spongiform body consisting in a center portion made of entangled thin ribbon-like copper filaments, the flat faces of which provide a maximum area of contact surface, outer cover sections of knitted flat copper-wire on opposite sides of said center portion, wire stitching joining the margins of said cover sections in enclosing relation to said center portion and wire stitching extending through said center portion and joining said cover sections at points intermediate the margins of said cover sections.

In testimony, that I claim the invention set forth above I have hereunto set my hand this 23rd day of June, 1927.

RUSSELL B. KINGMAN.