Nov. 17, 1953 A. KÄRCHER 2,659,223

APPARATUS FOR PRODUCING VIBRATIONS IN LIQUID BATHS

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Fig. 1

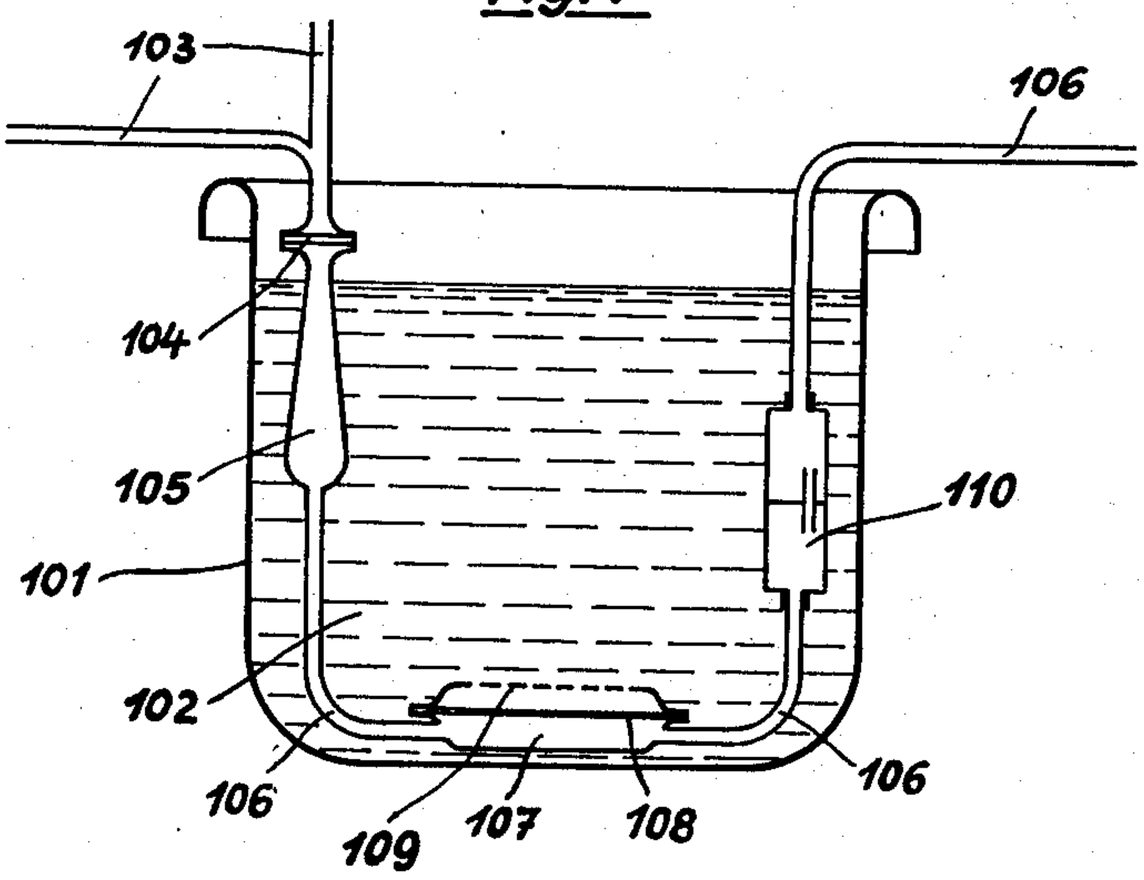
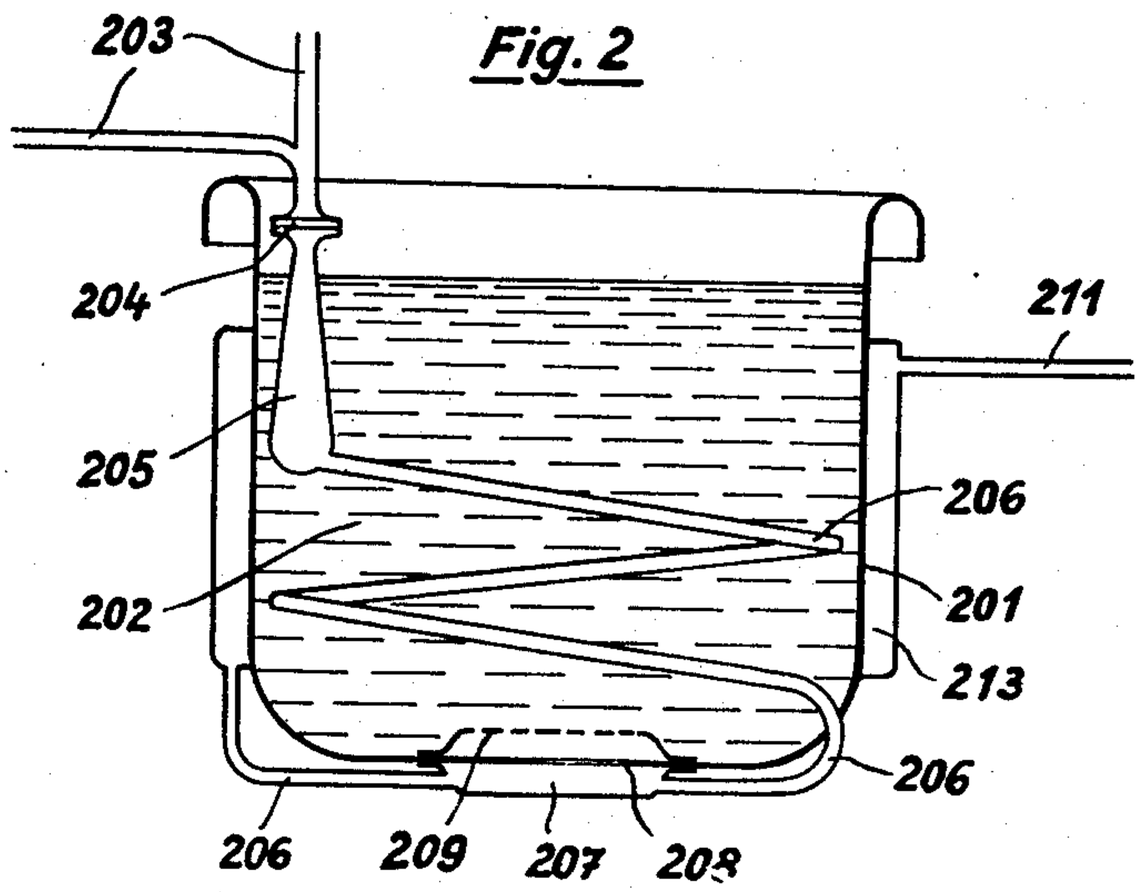


Fig. 2



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APPARATUS FOR PRODUCING VIBRATIONS IN LIQUID BATHS

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5 Claims. (Cl. 68—3)

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The invention relates to a device for producing vibrations or agitations in liquid baths, particularly such as are used in the treatment of textiles.

Devices for producing vibration or agitation in the liquid in coppers have already been proposed, the object being to intensify the effect of the washing lye when the dirt particles are removed from the clothes. Such vibrating liquids may also advantageously be used in other types of treatment, for example, the dyeing of textiles and for other materials.

For the known vibrators operated electromagnetically or by means of compressed air, a special source of energy, such for example, as electric current, air conduits or the like must be provided to which the vibrator is connected. Such apparatus can be moved only to a limited extent, and requires in many cases fairly long conduits and special connections. Also the vibrators are bulky and expensive.

According to the invention, these disadvantages are avoided in that a burner, having an oscillating gas column and provided with means for transmitting the gas vibrations to the liquid, is used as the vibrator. It is known that such burners require only a tank filled with fuel as the source of energy. Such a vibrator may easily be connected to the bath and erected together with it at any desired place, as it requires no conduits connecting it to a distant source of energy.

It is of particular advantage that the burner can be used at the same time both as the vibrator and for heating. In this case the burner-system consisting of combustion chamber, gas channels, a transmitter for the vibrations and in a given case a sound absorber, is partly or wholly used for heating the liquid in the bath. This may be effected either by immersing individual parts of the whole system in the bath, or by using the gases for heating the bath container from the outside.

When a sound absorber is used, this also may be used for heating the bath. When an outer jacket is used for heating, this may serve at the same time as a sound absorber by being correspondingly constructed, and sub-divided so that a special sound absorber is not required.

The invention is diagrammatically illustrated by way of example in the accompanying drawings.

Figure 1 is a longitudinal section of a container and burner,

Figure 2 is a longitudinal section of a modified construction.

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In the construction according to Figure 1, the bath liquid **102** is provided in a container **101**. The burner-system with vibrating gas column is only drawn diagrammatically. Air and fuel are fed through the conduits **103** which extend into the combustion chamber **105** through a blow-back stop **104**. The mixture in this combustion chamber is vaporised in synchronism with the vibrations of the gas column in the gas conduit **106** provided for conducting the combustion gas into the open and connected to the combustion chamber. The gases vibrate to and fro like an air-piston in this conduit when passing through according to the natural vibration of the conduit **106**. The ignition of the burner, the relative sizes of the parts, and the construction of blow-back stop **104** may all be as illustrated and described in French patent No. 901,025, issued October 23, 1944.

In the gas conduit **106** provided within the bath **101** is inserted a vibration transmitter which in the illustrated construction consists of a plate-like enlargement **107** closed externally by a membrane **108** and provided with a perforated closing cap **109** for protecting the membrane against contact with the material to be treated, which is in the bath. The membrane **108** is set into vibration by means of the gas column vibrating in the conduits **106** thus transmitting the vibrations to the liquid in the bath. **110** is a sound absorber installed in the conduit **106**.

In the construction illustrated by way of example in Figure 2, **203** are the feed pipes which lead into the combustion chamber **205** through the blow-back stop **204**. To the combustion chamber **205** is connected a gas conduit **206** constructed as a serpentine-heater, part of which extends within the bath **202** in the container **201** and the other part of which extends through the container wall and outside it. The vibration transmitter is provided in the portion provided at the outside, and consists also of a conduit enlargement **207**, the membrane **208** of which is inserted in the container wall to form part of the bottom of the container. The membrane **208** is also protected from contacting the material to be treated in the bath by means of a perforated closure cap **209**. When the gases have left the vibration transmitter, they are passed into a jacket **213** surrounding the liquid container **201**, and thus used further for heating the bath **202**. In given cases the jacket may be so constructed, for example by being sub-divided into several individual spaces through which gas flows, that it serves at the same time as a sound absorber. The

gases are withdrawn from this jacket 213 through the conduit 211.

I claim:

1. Device for producing vibrations in a liquid bath comprising a burner of the oscillating gas column type having a discharge means for discharging the combustion gases, a membrane means provided in said discharge means and adapted to transmit the oscillations of the oscillating gas column produced within said discharge means to the liquid bath when immersed in said bath.

2. Device for producing vibrations in a liquid bath comprising a burner of the oscillating gas column type having a discharge means for discharging the combustion gases, a transmitting member incorporated in said discharge means and adapted to transmit the oscillations of the oscillating gas column produced within said discharge means to the liquid bath when immersed in said bath, a container for containing said bath, a jacket provided on said container and having an outlet and an inlet opening, said discharge means being connected to said inlet opening so as to cause the hot combustion gases to flow through said jacket.

3. Device for producing vibrations in a liquid bath comprising a burner of the oscillating gas column type having an explosion chamber, conduits for feeding fuel and air to said chamber, discharge means for discharging the combustion gases from said chamber, a transmitting member incorporated in said discharge means and adapted to transmit the oscillations of the oscillating gas column produced within said discharge means to the liquid bath when immersed in said bath, said feeding conduits, explosion chamber and discharge means being at least partly utilized for

heating said liquid bath, a container for containing said bath, a jacket provided on said container and having an inlet and an outlet opening, said discharge means being connected to said inlet opening so as to cause the hot combustion gases to flow through said jacket.

4. Apparatus for producing vibrations in a liquid bath, or the like, comprising a burner of the oscillating gas column type having a discharge conduit for discharging combustion gases, said discharge conduit having a wall portion thereof formed by a membrane adapted to transmit the oscillations of the oscillating gas column in said conduit.

5. Vibration apparatus, comprising, in combination, a container adapted to hold a fluid to be vibrated; a burner of the oscillating gas column type having a discharge conduit for discharging combustion gases, said discharge conduit having a wall portion thereof located in said container and formed by a membrane adapted to transmit the oscillations of the oscillating gas column to a fluid in said container and said discharge conduit being at least partly located within said container to transmit heat to a fluid in said container.

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