

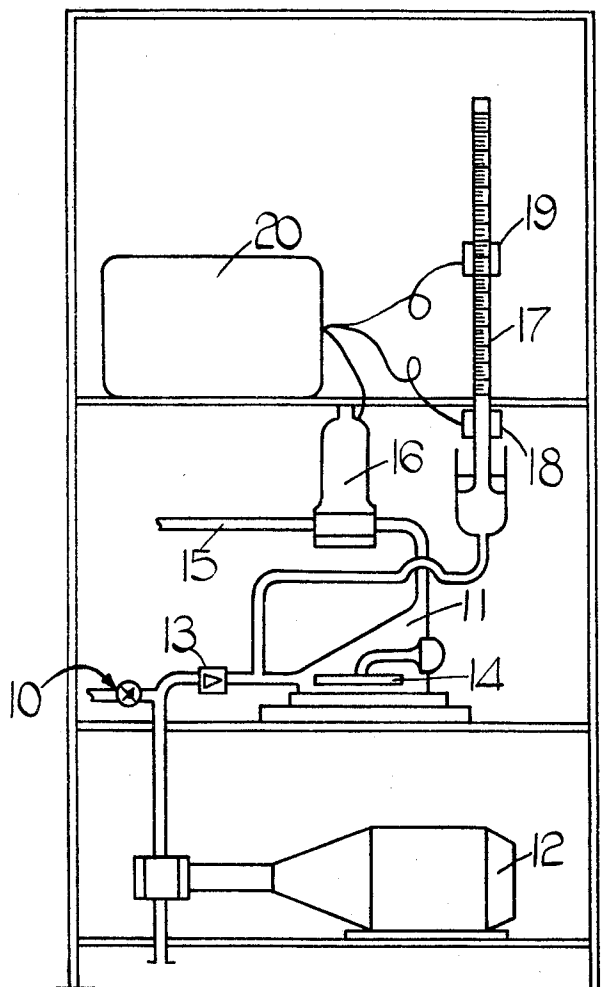
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MEASUREMENT OF THE WATER CONTENT OF AN OIL BATH

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3,511,083

## MEASUREMENT OF THE WATER CONTENT OF AN OIL BATH

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1 Claim

### ABSTRACT OF THE DISCLOSURE

In order to measure the water content of an oil bath, a chamber is filled with the oil, which is then heated to a first elevated temperature, excess oil being allowed to escape from the chamber through a valve. The valve is then closed and the oil is heated to a second higher elevated temperature, the oil this time being allowed to expand into an expansion pipe the level in which indicates the water content.

Where an oil bath is used for quenching, it is important that the bath should be substantially free from water, because the presence of water can lead to explosions during quenching. This invention relates to apparatus for indicating when the water content of an oil bath exceeds a predetermined acceptable level.

Apparatus according to the invention comprises a chamber, means for supplying oil from the bath to the chamber, means for heating oil in said chamber, a valve controlled bleed pipe extending from the top of the chamber, an expansion-pipe communicating with the chamber, and means for indicating when oil in the expansion-pipe reaches a predetermined level when oil in the chamber is heated with the valve closed.

An example of the invention is illustrated in the accompanying drawing.

Referring to the drawing, oil from an oil bath is conveyed to a chamber 11 by way of a pump-motor unit 12, a non-return valve 13 being incorporated between the pump and the chamber 11, and a valve-controlled outlet 10 being provided for priming the unit 12. In the chamber 11 is a heater 14, and extending from the top of the chamber is a bleed pipe 15 containing a solenoid-operated valve 16. Extending from inlet of the chamber 11 is an expansion pipe 17 with which are associated a pair of photo cells 18, 19 coupled to indicating equipment 20.

In order to ascertain whether the water content of the

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oil bath is above a predetermined safe level, the unit 12 is operated with the valve 16 open until the chamber 11 is filled with oil. The heater 14 is then operated under the control of a first thermostat in the chamber 11, so that the oil in the chamber 11 is heated to a predetermined value. At this stage the valve 16 is still open and part of the heated oil flows through the valve 16 and the bleed pipe 15. At this stage the chamber 11 is full with oil at a predetermined known temperature. The valve 16 is now closed, and the heater 14 is again operated to raise the temperature of the chamber 11 to a second predetermined higher value. The expansion of the oil now causes it to rise up the expansion pipe 17, and if the water content is above the safe value, the photocell 19 is actuated to give a warning. The photocell 18 is positioned so that it will be actuated even if no water is present, so indicating that the apparatus is working satisfactorily.

It will be appreciated that the operation of the apparatus is dependent on the fact that the expansion of the oil varies with the water content. It is of course essential to start the expansion from a predetermined known temperature, and since the temperature of the bath may vary, the two-stage heating arrangement described must be employed so that before the oil is allowed to expand into the expansion-pipe the chamber 11 contains a known volume of oil at a known temperature.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. Apparatus for indicating when the water content of an oil bath reaches a predetermined level, comprising a chamber, means for supplying oil from the bath to the chamber, means for heating oil in said chamber, a valve controlled bleed pipe extending from the top of the chamber, an expansion-pipe communicating with the chamber, and means for indicating when oil in the expansion-pipe reaches a predetermined level when oil in the chamber is heated with the valve closed.

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