

[54] APPARATUS FOR CONCENTRATING
LABORATORY SPECIMENS BY
EVAPORATION
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[51] Int. Cl. **B01d 1/14**
[58] Field of Search. **159/16 R, DIG. 1, 11, 16;**
34/104, 105

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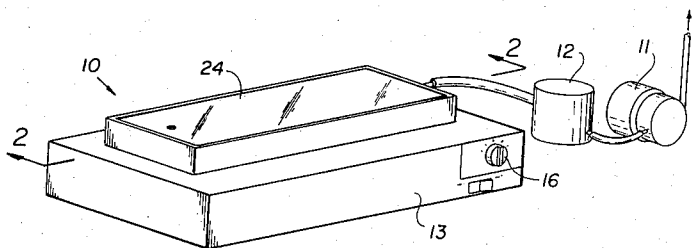
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[57] **ABSTRACT**

Apparatus is disclosed for concentrating chemical and biological specimens which are present in dilute solutions in solvent liquids. By means of a pressure differential and air jet nozzles, the vapor layer which normally appears above the specimens is continuously dispelled. The evaporating areas are maintained under sub-atmospheric pressure both to augment the evaporation process and induce a jet stream of air which impinges on the specimen surface. The specimen containers are heated from a controlled source, such as a thermostatically controlled heat sink.

3 Claims, 3 Drawing Figures



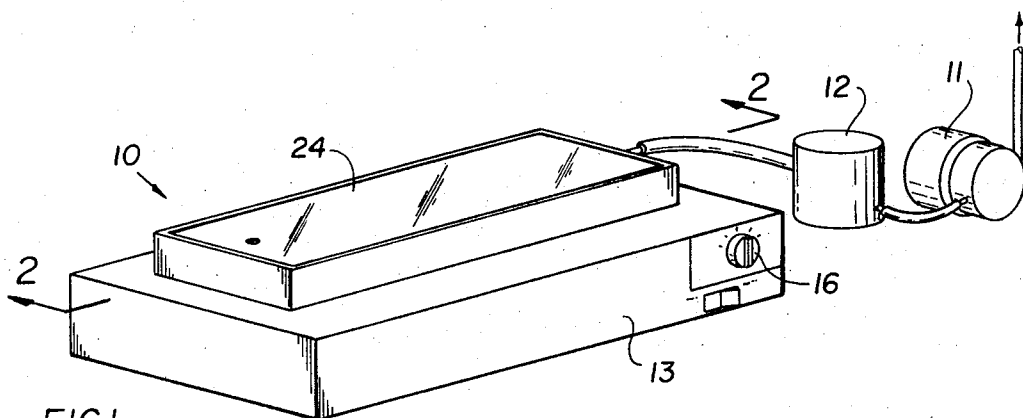


FIG. 1

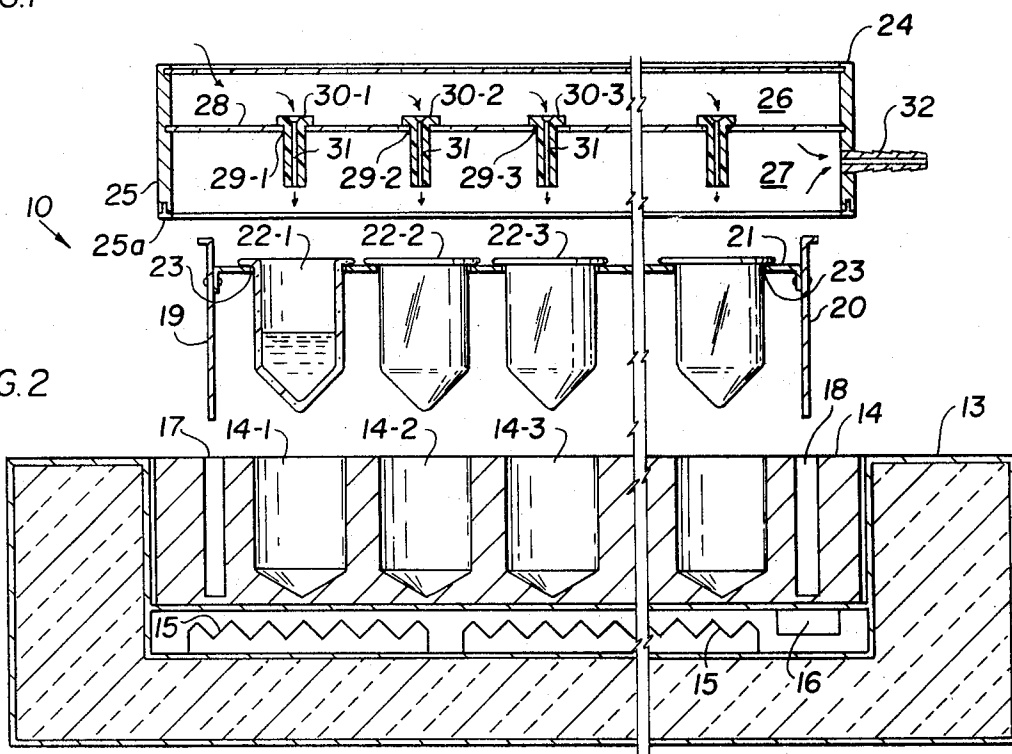


FIG. 2

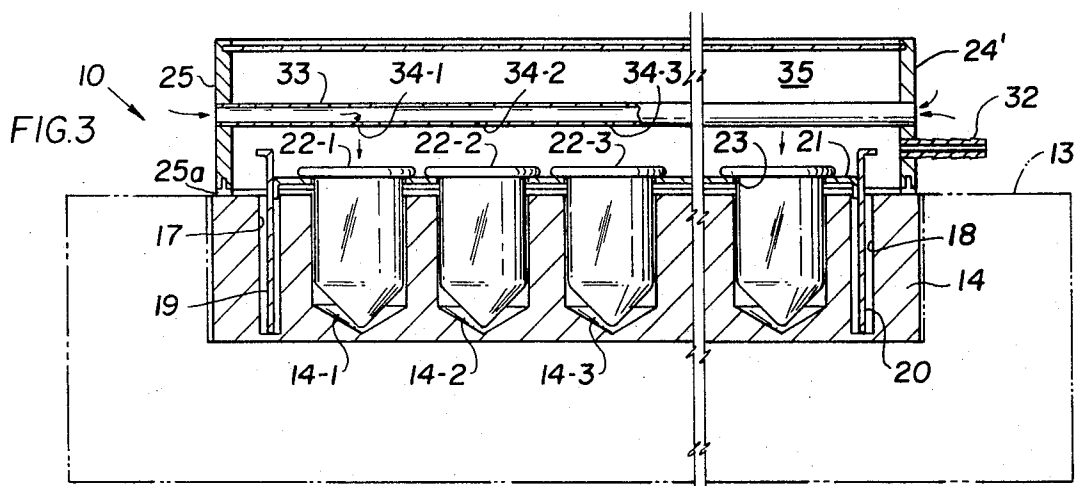


FIG. 3

APPARATUS FOR CONCENTRATING LABORATORY SPECIMENS BY EVAPORATION

BACKGROUND OF THE INVENTION

The invention is concerned with apparatus for concentrating chemical and biological specimens which occur in a highly diluted or attenuated form in an evaporatable medium.

Conventionally, laboratory specimens are concentrated by evaporating off the more volatile liquids or solvents by controlled heating of the specimen vials, often under fume hoods which exhaust to the atmosphere in order to prevent the accumulation of vapors in the laboratory. It is also known in the art to augment the evaporation process by the use of a partial vacuum. In such vacuum systems, heating is

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention is illustrated as embodied in a specimen-evaporating apparatus including a housing assembly 10 for holding a plurality of specimens to be evaporated and connected to a vacuum pump 11, preferably through a fume condenser 12. The housing assembly 10, as best seen in FIG. 2, includes a base portion 13 in which is mounted a metal specimen block 14 having a plurality of, say, 36 specimen-receiving chambers 14-1, 14-2 . . . 14-36. The block 14 is heated by electrical resistance heaters 15, and its temperature is sensed by an adjustable thermostat 16 which is connected to the circuit to the heaters 15.

atmospheric pressure in the chamber 27 and with the vapor layer being continuously dispelled, an accelerated evaporation rate occurs without the necessity of resorting to higher evaporating temperatures which might be harmful to the specimens or which might cause boiling or spattering which would cause particles of the specimens from rising into the chamber 27 to fall into other specimen vials to cause contamination.

Referring to FIG. 3, there is illustrated a modification of the invention in which the cover assembly 24' includes nozzle tubes 33 (which can correspond in number to the number of rows of specimen vials) supported by the end walls of the cover assembly 24'. The nozzle tubes 33 are vented at their ends to the atmosphere and include at equally spaced points along their lengths radial bores 34-1, 34-2 . . . 34-36 directed downwardly to the respective specimen holders. In this modification, the entire inside chamber 35 of the cover assembly defines the exhaust manifold and the spaces within the nozzle tubes 33 define the intake manifold. With the chamber 35 placed under sub-atmospheric pressure, the system functions identically with that described above having reference to FIG. 2.

While the invention has been described having reference to the preferred embodiments thereof, it will be understood that it can take various other forms and arrangements within the scope of the invention. It should not, therefore, be regarded as limited except as defined in the following claims.

We claim:

1. Apparatus for concentrating laboratory specimens by evaporation comprising a base receptacle for a plurality of specimen vessels and including a heat sink having a plurality of individual chambers adapted to have seated therein open vessels containing laboratory specimens, a heat source for the heat sink including means to regulate the temperature thereof, a detachable cover assembly adapted to be seated in substantially air-tight relationship on the base over the chambers, said cover assembly comprising depending side walls including opposing end portions to engage the base in air-tight relationship, at least one rigid horizontal tube member

carried by and joined to the opposing side walls and open to the atmosphere through at least one side wall, the tube member passing horizontally over a plurality of said chambers in close proximity thereto and carrying a plurality of downwardly directed air orifices aligned respectively with the plurality of chambers below, and means to establish sub-atmospheric pressure in the closed space whereby air is drawn into the tube member and discharged downwardly in a plurality of jet streams into the respective vessels disposed in the chambers.

2. Apparatus as set forth in claim 1, including a common rack for supporting said plurality of specimen vessels in positions in vertical alignment with the respective chambers in the heat sink, said rack having downwardly extending legs to carry the respective specimen vessels above a supporting surface, and means forming guide slots in the receptacle to receive the legs and to cause the respective vessels to be lowered into their corresponding chambers.

3. Apparatus for concentrating laboratory specimens by evaporation comprising a base for receiving a plurality of specimen vessels, a heat source for the vessels including means to regulate the temperature thereof, a detachable cover assembly adapted to be seated in substantially air-tight relationship on the base over the vessels, said cover assembly comprising depending side walls to engage the base and a substantially flat, horizontally disposed top surface, manifold means carried by the side walls between the top surface and the chambers and defining an air conduit both to the underside of the top surface and to the respective vessels below, the air path to the chambers including a plurality of downwardly directed openings defining air nozzles above the respective chambers, inlet means connecting the manifold to the atmosphere, and means to establish sub-atmospheric pressure in the closed space whereby air is drawn into the conduit and caused to impinge both on the underside of the top surface and downwardly in a plurality of jet streams directed into the respective vessels.

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