APPARATUS FOR TRANSPORT AND STORAGE OF LIQUID SPECIMENS FOR RADIO-IMMUNOASSAY FOR INSULIN

Inventors: Josef Karel Viktora, Hyattsville; Albert Jozef Baukal, Silver Spring, both of Md.

Assignee: The Research Foundation of the Washington Hospital Center, Washington, D.C.

Filed: Sept. 11, 1969

Appl. No.: 857,034

U.S. Cl. ........................................ 73/21 R, 23/253 R
Int. Cl. ........................................ G01n 1/00
Field of Search 73/21, 53, 61, 61.1; 23/253, 23/253 TP; 53/180

References Cited

UNITED STATES PATENTS
2,734,377 2/1956 Traver 73/61.1
3,131,521 5/1964 Buttolph et al. 53/180
3,368,872 2/1968 Natelson 23/253

ABSTRACT

Samples from a number of individual liquid specimens containing varying and unknown amounts of insulin are made radioactive and are sequentially supplied to a continuously moving paper strip to impregnate the strip with separate spaced specimens along its length, which are then washed and dried. Cellophane tape is continuously adhesively united to the strip bearing the impregnated and dried specimens and the composite strip and tape are stored in a roll from which the strip may be taken for examination and analysis of the separate specimens.

2 Claims, 1 Drawing Figure
Means are provided by the invention for causing the liquid sample falling from capillary tube 4 and the successive washes falling from tubes 6, 8 to be held on the absorbent strip 12 without spreading, thereby to provide discrete samples embedded in the strip, which may be separately scanned and evaluated. Such means comprise three porcelain filter discs 40, 42, 44 which are positioned, respectively, beneath the tubes 4, 6, 8 and also beneath the horizontal reach formed by parts 20, 34 of the absorbent strip 12 and the endless belt 30. These filter discs are mounted on a glass tube 46 and each is connected by tubing to a vacuum pump 48.

Means are also provided for heating the washed samples after impregnation into the absorbent strip, and such means are positioned adjacent and downstream from the filter discs which have just been described. These means comprise an elongated horizontal tube 50 which is positioned below the horizontal reaches 20, 34 and which is connected to a source of air under pressure 52 and within which is an electrical resistance heating element 54. The upper part of the tube is provided with an elongated opening just below the horizontal reaches 20, 34 to direct heated air upwardly onto the sample strip 12.

Means are provided for sealing the absorbent strip 12 after the washed samples have been impregnated into it, and such means comprise a reel 60 which is rotatably mounted on the mounting base above the supply reel 10 and above the horizontal reaches 20, 34 of the two strips 12, 30. A roll of cellophane strip 62 (or other suitable material) is mounted on this reel and is trained from the reel under a roller 64 into surface contact with the upper surface of the horizontal reach 20 of the absorbent strip 12 downstream of the area of impingement of heated air from tube 50. The cellophane strip is not adhered or otherwise connected to strip 12 but moves in surface contact with it to be wound with strip 12 on the take-up reel 14.

Any suitable means may be provided for imparting the necessary movement to the apparatus to cause the absorbent strip and cellophane tape to be drawn from their respective supply rolls to the take-up roll on reel 14. In the described embodiment these means comprise an electric motor 70 the armature of which is connected to a roller 72 which drives the belt 30 and strip 12 by friction. The motor armature is also connected by slipping belt 74 to reel 14 to positively drive it and cool on it the composite strip 12, 62.

In the use and operation of the described apparatus the motor 70 is operated to cause the belt 30 to move in its endless path with its upper horizontal reach 34 below and in face contact with the horizontal reach 20 of the absorbent strip 12, thus supporting the horizontal reach of the absorbent strip and assisting its movement. At the same time motor 70 drives the take-up reel 14, causing the composite absorbent strip and cellophane strip to coil up on that reel. Liquid samples from the auto-analyzer apparatus periodically drop from capillary tube 4 onto the absorbent strip and are fixed there by vacuum applied through filter disc 40, after which each sample is subjected to washes from capillary tubes 6, 8, each being fixed by vacuum applied, respectively, through filter discs 42, 44. Each fixed and washed sample then passes with the moving absorbent strip over the drying area provided by the upwardly directed air stream from tube 50. Cellophane strip 62 now engages the upper surface of the impregnated absorbent strip 12 and the two strips are moved in surface-to-surface engagement into the storage roll on take-up reel 14, from which any part may be scanned and evaluated at any time.

We claim:
1. Apparatus for transporting and storing liquid samples supplied by an auto-analyzer apparatus, comprising a supporting base, a capillary tube vertically mounted on the base and having an open lower end and being adapted to receive and dispense a series of separate liquid samples, at least one additional capillary tube vertically mounted on the base adjacent the first capillary tube and having an open lower end and being adapted to receive and dispense a wash liquid, a supply roll of absorbent material rotatably mounted on the base,
3,675,488

3. A storage roll rotatably mounted on the base, means for guiding strip material from the supply roll to the storage roll over a path passing under said tubes, means for causing the strip to pass along said path from the supply roll to the storage roll, a filter disc beneath each of said tubes and beneath the strip, and means for applying suction to each disc.

4. Apparatus according to claim 1 comprising, in addition, means positioned upstream of the strip from the filter discs and below the strip for directing a stream of heated air upwardly onto the strip.