April 23, 1963 W. GROOM 3,086,530

SURGICAL MULTIPLE PUNCTURE DEVICES

Filed Dec. 7, 1959 2 Sheets-Sheet 1

FIG. 1.

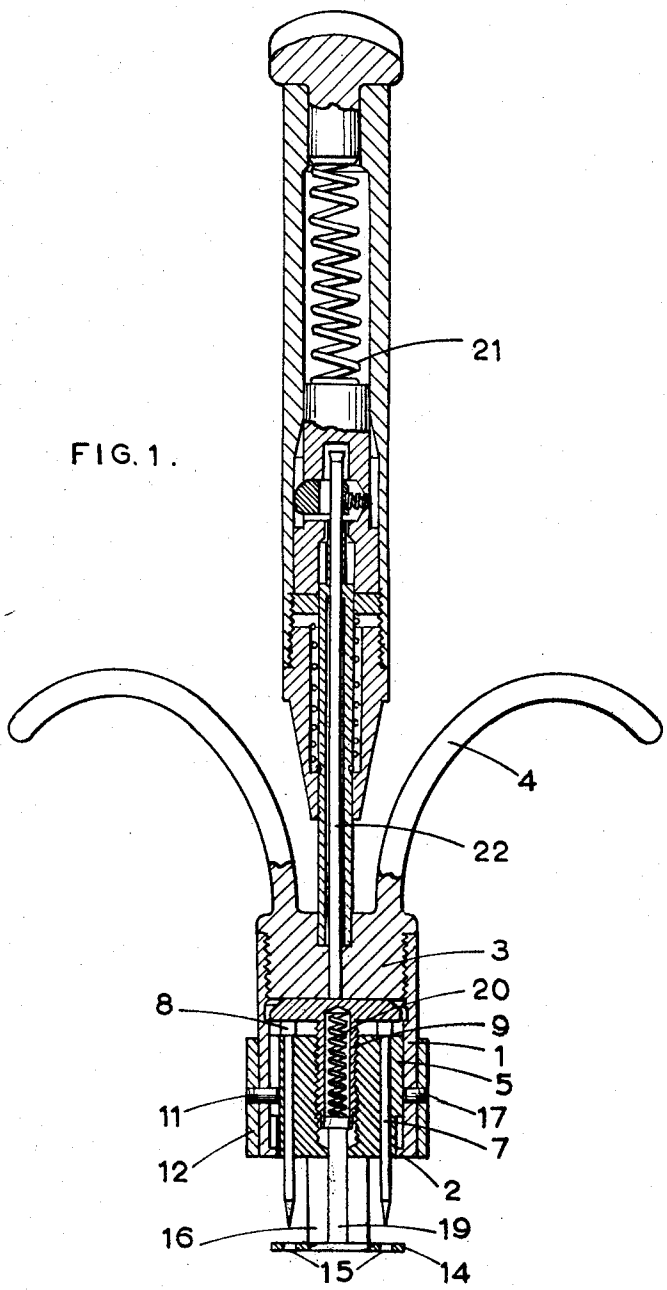

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FIG. 2.

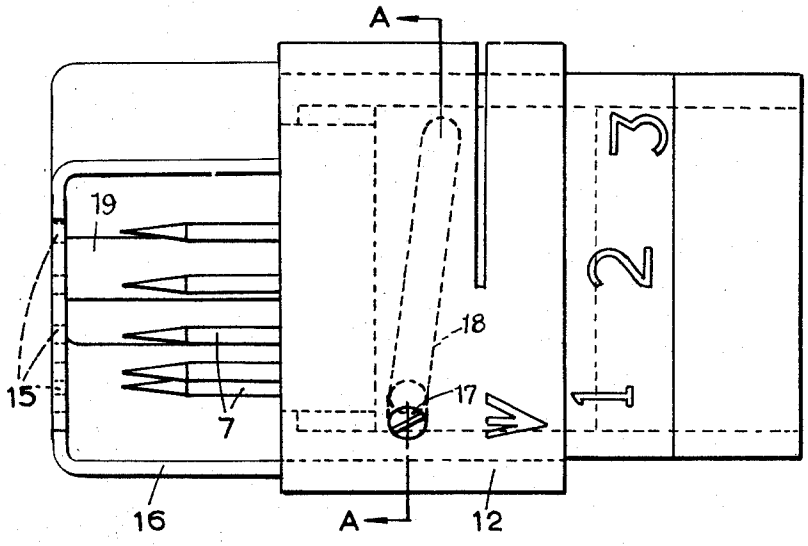
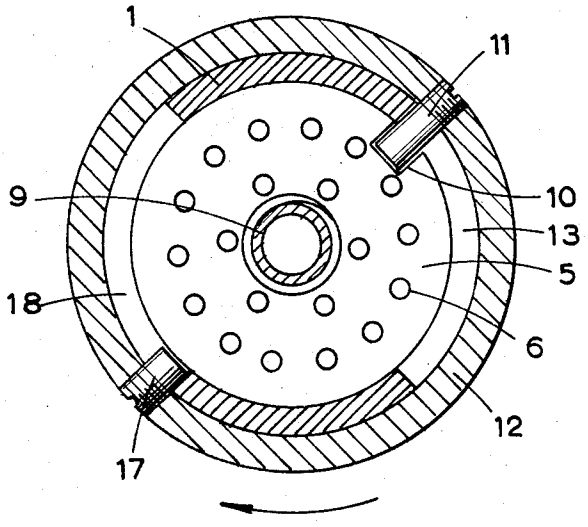


FIG. 3



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SURGICAL MULTIPLE PUNCTURE DEVICES

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1 Claim. (Cl. 128—329)

This invention relates to a surgical multiple puncture device, that is to say a device which can be used to puncture the skin of a patient in a number of places in a single operation.

The invention provides an improved such device comprising a body which is open at one end, a needle carrier block longitudinally slidable in the body, a plurality of needles for puncturing the skin of a patient, the said needles being removably secured in the block with their working ends protruding from the block and the open end of the body, means for displacing the block and the needles carried by it in a working stroke in which the needles can puncture the skin of a patient, and means for adjustably limiting the depth which the needles can penetrate the skin of a patient.

In the accompanying drawings:

FIGURE 1 is a sectional elevation of an embodiment of the invention,

FIGURE 2 is an enlarged view of part of the device illustrated in FIGURE 1, and

FIGURE 3 is a section on line A—A of FIGURE 2.

In the illustrated embodiment of the invention, a surgical multiple puncture device, which is particularly useful as a tuberculin scarifier, comprises a cylindrical body or barrel **1** which has an open end formed with an inturned flange or rim **2** and is closed at the other end by a plug **3** which is screwed in the body **1** and can be removed to give access to the interior of the body. The plug supports a finger grip **4** as well as closing the end of the body.

A cylindrical needle carrier block **5** has a sliding fit inside the body **1** and has one end portion of smaller diameter than the remainder of the block so that this smaller portion can be made to protrude from the open end of the body **1** by suitable longitudinal movement of the carrier block, such movement being limited by the engagement of the rim **2** at the open end of the body **1** with the larger portion of the carrier block **5**. The carrier block **5** has a plurality of longitudinal passages **6**. A needle **7** of length greater than the carrier block **5** is located in each of these passages **6** with its sharp or working end protruding from the block and the open end of the body **1**. The needles have cylindrical heads **8** which fit on the inner surface of the block **5** to prevent movement of the needles relative to the block in the outward direction. The needles **7** are held against inward movement relative to the block **5** by the head of a needle-retaining screw **9** which screws into the block.

Alternatively, the passages **6** can have countersunk recessed inner ends and the needles **7** can have frusto-conical heads located in their recesses so as to be flush with the inner end face of the block.

Sleeve **12** is rotatably positioned on the outer surface of the cylindrical body **1**, and a helical slot **13** as seen in FIGS. 2 and 3 is formed through the wall of the body. The larger portion of the needle carrier block **5** has a radial bore **10** formed therein. A screw pin **11** is threaded into a suitable threaded aperture in sleeve **12** and extends radially inwardly through the helical slot in the body, and the inner end of the screw pin fits loosely within the bore **10** of the carrier block **5**. Accordingly,

rotation of sleeve **12** with respect to body **1** will cause the sleeve to move longitudinally with respect to the body, and at the same time carrier block **5** will turn with the sleeve due to the interconnection between the sleeve and the carrier block through the pin **11**.

A guide plate **14** is positioned outwards of the open end of the body **1** and is adapted to be placed on the skin of a patient. This guide plate **14** is provided with a plurality of holes **15** at least equal in number to the number of needles **7** and so positioned that the working ends of the needles **7** can pass through them into the skin of the patient. The guide plate is supported by arms **16** fixed to the rotatable sleeve **12** so that rotation of the sleeve alters the longitudinal and angular positions of the guide plate with respect to the body. A second screw pin **17** is mounted in the sleeve **12** opposite the pin **11** and is movable in a helical slot **18** in the body **1**. A return plunger **19** fixed to the guide plate **14** and loaded by a spring **20** is movable in an axial bore in the carrier block **5** and urges the carrier block in the inward direction.

The amount by which the needles can penetrate the skin depends on the position of the guide plate **14** relative to the body **1** at the commencement of the operation and this in turn depends on the angular position of the sleeve **12** on the body. Means can be provided for positively locating the sleeve in any one of a number of desired positions. For example, a spring-loaded pin carried by the sleeve can engage in any one of a number of recesses in the body. An operating mechanism indicated generally by reference numeral **21** is provided for urging the carrier block and needle **7** outward in a working stroke. This operating mechanism includes a striker rod **22** which engages the head of retaining screw **9**. It will be understood that the operating mechanism may be of any typical conventional and well-known construction and does not form a part of the present invention. After the working stroke has been completed, the needle carrier block is returned to its initial position under the influence of spring **20**.

When utilizing the device, the sleeve **12** is rotatably adjusted with respect to body **1**, whereby pins **11** and **17** moving in the respective slots **13** and **18** will cause the sleeve **12** to be shifted axially with respect to body **1**. Sleeve **12** carries the guide plate **14** through the intermediary of arms **16** whereby longitudinal shifting of the sleeve will cause the guide plate **14** to be shifted axially with respect to body **1**. The amount of axial shifting of guide plate **14** will serve to adjust the amount of penetration of the needles into the skin of a patient. As sleeve **12** is rotated to obtain such axial adjustment, the carrier block **5** is also rotated in unison with sleeve **12** through the intermediary of pin **11**, pin **11** in its associated slot **10** allowing relative axial movement of the pin with respect to the block. Since the carrier block and the needles are rotated along with sleeve **12** and guide plate **14**, this ensures that the needles will always be aligned with the slots in the guide plate so that the needles may freely pass through the guide plate to penetrate the skin of a patient.

What I claim is:

A surgical multiple puncture device comprising a substantially cylindrical hollow body having an inturned flange at one thereof, said flange defining a central opening at said end of the body, a removable plug secured in the opposite end of said body, a substantially cylindrical needle carrier block slidably fitted within said body and having an enlarged portion which is of greater diameter than the central opening in said one end of the body and including a smaller portion which is movable through said open end of the body, movement of said block in an outward direction being limited by engagement of the

enlarged portion of the block with said inturned flange on the body, said block having a plurality of passages extending longitudinally therethrough, needles positioned within said passages with the sharp working end of the needles protruding from the block and the open end of the body, said needles each having an enlarged head formed thereon of greater diameter than the passages in said block for limiting outward movement of the needles relative to the block, needle retaining screw means detachably secured to said block and engaging said enlarged heads of the needles for limiting inward movement of the needles relative to the block, said needle retaining screw means being positioned for engagement with said plug, said body having a helical slot formed therethrough, a sleeve rotatably positioned about said body, pin means operatively connected with said sleeve and extending through said helical slot in the body, said block having a radially extending bore which receives the inner end of said pin means whereby rotation of said sleeve also produces rotation of said block, guide plate means positioned

outwardly of the open end of the body, said guide plate means having a plurality of holes formed therethrough at least equal in number to the number of needles supported by said block and so positioned that the working end of the needles can pass through the holes in the guide plate, said guide plate being supported by said rotatable sleeve so that rotation of the sleeve alters not only the angular and longitudinal position of the sleeve, but also the angular and longitudinal position of the guide plate with respect to the body, and resilient means for urging said block continuously in an inward direction so as to retract said needles, and means for moving said block and said needles outwardly in a working stroke in which said needles can puncture the skin of the patient.

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