Dec. 27, 1960 C. H. BOETCKER ET AL 2,966,383

SURGICAL HEADREST

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FIG. 1

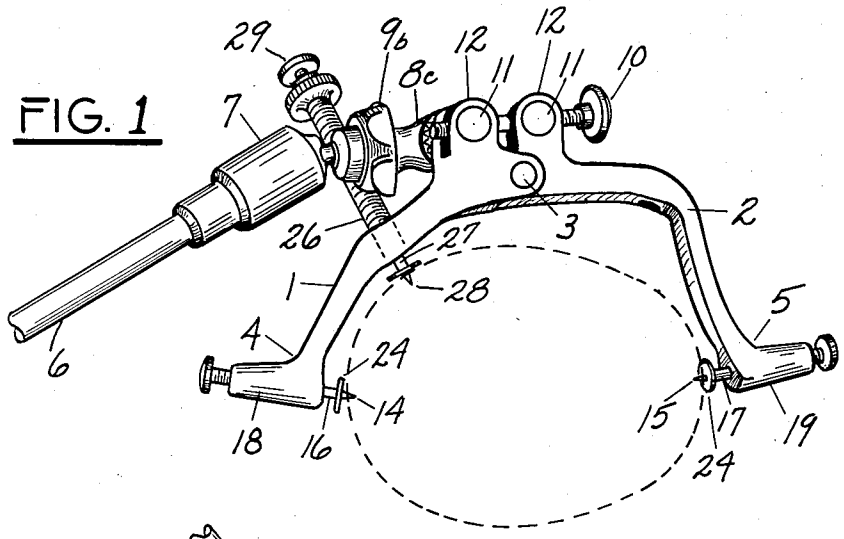
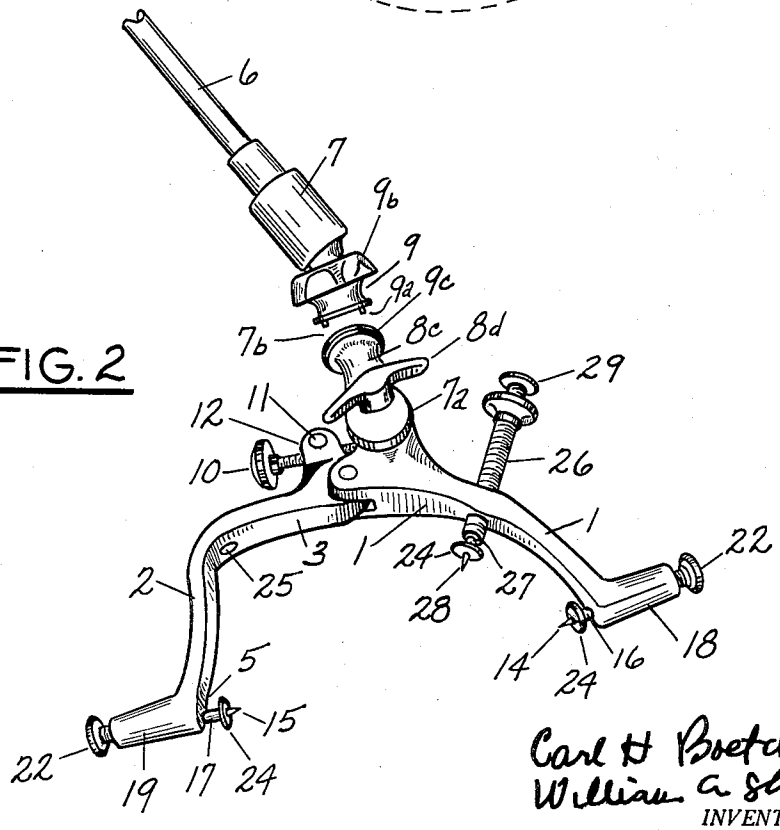


FIG. 2



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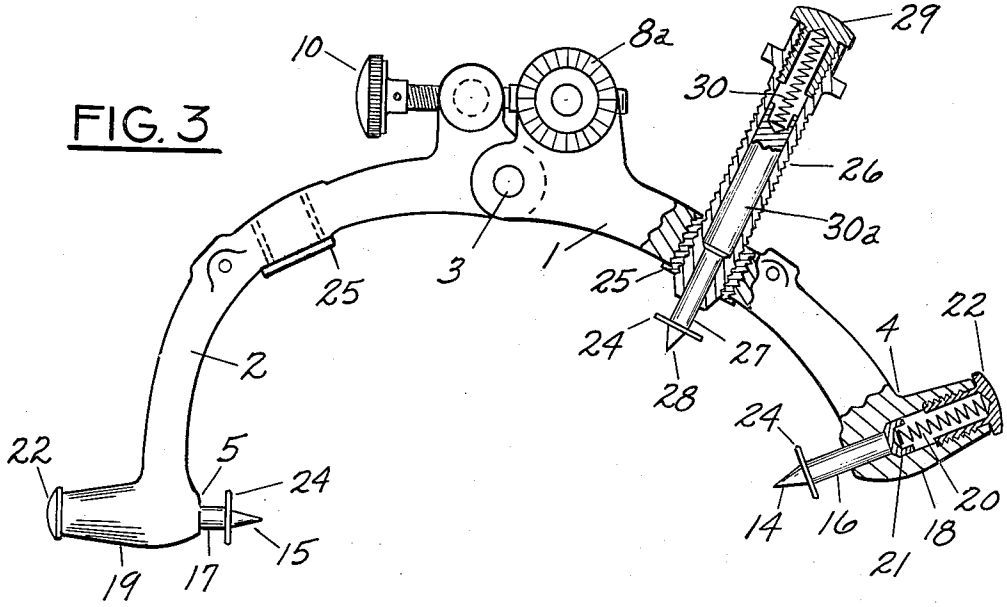
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FIG. 3



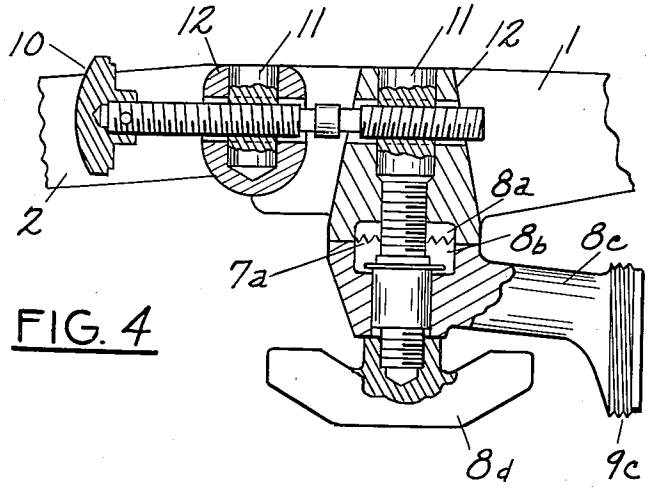


FIG. 4

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SURGICAL HEADREST

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7 Claims. (Cl. 311—10)

This invention is a surgical headrest which provides rigid fixation of the head of a patient during neurosurgical and related procedures at a minimum of discomfort to the patient. In a preferred form, the head is precisely positioned and completely immobilized by three spring loaded pin support points anchored directly to the skull which provide positive non slipping anchorage. Two of the pins engage opposite sides of the skull while the third pin engages the skull at a point intermediate the other two pins. No incision is necessary. The skin must be surgically clean prior to insertion of the pins. Tiny penetration of the points insures no bleeding or discomfort to the patient. The headrest may be applied to the patient prior to the transfer of the patient to the operating table.

The headrest is also useful in plastic surgery and in eye, ear, nose and throat surgery.

In the drawing, Fig. 1 is a perspective of the headrest viewed from above and showing application to the skull of a patient. Fig. 2 is a perspective viewed from below, Fig. 3 is a view partly in section, and Fig. 4 is a detail of the pressure mechanism and of the detachable joint between the headrest and operating table.

The headrest has a frame comprising arms 1 and 2 hinged at 3 and having free ends 4 and 5 adapted to extend along opposite sides of the head of a patient. One of the arms, for example the arm 1, has a jointed connection to a supporting structure, such as one or more ball joints 7, a swivel joint 7*a*, and a break joint 7*b*. The ball joint 7, which may be of common construction, permits universal adjustment and includes structure for locking in adjusted position. The swivel joint 7*a* has serrated surfaces 8*a* and 8*b* respectively on the arm 1 and on a support 8*c*. The swivel joint 7*a* permits adjustment through 360° and is locked in adjusted position by thumb screw 8*d*. The break joint 7*b* comprises a member 9 supported by the ball joint 7 and having two prongs 9*a* received in complementary sockets (not shown) in the support 8*c*. A nut 9*b* screwed on threads 9*c* locks the break joint. The support 6, ball joint 7 and member 9 are normally part of the operating table. The headrest need not be connected to the operating table at the time of application to the patient but may be connected to the table later by the joint 7*b*.

The outer ends 4 and 5 of the arms may be forced together by a screw 10 threaded through swivel nuts 11 in bosses 12 on the arms 1 and 2. One of the nuts 11 has a right hand thread and the other nut has a left hand thread meshing with corresponding threads on the screw so that the arms 1 and 2 move in opposite directions. As the ends 4 and 5 of the arms are forced together, points 14 and 15 on pins 16 and 17 are forced through the scalp and slightly into the skull of a patient as shown in Fig. 1. The pins 16 and 17 are slidably received in sockets 18 and 19 and are urged outward by springs 20, between spring slots 21 and caps 22, 23 screwed into the outer ends of the sockets 18, 19. The caps 22 preset the pressure on the springs 20, the pressure being greatest when the caps are fully screwed into the outer ends of the sockets. The springs 20 limit the pressure which can be developed as the outer ends 4 and 5 of the arms are forced together. The pressure limiting effect of the springs ceases when flanges 24 on the pins bottom against the inner ends of the sockets 18, 19. The flanges 24 also prevent plunging of the points 14, 15 through the bone structure of the patient's head.

In both of the arms 1 and 2 is fixed a threaded bushing 25 making an angle of approximately 60 degrees with the socket 18 or 19, as the case may be, and in one of these bushings is screwed an externally threaded socket member 26 having its inner end slidably receiving a pin 27 of the same construction as the pins 16 and 17 and having a point 28 which is forced into the skull as the socket member 26 is screwed into the selected bushing 25. The socket member 26 has a cap 29 and a pressure limiting spring 30 of the same construction as the caps 22 and springs 20. The pin 27 and the spring 30 are of the same length as the pins 16, 17 and the springs 20 but because of the greater length of the socket 26, the spring seat 30*a* is longer than the spring seats 21. The relative position of the cap 29 with respect to the socket 26 determines the pressure preset into the spring 30 in the same manner as the caps 22. The pin 27 has the same flange 24 as the pins 16, 17.

In the use of the headrest, the arms 1 and 2 are placed to straddle the head of the patient in the desired location and the socket member is screwed into the threaded bushing 25 in one of the arms 1 or 2. The anchoring of the patient's head in the headrest is effected by forcing the points 14, 15 and 28 into the bone structure first by tightening the screw 10 to force the outer ends of the arms 1 and 2 together and then by screwing the socket member 26 further into the bushing 25 to force the point 28 inward. The relative positions of the flanges 24 with respect to the sockets 18, 19 and 26 provide a visual indication of the pressure developed at the points of the pins. Likewise, the relative position of the caps 22, 29 with respect to the outer ends of the sockets 18, 19 and 26 provides a visual indication of the pressure preset into the springs 20 and 30. It accordingly is easy to obtain uniform pressure on the points adequate to establish a non slipping anchorage of the head in the rest without risking damage from over-pressure. The three point suspension provided by the pin points positively locates the head. The punctures made by the pins cause little damage and quickly heal upon removal of the headrest.

As the arms 1, 2 are forced together by the thumb screw 10, the pressure on the points 14, 15 is equal. As the socket 26 is tightened, the pressure on the point 28 because of its line of action tends to reduce the pressure on the nearer of the points 14, 15 and to increase the pressure on the more remote of the points 14, 15. For example as shown in Fig. 1, the pressure on the point 14 would be decreased and the pressure on the point 15 would be increased by the tightening of the socket 26. This however does not cause any loosening of the engagement of the point 14 with the skull because of the automatic take-up provided by the associated spring 20. The same automatic take-up is provided at all of the points 14, 15, 28 in case there should be any enlargement of the penetration. The automatic take-up prevents any change in the fixation of the head even during surgical procedures of long duration.

The points 14, 15, 28 may be fluted or may be conical as shown. The flutes tend to cut through the scalp and flesh while the conical shape tends to push the scalp and flesh to one side. While the fluted shape is theoretically better, the punctures made by both forms of points are

so small that in practice there is little difference. With either point, the pin marks usually completely disappear within 24 to 48 hours.

The direct anchorage of the points to the skull provides a rigidity of fixation not possible in head rests relying upon contact with surface tissue.

What is claimed as new is:

1. A surgical headrest comprising a support, a frame having two arms hinged together and having free ends adapted to extend along the opposite sides of the head, three pins having pointed ends positioned to engage and slightly penetrate the skull of a patient, two of the pins respectively mounted on the free ends of said arms for engaging opposite sides of the skull and the third pin mounted on one of said arms for engaging the skull at a point between the other two pins, an adjusting member screwed into one of the arms and bearing on the other arm for forcing the free ends of the arms together and thereby to force said two pins into engagement with the sides of the skull, another adjusting member screwed into one of the arms for forcing the third pin into engagement with the skull, force transmitting connections from the arms to the pins including springs for limiting the pressure at the points of the pins and the penetration of the points into the skull to a safe value, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking in adjusted position.

2. A surgical headrest comprising a support, three pins having pointed ends positioned to engage and slightly penetrate the skull of a patient, two of the pins adapted to engage opposite sides of the skull and the third adapted to engage the skull at a point between the other two, a frame supporting the pins for movement toward and away from the skull, force transmitting connections from the frame to the pins including springs for limiting the pressure at the points of the pins and the penetration of the points into the skull to a safe value, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking in adjusted position.

3. A surgical headrest comprising a support, a frame having two arms hinged together and having ends adapted to extend along opposite sides of the skull of a patient and each provided with a socket presented toward the skull, a pressure screw for hinging the arms toward the skull, another socket adjustably supported in the frame and presented toward the skull between the other sockets and at an acute angle to one of the other sockets, three pins respectively slidably mounted in said sockets and having pointed ends positioned to engage and slightly penetrate the skull, force transmitting connections from the sockets to the pins including springs for limiting the pressure at the points of the pins and the penetration of the points into the skull to a safe value, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking in adjusted position.

4. A surgical headrest comprising a support, a frame having two arms jointed by a hinge pivot and having free ends adapted to extend along opposite sides of the skull of a patient and each terminating in a socket presented toward the skull, each arm having a threaded opening between the hinge pivot and its socket, an externally threaded socket member screwed in one of said openings for movement toward and away from the skull, a pressure screw for pivoting the arms toward the skull, a pointed pin slidably received in each socket for slightly penetrating into the skull and providing a rigid anchorage, a spring between each pin and its socket for limiting the pressure on the pins, and a jointed connection between the frame and support for permitting adjustment of the frame relative to the support and including means for locking the structure in adjusted position.

5. A surgical headrest comprising a support, three pins having pointed ends positioned to engage and slightly penetrate the skull of a patient, two of the pins adapted to engage opposite sides of the skull and the third adapted to engage the skull at a point between the other two, a frame having provisions for supporting the pins for movement toward and away from the skull, force transmitting connections from the frame to the pins, including springs for limiting the pressure on the points of the pins, and flanges on the pins spaced from the points for preventing plunging of the points through the skull, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking in adjusted position.

6. A surgical headrest comprising a support for rigidly supporting the skull of a patient during surgical procedures, three pins having pointed ends positioned to engage and slightly penetrate the skull of the patient, two of the pins adapted to engage opposite sides of the skull and the third adapted to engage the skull at a point between the other two, a frame having provisions for supporting the pins for movement toward and away from the skull, force transmitting connections from the frame to the pins, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking the jointed connection rigidly in adjusted position.

7. A surgical headrest comprising a support for rigidly supporting the skull of a patient during surgical procedures, three pins having pointed ends positioned to engage and slightly penetrate the skull of the patient, two of the pins adapted to engage opposite sides of the skull and the third adapted to engage the skull at a point between the other two, a frame having provisions for supporting the pins for movement toward and away from the skull, force transmitting connections from the frame to the pins, flanges on the pins spaced from the points for preventing plunging of the points through the skull, and a jointed connection between the support and frame permitting adjustment of the frame relative to the support and including provisions for locking the jointed connection rigidly in adjusted position.

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