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(54) BRACKET FOR MOUNTING AT LEAST ONE POSITION DETECTING SENSOR ON AN ULTRASONIC PROBE

BÜGEL ZUR BEFESTIGUNG ZUMINDEST EINES POSITIONSNACHWEISSENSORS AUF EINER ULTRASCHALLSONDE

CONSOLE POUR MONTER AU MOINS UN CAPTEUR DE POSITION SUR UNE SONDE ULTRASONORE

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(56) References cited:
EP-A- 1 491 158
EP-A- 1 932 477
EP-A- 1 935 365
WO-A-96/10958
US-A- 4 896 673
US-A1- 2004 049 111
US-A1- 2004 230 200
US-A1- 2005 096 536
US-A1- 2006 072 124
US-A1- 2007 167 817
US-A1- 2008 262 356
US-B1- 6 190 395
US-B1- 6 332 891

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Description

SPECIFICATION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Utility Application Serial No. 12/111,387 filed on April 29, 2008, entitled BRACKET FOR MOUNTING AT LEAST ONE POSITIONING DETECTING SENSOR ON AN ULTRASONIC PROBE.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] "Not Applicable"

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISK

[0003] "Not Applicable"

FIELD OF THE INVENTION

[0004] This invention relates generally to medical devices and more particularly to devices for releasably mounting at least one sensor of a 3D tracking system on a ultrasound transducer or other hand-held medical instrument.

BACKGROUND OF THE INVENTION

[0005] Ultrasound has received widespread acceptance as a useful diagnostic tool by providing an image of the internal area of inquiry by emission of very high frequency sound waves from a transducer (commonly called a "probe") placed in contact with the patient's skin adjacent that area of inquiry. Repeated arrays of ultrasonic beams scan that area and are reflected back to the transducer, where the beams are received and the data transmitted to a processing device. A processing unit, to which the probe is connected, analyzes the information and composes a picture for display on an associated monitor screen. For some applications the determination of the precise position or location of the probe with respect to the patient's body is desirable, e.g., to correlate the ultrasonic image to other scans, such as CT scans.

[0006] So-called "3D tracking" systems are commercially available and disclosed in the patent literature for enabling one to readily determine the 3D position of an instrument, such as a medical device, by determining location, orientation, and/or positioning information relative to some coordinate system. For example, Ascension Technology Corporation makes 3D position and orientation tracking devices suitable for various medical applications, e.g., to navigating, localize, and guide medical instruments for image-guided procedures. Other manufacturers/suppliers of 3D tracking systems include Polhemus, Inc. Northern Digital Inc. and Medtronic, Inc.

[0007] Typically 3D tracking systems use the attenuation of oriented electromagnetic signals to determine the absolute position and orientation of a sensor, relative to a source, e.g., a DC magnetic field generator. The source and the sensor are connected via cables to an electronics module, which contains a microcomputer and associated electronics of the system. The source typically includes three orthogonal coils that are pulsed in rotation, one after another. Each pulse transmits a radio frequency electromagnetic signal that is detected by the sensor. The sensor also contains three orthogonal coils, which measure the strength of the signal from the current source coil. By using the known pulse strength at the source and the known attenuation of the strength with distance, the position and orientation of the sensor coils can be calculated by the system via triangulation techniques.

[0008] Utilizing device location or 3D tracking systems with ultrasonic probes can be accomplished by permanently mounting the sensor(s) on the probe or by building such sensor(s) into the probe. However, this approach may not be desirable if the probe is also intended to be used in applications wherein its position need not be determined, since the inclusion of such sensor(s) permanently on or in the probe will likely increase the cost and complexity of the probe. Moreover, such an approach may not be suitable to retrofit existing ultrasonic probes. Thus, the use of some releasable mounting system is deemed to be the better approach for providing an ultrasonic probe with means for determining its position with respect to the patient's body.

[0009] As will be appreciated by those skilled in the art, the prior art includes various brackets for releasable mounting devices on an ultrasonic probe. Such brackets are commonly used to support biopsy needle guides and the like. Examples of such brackets are disclosed in United States Letters Patent Nos.: 5,052,396 (Wedel et al.), 5,076,269 (Arenson et al.), 5,623,931 (Wung et al.), 5,758,650 (Miller et al.), 5,941,889 (Cermak), 6,379,307 (Filly et al.), and 7087,024 (Pruter). My prior United States Letters Patent No. 5,941,889 (Cermak) discloses and claims a multiple angle disposable needle guide system for use in guiding needles into selected locations of a patient relative to an ultrasonic probe or some other medical instrument imaging sensor. Document US 2006 072124 discloses a bracket according to the pre-amble of claim 1.

[0010] While such brackets are suitable for their intended purposes, they are not designed for mounting one or more position sensors thereon. Accordingly, a need exists for such a bracket. Moreover, that bracket should be constructed so that the sensor(s) when mounted thereon will be resistant to accidental displacement, but can be readily removed and/or mounted when desired. This invention addresses those needs.

[0011] All references cited herein are incorporated herein by reference in their entireties.

SUMMARY OF THE INVENTION

[0012] The invention is a bracket according to Claim 1. In accordance with one exemplary embodiment of the bracket of this invention each of the wall portions of the at least one socket includes a slot and the pins project from the opposed wall portions of the at least one sensor and are axially aligned.

[0013] In accordance with one embodiment of this invention there is provided the combination according to Claim 7.

DESCRIPTION OF THE DRAWING

[0014]

Fig.1 is an isometric view of a portion of an ultrasonic probe having one exemplary embodiment of a bracket constructed in accordance with one aspect of this invention for supporting up to two position-locating sensors on the probe, so that those sensors are resistant to accidental displacement;

Fig. 2A is an side elevation view showing the sensor in an orientation wherein it is juxtaposed opposite a socket portion of a bracket like shown in Fig. 1 so that a sensor is ready for mounting therein;

Fig. 2B is an side elevation view, similar to Fig. 2A, showing the sensor at an initial position within the socket;

Fig. 2C is a side elevation view, similar to Figs. 2A and 2B, but showing the sensor at its final or locked position within the socket, wherein it is resistant to accidental displacement;

Fig. 3 is an isometric view of the exemplary sensor shown in Figs. 2A - 2C;

Fig. 4 is an exploded isometric view of the various components making up the embodiment of the bracket shown in Fig. 1;

Fig. 5 is an isometric view of an alternative embodiment of a bracket constructed in accordance with this invention, the bracket of this embodiment including a fixed-angle biopsy needle guide assembly;

Fig. 6 is an isometric view similar to Fig. 5, but showing still another embodiment of a bracket constructed in accordance with this invention, the bracket of this embodiment including an adjustable angle biopsy needle guide assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Referring now to the various figures of the drawing wherein like reference characters refer to like parts, there is shown in Fig. 1 a bracket 20 for use with an ultrasound transducer 10 to releasably mount one or more sensors 22 of a location sensing system, e.g., a 3D tracking system, such as available from Ascension Technology Corporation, or any other manufacturers of such systems. In the interest of drawing simplicity and brevity the other components of the locating sensing system are not shown. It should be pointed out at this juncture that subject invention can make use of any kinds of sensors for any kinds of 3D tracking systems whether based on electromagnetic, acoustic, mechanical, or optical technology. As such, the subject invention does not require any particular construction for the sensor, except that the body or housing of the sensor should be constructed to include a feature to be described shortly that ensures that when the sensor is in a locked position it is resistant to accidental displacement. In the exemplary embodiments shown and described herein such features comprise a pair of pins. However, other arrangements can be used as well.

[0016] The bracket 20 basically comprises a body portion 24 supporting one or more sockets 26. The details of the body portion 24 will be described later. Suffice for now to state that the body portion is arranged to be releasably mount the bracket 20 on the transducer 10. Each socket 26 is, in turn, arranged to releasably mount a respective one of the sensors 22 of the location sensing system. In the embodiment shown in Fig. 1, two such sensors 22 are shown mounted in respective sockets of the bracket 20 in their operative or locked position (i.e., a position wherein they are resistant to accidental displacement). It should be pointed out at this juncture that the bracket of the subject invention can be constructed to accommodate more than two sensors or only one sensor, depending upon the application.

[0017] The transducer 10 can be of any conventional or non-conventional construction and may be an ultrasonic transducer or any other hand-holdable probe or device for use with any type of scanning system where the position and orientation of the probe or device is desired to be determined. As best seen in Figs. 1 and 4, the body portion 24 basically comprises a ring-like member which is arranged to snap-fit about a portion of the periphery of the probe 10, e.g., about the lower or distal portion of the probe as shown in Fig. 1. A sterilized cover (not shown) may be interposed between the probe and the bracket 20. In the exemplary embodiment shown, the ring-like body portion 24 is an integral member, e.g., a molded component formed of any suitable material, e.g., plastic, and includes four sidewall portions, namely, a left sidewall portion 24A, a right sidewall portion 24B, a front wall portion 24C and a rear wall portion 24D. In the exemplary embodiment of Fig. 1 two sockets 26 are mounted on the body portion 24. In particular, one socket 26 is mounted on the left sidewall portion 24A while the other socket 26 is mounted on the right sidewall portion 24A. The mounting of the sockets on their respective sidewalls is accomplished by use of respective pairs of threaded fastener 28 as shown clearly in Fig. 4. These fasteners are arranged to extend through respective holes (to be described later) in the sockets for receipt in respective holes (also to be described later) in bosses (also to be described later) formed on the respective sidewalls of

the ring-like body member 24.

[0018] The details of the sockets 26 will now be described with reference to Fig. 4. As can be seen therein each socket 26 is a generally U-shaped member, e.g., an integral molded component formed of any suitable material, e.g., plastic. Each socket 26 basically comprises a member having a pair of opposed sidewalls 28 and 30, a back wall 32 that bridges the sidewalls 28 and 30 along their full length and a front wall 34 that bridges the bottom ends of the sidewalls 28 and 30. The free end of each of the sidewalls 28 and 30 is in the form of a slight cam surface lip or flange 36. The contiguous walls 28, 30, 32 and 34 define an internal cavity 38 which is arranged for receipt of the body of the sensor 26. The cavity 38 has a longitudinal (e.g., vertical in Fig. 4) axis 38A. The entrance to the cavity 38 is the gap between the cam surface flanges 36 of the sidewalls 28 and 30. The gap extends generally parallel to the longitudinal axis 38A of the socket's cavity. It is through this gap that the sensor is introduced into the cavity 38.

[0019] Each of the sidewalls 28 and 30 includes a horizontally oriented slot 40. Each slot 40 is located immediately above the front wall 34 where the front wall meets the sidewall in which the slot is located. The innermost end of each slot 40 is semicircular in shape and of a predetermined radius to accommodate a respective pin (to be described later) of the sensor 22. The back wall 32 of each socket 26 includes a pair of openings 42 through which the heretofore mentioned fasteners 28 extend for mounting the socket on the ring-like body member 24. As mentioned earlier the ring-like body member includes a pair of bosses and associated holes to receive the fasteners. In particular a pair of bosses 44 projects outward from the outer surface of the sidewall portion 24A of the body portion 24, while a similar pair of bosses 44 projects outward from the outer surface of the sidewall portion 24B. A hole 46 extends through each of the bosses 44. It is in the hole 46 that a portion of and associated fastener 28 resides to secure the socket 26 to the ring-like body member 24.

[0020] The details of the sensors 22 will now be described with reference to Figs. 1 and 3. To that end, each sensor 22 basically comprises an elongated body 48 having a longitudinal axis 48A. The sensor's body may be formed of any suitable material, e.g., a molded plastic, and houses the components (not shown) making up the sensor.

[0021] As mentioned earlier, each sensor includes a pair of pins for cooperation with the sockets to render the sensor resistant to accidental displacement from that socket when the sensor is in the locked position. Those pins are designated by the reference number 50 and are best seen in Fig. 3. The pins 50 are axially aligned pins project outward from a lower portion of sensor's body 48 perpendicularly to its longitudinal axis 48A. A cable 52 projects outward from the upper end of the sensor for connection to the associated component of the 3D tracking system. In the exemplary embodiments shown herein the sensor's body is of a generally parallelepiped shape. However, other elongated shapes, e.g., cylindrical, oval, hexagonal, etc., can clearly be utilized for the sensor. Each of the axially aligned pins has an outside diameter just slightly less than the width of the slots 40 in the sidewalls 28 and 30 of the sockets 26 so that the pins 50 can be inserted therein for ultimate residence at the semicircular inner end of the slot 40. In order to facilitate the entry of the pins into the slots the entry to each of the slots 40 is flared or chamfered slightly as best seen in Figs. 2A - 2C.

[0022] The manner of mounting each sensor into its respective socket will now be described with reference to Figs. 2A - 2C. To that end, the sensor 22 is oriented at a first position so that its lower end is juxtaposed opposite the socket 26 an wherein its longitudinal axis 48A is at an angle of approximately 80 degrees to the longitudinal axis 38A of the socket's cavity as shown in Fig. 2A. The probe is then moved towards the socket so that its pins 50 enter into the respective slots 40 in the sidewalls 28 and 30 as shown in Fig. 2B until the pins reach the semi-circular ends of those slots. The sensor is then rotated upward, i.e., towards the longitudinal axis 38A of the socket using the pins 50 as the pivot axis. This action causes the body 48 of the sensor to enter into the gap between the cam ends 36 of the sidewalls 28 and 30, whereupon those sidewalls flex apart slightly to allow the body 48 of the sensor to pass therebetween. When the longitudinal axis 48A of the sensor's body 48 is in a second position that is parallel to the longitudinal axis 38A of the socket, the body portion of the sensor will be fully within the socket, whereupon the sidewalls 28 and 30 snap back into place thereby locking the sensor in the cavity of the socket. This second position is the heretofore mentioned locked position, wherein the sensor is resistant to accidental displacement with respect to the bracket. In particular, the cam flanges on the ends of the sidewalls 28 and 30 will prevent lateral displacement of the probe, while the residence of the pins 50 within the slots 40 will prevent longitudinal displacement, e.g., displacement which could occur if the sensor's cable is accidentally pulled.

[0023] Notwithstanding the above, dismounting of any sensor can be readily accomplished when desired by merely pivoting the sensor 22 in the counter-clockwise direction, i.e., away from the longitudinal axis 38A of the socket, from its locked position shown in Fig. 2C, whereupon the body 48 of the sensor passes through the gap between the cam surfaces 36 on the ends of the sidewalls 28 and 30. Continued rotation of the sensor 22 in that rotational direction with respect to the socket 26 will bring it to the orientation wherein its longitudinal axis 48A is at an angle of approximately 80 degrees to the longitudinal axis 38A of the socket. When the sensor is in this orientation (such as shown in Fig. 2B), the sensor can be pulled laterally away from the socket, like shown in Fig. 2A, thereby dismounting it from the bracket. It should be pointed out that the acute angle of 80 degrees at which

the sensor body is oriented to introduce its pins 50 into the slots 40 to either mount the sensor or dismount the sensor is merely exemplary. Thus, the bracket of the subject invention can be constructed so that the entry angle of the sensor is at whatever angle is desired, e.g., perpendicular or at some acute angle less than 90 degrees.

[0024] Each sensor 22 may be mounted in or dismounted from each socket 26 in the same manner as described above. Moreover, while the embodiment of the bracket 20 shown in Fig. 1 includes two sockets, each identified with respective indicia, i.e., the number "1" embossed on the sidewall 28 of one socket and the number "2" embossed on the sidewall 28 of the other socket, to permit up to two sensors to be used at one time, that is not obligatory. Thus, only one sensor may be mounted on the bracket at any one time for some procedure and that sensor may be mounted within either socket #1 or socket #2.

[0025] In Fig. 5 there is shown a second embodiment of a bracket 20' constructed in accordance with this invention. The bracket 20' is identical in construction to bracket 20 except that it includes a conventional biopsy needle guide assembly 100 mounted on the rear wall 24D. The needle guide can be of any desired construction. In this embodiment the needle guide is a fixed angle needle guide, i.e., a guide wherein the angle that the biopsy needle is introduced into the patient's body via the transducer is a fixed, predetermined angle.

[0026] In Fig. 6 there is shown a third embodiment of a bracket 20" constructed in accordance with this invention. The bracket 20" is identical in construction to bracket 20' except that it includes an adjustable angle biopsy needle guide assembly 200 mounted on the rear wall 24D. The adjustable needle guide assembly 200 is preferably constructed in accordance with the teachings of my aforementioned United States Patent No. 5,941,889, which as mentioned above is incorporated by reference herein, so that the biopsy needle can be introduced into the patient's body from any one of several predetermined angles. Other adjustable needle guides can be used in lieu of that adjustable needle guide.

[0027] It should be pointed out at this juncture, that while the exemplary preferred embodiments disclosed above make use of the projecting pins being located on the sensor, it is contemplated that the pins form a portion of the sockets, e.g., extend inward into the cavity 38 from respective sidewalls 28 and 30, in which case the body 48 of the sensor would have to include appropriately configured slots or recesses to enable the pins of the socket to be received therein so that the sensor can be pivoted from an initial position to a locked position and vice versa.

[0028] Without further elaboration the foregoing will so fully illustrate my invention that others may, by applying current or future knowledge, adopt the same for use under various conditions of service.

Claims

1. A bracket (20) for use with an ultrasound transducer (10) and for releasably mounting at least one sensor (22) of a location sensing system on the transducer (10), the at least one sensor (22) having a body (48) including an opposed pair of wall portions, said bracket (20) comprising a member (24) arranged in use to be releasably mounted on the transducer (10), **characterized in that** said bracket (20) includes at least one socket (26) therein, said at least one socket (26) having a pair of spaced-apart wall portions (28, 30) and one of a pair of pins (50) and a pair of slots (40), the at least one sensor having the other of one of the pair of pins (50) and the pair of slots (40), and **in that** in use said at least one socket (26) and the at least one sensor (22) are arranged to be coupled together via the pins (50) and slots (40) wherein in use the pair of pins are received in the pair of slots when the at least one sensor (22) is in a first position to enable the pins and slots to cooperate with each other, whereupon the at least one sensor (22) may be rotated to a second position within said at least one socket (26),
wherein said spaced-apart walls (28, 30) of said at least one socket (26) are adapted to snap fit about portions of the at least one sensor (22) to deter in use accidental displacement of the at least one sensor (22) with respect to the transducer (10).

2. The bracket (20) of Claim 1 wherein the at least one sensor (22) comprises the pins (50), the pins (50) projecting from the opposed wall portions of the at least one sensor (22) and being axially aligned, and wherein each of said spaced-apart wall portions (28, 30) of said at least one socket (26) includes the slots (40), said slots (40) of said at least one socket (26) being arranged for receipt of respective ones of the pins (50) of the at least one sensor (22).

3. The bracket (20) of Claim 2 wherein the at least one sensor (22) comprises an elongated body (48) having a longitudinal axis (48A), and wherein the axially aligned pins (50) project outward from a lower portion of the body (48) perpendicular to the longitudinal axis (48A) and wherein said slots (40) of said at least one socket (26) are axially aligned for receipt of the axially aligned pins (50).

4. The bracket (20) of Claim 3 wherein said at least one socket (26) includes a longitudinal axis (38A) and wherein the longitudinal axis (48A) of the at least one sensor (22) is oriented parallel to said longitudinal axis (38A) of said at least one socket (26) when the at least one sensor (22) is in the second position.

5. The bracket (20) of Claim 4 wherein the longitudinal axis (48A) of the at least one sensor (22) is oriented

at an acute angle to said longitudinal axis (38A) of said at least one socket (26) when the at least one sensor (22) is in the first position.

6. The bracket (20) of any preceding Claim wherein said bracket (20) includes a ringlike member (24) for encircling a portion of the transducer (10) to releasably mount said bracket (20) thereon.

7. The bracket of claim 1 in combination with at least one said sensor.

8. The combination of Claim 7 wherein said pins (50) project from said opposed wall portions of said at least one sensor (22) and are axially aligned, and wherein each of said spaced-apart wall portions (28, 30) of said at least one socket (26) includes the slots (40), said slots (40) of said at least one socket (26) being arranged for receipt of respective ones of said pins (50) of said at least one sensor (22).

9. The combination of Claim 8 wherein said sensor (22) comprises an elongated body (48) having a longitudinal axis (48A), and wherein said axially aligned pins (50) project outward from a lower portion of said body (48) perpendicular to said longitudinal axis (48A).

10. The combination of Claim 9 wherein said at least one socket (26) includes a longitudinal axis (38A) and wherein said longitudinal axis (48A) of said at least one sensor (22) is oriented parallel to said longitudinal axis (38A) of said at least one socket (26) when said at least one sensor (22) is in said second position.

11. The combination of Claim 10 wherein the longitudinal axis (48A) of said at least one sensor (22) is oriented at an acute angle to said longitudinal axis (38A) of said at least one socket (26) when said at least one sensor (22) is in said first position.

12. The combination of any one of Claims 7 to 11 wherein said bracket (20) includes a ring-like member (24) for encircling a portion of the transducer (10) to releasably mount said bracket (20) thereon.

Patentansprüche

1. Halter (20) zur Verwendung mit einem Ultraschallwandler (10) und zur lösbaren Befestigung von wenigstens einem Sensor (22) eines Positionserfassungssystems an dem Wandler (10), wobei der wenigstens eine Sensor (22) einen Körper (48) mit einem gegenüberliegenden Paar von Wandbereichen aufweist, wobei der Halter (20) wenigstens ein Teil (24) aufweist, das bei der Benutzung lösbar an dem Wandler (10) befestigt ist, **dadurch gekennzeichnet, dass** der Halter (20) wenigstens einen Sockel (26) daran aufweist, wobei der wenigstens eine Sokkel (26) ein Paar von beabstandeten Wandteilen (28, 30) und eines eines Paars von Stiften (50) und eines Paars von Schlitzen (40) aufweist, und der wenigstens eine Sensor das andere des Paars von Stiften (50) und des Paars von Schlitzen (40) enthält, und dass bei der Verwendung der wenigstens eine Sokkel (26) und der wenigstens eine Sensor (22) so angeordnet sind, dass sie über die Stifte (50) und Schlitze (40) miteinander gekoppelt sind, wobei bei der Verwendung das Paar von Stiften in dem Paar von Schlitzen aufgenommen ist, wenn der wenigstens eine Sensor (22) sich in einer ersten Position befindet, um es zu ermöglichen, dass die Stifte und Sockel miteinander zusammenwirken, und danach der wenigstens eine Sensor (22) in eine zweite Position innerhalb des wenigstens einen Sockels (26) geschwenkt werden kann, wobei die beabstandeten Wände (28, 30) des wenigstens einen Sockels (26) so ausgebildet sind, dass sie um Teile des wenigstens einen Sensors (22) passend einschnappen können, um bei der Benutzung ein zufälliges Versetzen des wenigstens einen Sensors (22) im Hinblick auf den Wandler (10) zu verhindern.

2. Halter (20) nach Anspruch 1, wobei der wenigstens eine Sensor (22) die Stifte (50) enthält, wobei die Stifte (50) von den gegenüberliegenden Wandteilen des wenigstens einen Sensors (22) abstehen und axial ausgerichtet sind, und wobei jeder der beabstandeten Wandbereiche (28, 30) des wenigstens einen Sockels (26) die Schlitze (40) aufweist, wobei die Schlitze (40) des wenigstens einen Sockels (26) so ausgebildet sind, dass sie jeweils einen der Stifte (50) des wenigstens einen Sensors (22) aufnehmen.

3. Halter (20) nach Anspruch 2, wobei der wenigstens eine Sensor (22) einen länglichen Körper (48) enthält, der eine Längsachse (48A) aufweist, und wobei die axial ausgerichteten Stifte (50) sich von einem unteren Bereich des Körpers (48) rechtwinklig nach außen zur Längsachse (48A) erstrecken und wobei die Schlitze (40) des wenigstens eines Sockels (26) axial zur Aufnahme der axial ausgerichteten Stifte (50) axial ausgerichtet sind.

4. Halter (20) nach Anspruch 3, wobei der wenigstens eine Sockel (26) eine Längsachse (38A) enthält, und wobei die Längsachse (48A) des wenigstens einen Sensors (22) parallel zur Längsachse (38A) des wenigstens einen Sockels (26) orientiert ist, wenn der wenigstens eine Sensor (22) sich in der zweiten Position befindet.

5. Halter (20) nach Anspruch 4, wobei die Längsachse (48A) des wenigstens einen Sensors (22) in einem

spitzen Winkel zur Längsachse (38A) des wenigstens einen Sockels (26) orientiert ist, wenn der wenigstens eine Sensor (22) sich in der ersten Position befindet.

6. Halter (20) nach einem der vorhergehenden Ansprüche, wobei der Halter (20) ein ringartiges Teil (24) zum Umschließen eines Teils des Wandlers (10) enthält, um den Halter (20) daran lösbar zu befestigen.

7. Halter (20) nach Anspruch 1 in Kombination mit wenigstens einem Sensor.

8. Kombination nach Anspruch 7, wobei die Stifte (50) von den gegenüberliegenden Wandteilen des wenigstens einen Sensors (22) abstehen und axial ausgerichtet sind, und wobei jeder der beabstandeten Wandbereiche (28, 30) des wenigstens einen Sokkels (26) die Spalten (40) enthält, wobei die Spalten (40) des wenigstens einen Sockels (26) so angeordnet sind, dass sie jeweils einen der Stifte (50) des wenigstens einen Sensors (22) aufnehmen.

9. Kombination nach Anspruch 8, wobei der Sensor (22) einen länglichen Körper (48) aufweist, der eine Längsachse (48A) enthält, und wobei die axial ausgerichteten Stifte (50) von einem unteren Teil des Körpers (48) nach außen rechtwinklig zur Längsachse (48A) abstehen.

10. Kombination nach Anspruch 9, wobei der wenigstens eine Sockel (36) eine Längsachse (38A) enthält, und wobei die Längsachse (48A) des wenigstens einen Sensors (22) parallel zur Längsachse (38A) des wenigstens einen Sockels (26) orientiert ist, wenn der wenigstens eine Sensor (22) sich in der zweiten Position befindet.

11. Kombination nach Anspruch 10, wobei die Längsachse (48A) des wenigstens einen Sensors (22) in einem spitzen Winkel zur Längsachse (38A) des wenigstens einen Sockels (26) orientiert ist, wenn der wenigstens eine Sensor (22) sich in der ersten Position befindet.

12. Kombination nach einem der Ansprüche 7 - 11, wobei der Halter (20) ein ringartiges Teil (24) zum Umgreifen eines Teils des Wandlers (10) enthält, um den Halter (20) lösbar daran zu befestigen.

Revendications

1. Console (20) destinée à être utilisée avec un transducteur ultrasonore (10) et pour monter de manière amovible au moins un capteur (22) d'un système de détection de position sur le transducteur (10), le au moins un capteur (22) ayant un corps (48) comprenant une paire opposée de parties de paroi, ladite console (20) comprenant un élément (24) agencé, à l'usage, pour être monté de manière amovible sur le transducteur (10), **caractérisée en ce que** ladite console (20) comprend au moins une douille (26) à l'intérieur de cette dernière, ladite au moins une douille (26) ayant une paire de parties de paroi espacées (28, 30) et l'une parmi une paire de broches (50) et une paire de fentes (40), le au moins un capteur ayant l'autre parmi la paire de broches (50) et la paire de fentes (40), et **en ce que**, à l'usage, ladite au moins une douille (26) et ledit au moins un capteur (22) sont agencés pour être couplés ensemble via les broches (50) et les fentes (40), dans laquelle, à l'usage, la paire de broches est reçue dans la paire de fentes lorsque le au moins un capteur (22) est dans une première position pour permettre aux broches et aux fentes de coopérer entre elles, suite à quoi le au moins un capteur (22) peut être entraîné en rotation vers une seconde position dans ladite au moins une douille (26), dans laquelle lesdites parois espacées (28, 30) de ladite au moins une douille (26) sont adaptées pour s'ajuster parfaitement autour des parties du au moins un capteur (22) pour empêcher à l'usage, le déplacement accidentel du au moins un capteur (22) par rapport au transducteur (10).

2. Console (20) selon la revendication 1, dans laquelle le au moins un capteur (22) comprend les broches (50), les broches (50) faisant saillie des parties de paroi opposées du au moins un capteur (22) et étant axialement alignées, et dans laquelle chacune desdites parties de paroi espacées (28, 30) de ladite au moins une douille (26) comprend les fentes (40), lesdites fentes (40) de ladite au moins une douille (26) étant agencées pour recevoir les broches respectives des broches (50) du au moins un capteur (22).

3. Console (20) selon la revendication 2, dans laquelle le au moins un capteur (22) comprend un corps allongé (48) ayant un axe longitudinal (48A), et dans laquelle les broches (50) axialement alignées font saillie vers l'extérieur à partir d'une partie inférieure du corps (48) perpendiculaire à l'axe longitudinal (48A), et dans laquelle lesdites fentes (40) de ladite au moins une douille (26) sont axialement alignées pour la réception des broches (50) axialement alignées.

4. Console (20) selon la revendication 3, dans laquelle ladite au moins une douille (26) comprend un axe longitudinal (38A), et dans laquelle l'axe longitudinal (48A) du au moins un capteur (22) est orienté parallèlement audit axe longitudinal (38A) de ladite au moins une douille (26) lorsque le au moins un capteur (22) est dans la seconde position.

5. Console (20) selon la revendication 4, dans laquelle l'axe longitudinal (48A) du au moins un capteur (22) est orienté selon un angle aigu par rapport audit axe longitudinal (38A) de ladite au moins une douille (26) lorsque le au moins un capteur (22) est dans la première position.

6. Console (20) selon l'une quelconque des revendications précédentes, dans laquelle ladite console (20) comprend un élément de forme annulaire (24) pour encercler une partie du transducteur (10) afin de monter de manière amovible ladite console (20) sur ce dernier.

7. Console selon la revendication 1, en combinaison avec ledit au moins un capteur.

8. Combinaison selon la revendication 7, dans laquelle lesdites broches (50) font saillie desdites parties de paroi opposées dudit au moins un capteur (22) et sont axialement alignées, et dans laquelle chacune desdites parties de paroi espacées (28, 30) de ladite au moins une douille (26) comprend les fentes (40), lesdites fentes (40) de ladite au moins une douille (26) étant agencées pour recevoir des broches respectives desdites broches (50) dudit au moins un capteur (22).

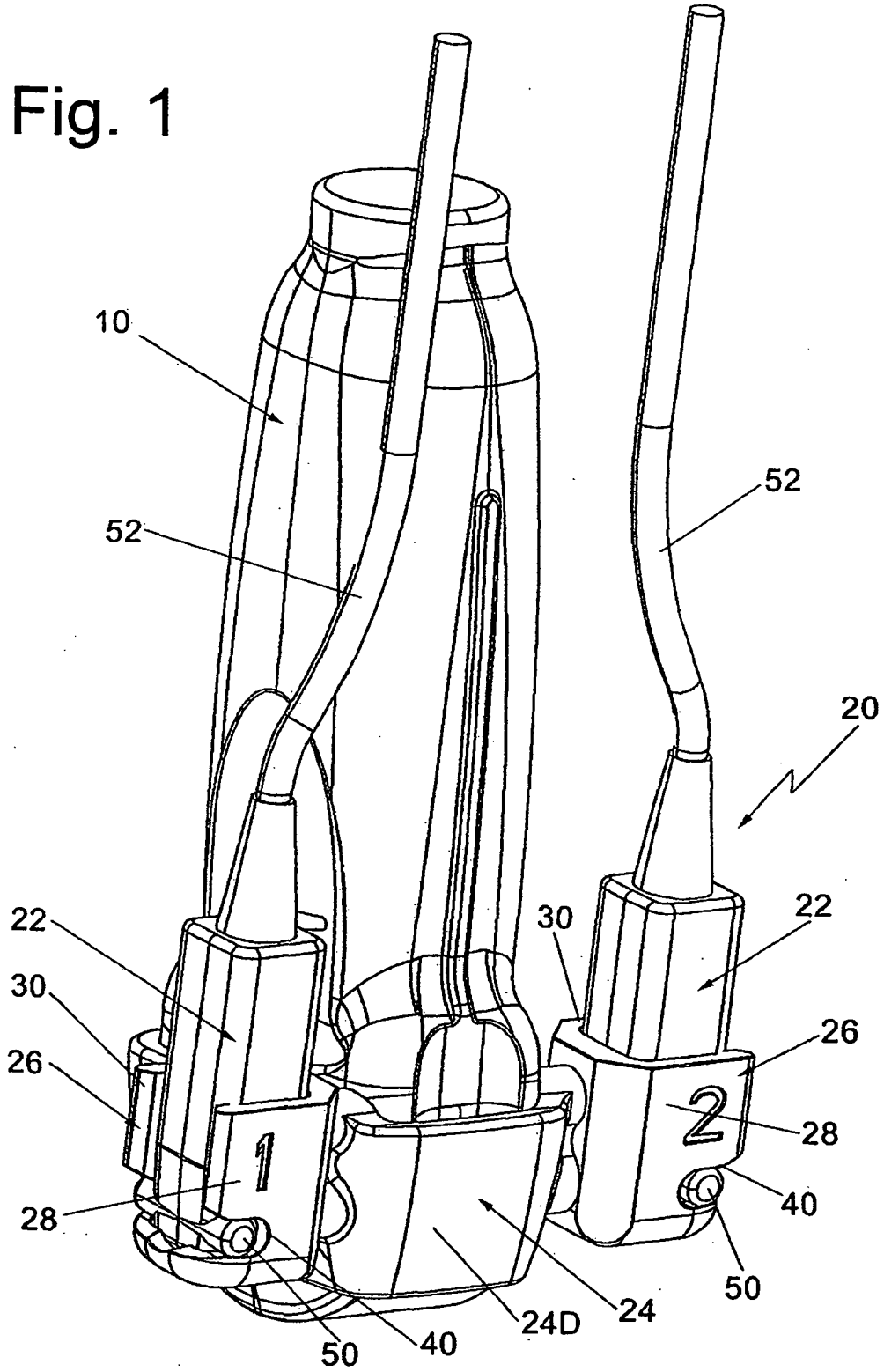
9. Combinaison selon la revendication 8, dans laquelle ledit capteur (22) comprend un corps allongé (48) ayant un axe longitudinal (48A), et dans laquelle lesdites broches (50) axialement alignées font saillie vers l'extérieur à partir d'une partie inférieure dudit corps (48) perpendiculaire audit axe longitudinal (48A).

10. Combinaison selon la revendication 9, dans laquelle ladite au moins une douille (26) comprend un axe longitudinal (38A) et dans laquelle ledit axe longitudinal (48A) dudit au moins un capteur (22) est orienté parallèlement audit axe longitudinal (38A) de ladite au moins une douille (26) lorsque ledit au moins un capteur (22) est dans ladite seconde position.

11. Combinaison selon la revendication 10, dans laquelle l'axe longitudinal (48A) dudit au moins un capteur (22) est orienté selon un angle aigu par rapport audit axe longitudinal (38A) de ladite au moins une douille (26) lorsque ledit au moins un capteur (22) est dans ladite première position.

12. Combinaison selon l'une quelconque des revendications 7 à 11, dans laquelle ladite console (20) comprend un élément de forme annulaire (24) pour encercler une partie du transducteur (10) afin d'y monter de manière amovible ladite console (20).

Fig. 1



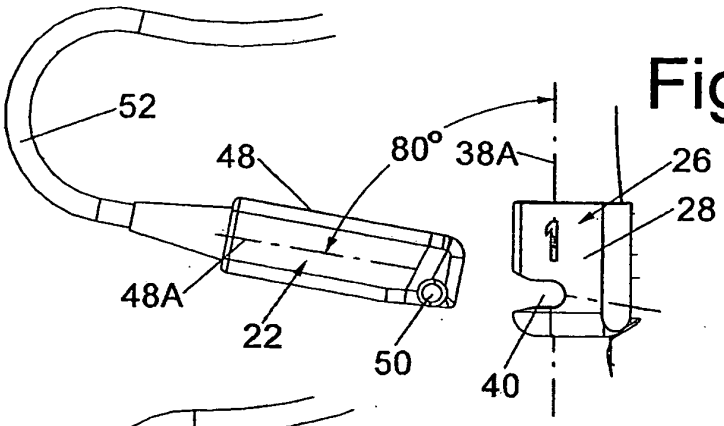


Fig. 2A

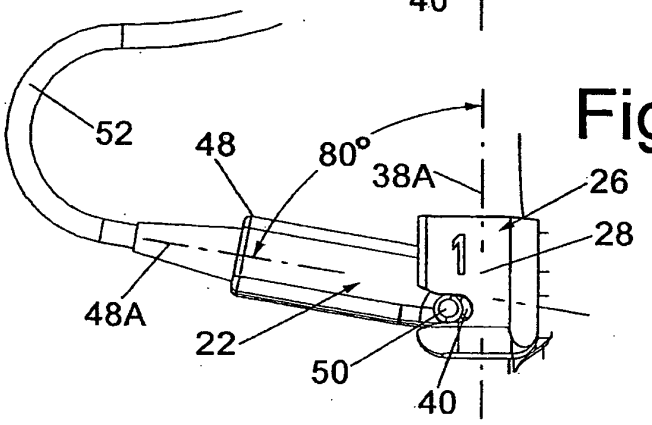


Fig. 2B

Fig. 2C

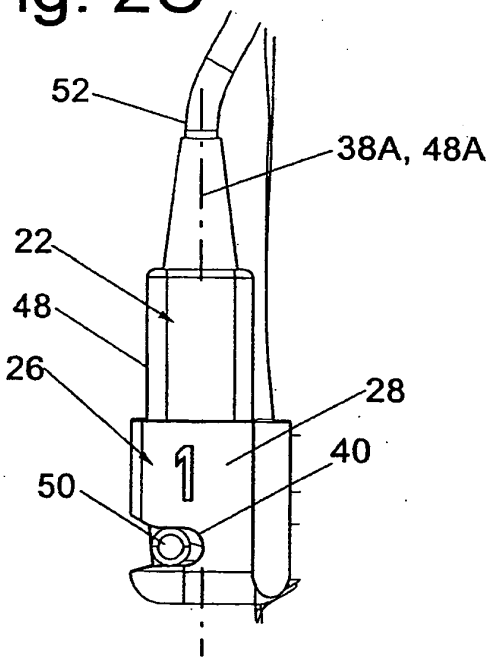
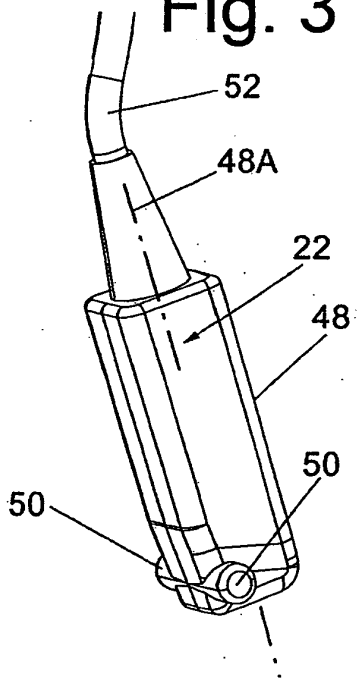


Fig. 3



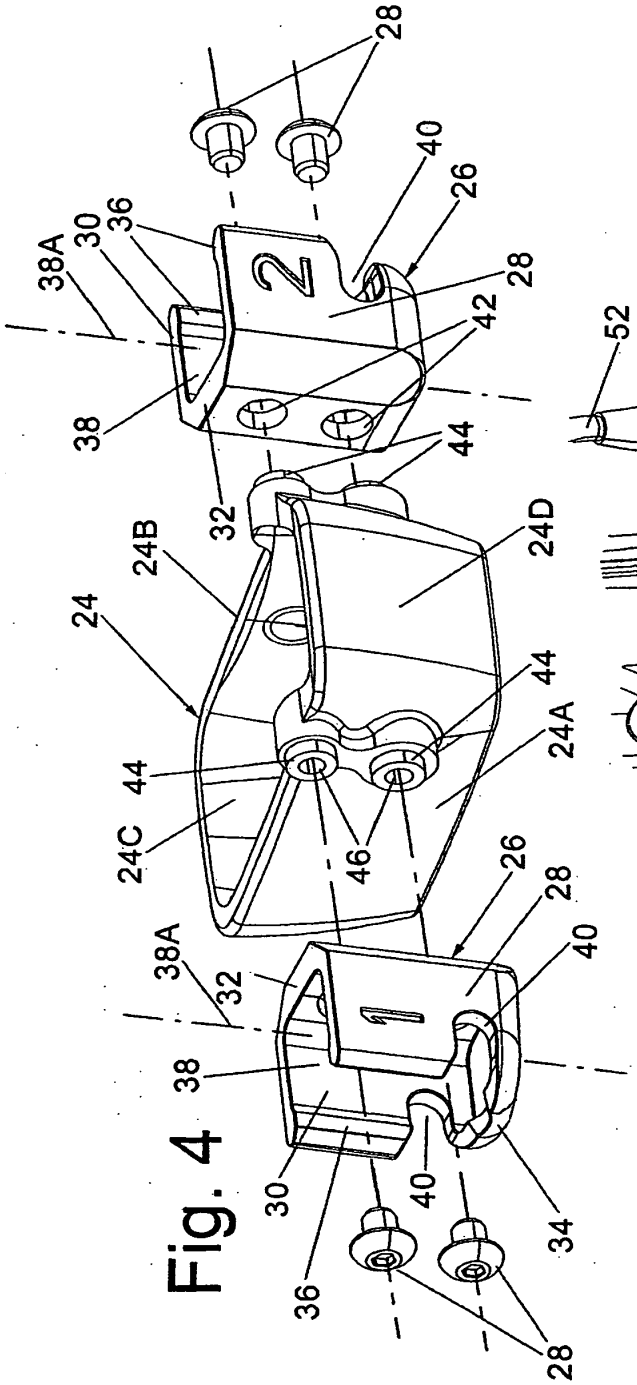

28
40
26
38A
30
36
28
38
42
44
32
24B
24D
24
44
24A
24C
46
26
28
38A
40
32
38
30
40
34
36
28

Fig. 4

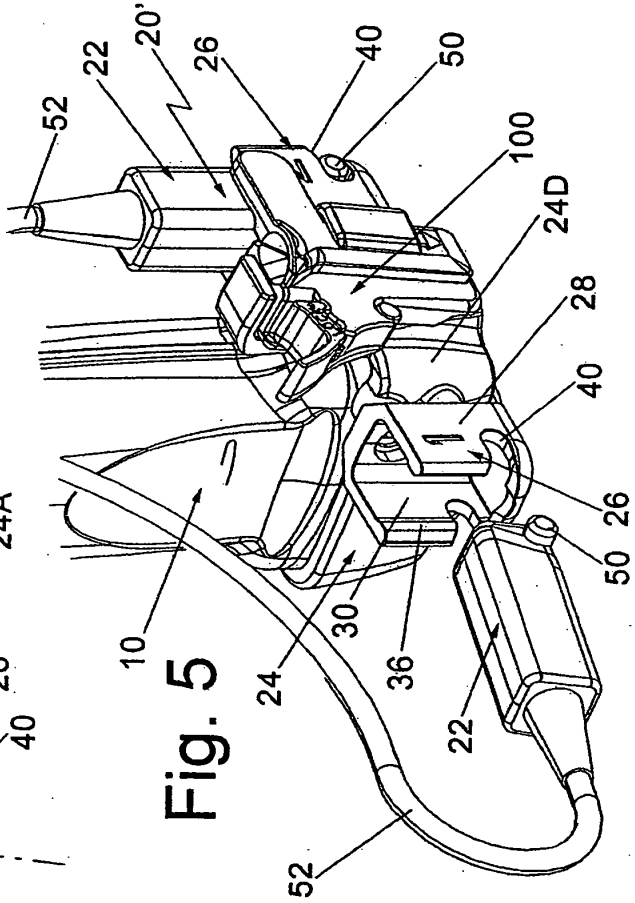
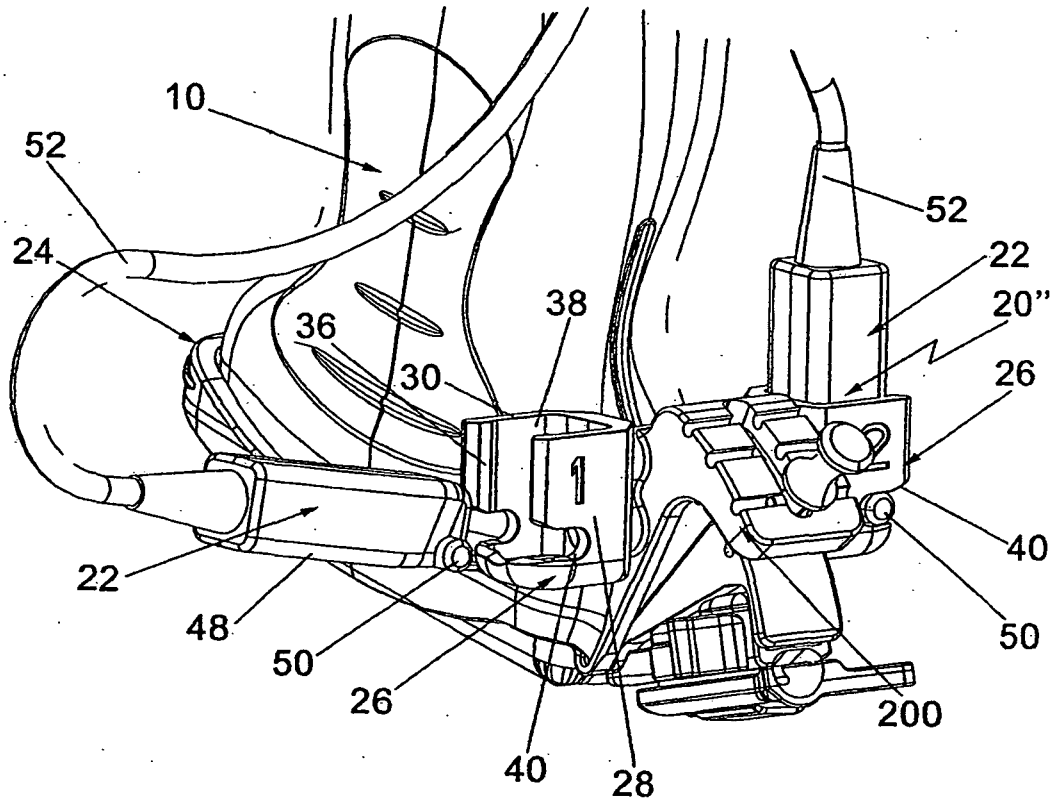

52
22
20'
26
40
50
100
24D
28
40
26
50
10
24
30
36
22
52

Fig. 5

Fig. 6



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 11138708 A **[0001]**
- US 5052396 A, Wedel **[0009]**
- US 5076269 A, Arenson **[0009]**
- US 5623931 A, Wung **[0009]**
- US 5758650 A, Miller **[0009]**
- US 5941889 A, Cermak **[0009] [0026]**
- US 6379307 B, Filly **[0009]**
- US 7087024 B, Pruter **[0009]**
- US 2006072124 A **[0009]**

专利名称(译)	用于在超声波探头上安装至少一个位置检测传感器的支架		
公开(公告)号	EP2293722B1	公开(公告)日	2013-02-27
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申请(专利权)人(译)	CIVCO医疗器械CO.，INC.		
当前申请(专利权)人(译)	CIVCO医疗器械CO.，INC.		
[标]发明人	CERMAK CRAIG J		
发明人	CERMAK, CRAIG, J.		
IPC分类号	A61B8/00		
CPC分类号	A61B8/4254 A61B8/4245 A61B8/4281 A61B2017/00477		
优先权	12/111387 2008-04-29 US		
其他公开文献	EP2293722A1		
外部链接	Espacenet		

摘要(译)

一种支架（20），用于超声换能器（10）上，以将至少一个3D跟踪传感器（22）可释放地安装在换能器上。每个传感器具有一对轴向对齐的销（50），其从主体向外突出。支架包括至少一个插座（26），插座（26）具有一对间隔开的壁部分（28,30），每个壁部分包括一个槽（40），当传感器位于传感器时，该槽设置成接收传感器的相应一个销。在第一个位置。从该位置，传感器的主体可以旋转到第二位置，于是间隔开的壁部分可释放地接合（卡扣配合）传感器（22）的主体的一部分，以阻止传感器相对于传感器的意外移位。换能器。