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(54) Identification device with inductive antenna coupling

Identifizierungsvorrichtung mit induktiver Antennen-Ankopplung

Dispositif d'identification avec couplage inductif d'antenne

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• **PATENT ABSTRACTS OF JAPAN vol. 10, no. 384
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Description

The invention relates to an identification device of the type defined in the precharacterizing part of claim 1. A device of this type is disclosed in FR-A-2 297 525.

Identification devices of the type mentioned above can be used for sending interrogation pulses to transponders carried for example by animals and receiving data transmitted by the transponders as reaction to the interrogation pulses. Since the range of the signals transmitted by the transponders is not very large the antenna of the identification device is so constructed that it can easily be brought into the vicinity of a transponder to be interrogated. However, this makes the antenna bulky and long, so that the identification device cannot easily be transported. In particular in mobile use, for example by veterinary surgeons or government inspectors, this would however be desirable.

It is already known to connect an antenna with the corresponding transmitter and receiver section detachably via an antenna coupling. Known antenna couplings are trouble-prone from both the electrical and the mechanical point of view.

In particular in use under unfavourable ambient conditions, for example in stables, stalls or on fields, the antenna coupling systems available fail due to soiling. Usually, the known antenna couplings have a galvanic connection and the plug-type connections used are easily soiled. In addition, with plug-type connections under rough use conditions bending of the connection contacts can easily occur so that the entire identification device then no longer functions.

It is therefore desirable to equip an identification device with a contactless antenna coupling. This can be implemented basically with an antenna coupling with inductive coupling. However, the particular problem is encountered here of making the inductively coupled antenna coupling mechanically stable and electrically functionable even under rough ambient conditions.

The problem thus arises of further developing an identification device according to the precharacterizing part of claim 1 in such a manner that it is suitable for mobile use and remains functionable even under rough ambient conditions.

The solution of this problem is provided by the features of the characterizing part claim 1.

The device according to the invention has the advantage that the antenna is always automatically mounted in a position correctly disposed with respect to the transmitter and receiver section.

Due to the use of the features defined in claims 3 to 5 an antenna coupler is obtained which is largely insensitive to soiling. If for example in the disassembled state dirt particles should get into the insert region of the transmitter and receiver section on assembly they are engaged by the front end of the insert member and conveyed into the hollow chamber formed between the insert member and insert region. This makes it possible

to prevent dirt particles getting between the diaphragms covering the transformer halves. A penetration of dirt particles during the engaged state is prevented in advantageous manner by the hood provided on the antenna side.

In another preferred further development E cores may also be employed for the cores.

Further details, features and advantages of the invention will be apparent from the following description of the examples of embodiment illustrated in the drawings, wherein:

Fig. 1 is a schematic side view of the identification device according to the invention;

Figs. 2 and 3 each show schematical longitudinal sections (from the front and side) of a second embodiment of the antenna coupling;

Fig. 4 is a detail view of a preferred embodiment of the antenna.

An identification device 10 consists according to the schematic representation in Fig. 1 substantially of a transmitter and receiver section 12 and an antenna 14. The transmitter and receiver section 12 and the antenna 14 are detachably connected to each other via an antenna coupling 16. The antenna 14 is bent at its free end and is preferably connected via the antenna coupling 16 to the transmitter and receiver section 12 in such a manner that the bent portion of the antenna 14 points obliquely downwardly when the identification device 10 is in a horizontal position. The entire identification device 10 may be held at a grip 17.

Instead of the rod-shaped antenna shown in Fig. 1 a ring antenna may also be employed.

In Figs. 2 and 3 the preferred second embodiment of the antenna coupling 16 is shown. In this example of embodiment in the transmitter and receiver section 12 an insert region 50 is disposed into which an antenna-side insert member 52 can be inserted. The insert region 50 has a rectangular cross-section, the cross-sectional area being substantially in two stages. In the outer portion of the insert region the cross-sectional area is broader than in the inner portion of the insert region 50, as can be seen in Fig. 3. The insert member 52 is fixed in the insert region 50 by a snap means consisting of projections 56 which are arranged in the insert region 50 and which can enter detent engagement with recesses 58 correspondingly provided in the insert member 52.

The first pot core half 20 is disposed in a side wall 54 of the insert region 50 behind the diaphragm 26. The second pot core half 22 is arranged in the insert member 52 in such a manner that in the engaged state of the insert member 52 it lies opposite the first pot core half 20. A projection 64 is formed on the side of the insert

member 52 lying opposite the second pot core half 22. Said projection bears in the engaged state on a side wall of the insert region 50, the cross-sectional area of which as described above is small compared with that of the outer insert region. The purpose of reducing the cross-sectional area is for the insert member 52 to be easily insertable in the outer insert region without resistance whilst in the inner insert region it must be fixed in a position in which a defined gap is set between the two pot core halves 20 and 22. This is ensured by bearing of the projection 64 on the wall portion of the insert region 50 corresponding thereto. In this embodiment a gap is formed between the two pot core halves and corresponds substantially to the thickness of the two diaphragms 26 and 28.

The embodiment shown in Figs. 2 and 3 is distinguished in particular by its robustness; it withstands mechanical stresses particularly well. This embodiment in particular is made insensitive by a simple constructional form also to soiling which in the region of the antenna coupling 16 can otherwise easily lead to functional disturbance. A protection against soiling is first formed by an antenna-side hood 62 which in the engaged state covers the opening of the insert region 50. In addition, in the engaged state between the insert member 52 and the insert region 50 a cavity 60 is formed. The latter serves to receive any dirt particles possibly present in the insert region 50 prior to insertion of the insert member 52, said particles being pushed along the insert region 50 by the inserted insert member 52 into the cavity 60.

In the example of embodiment illustrated in Fig. 2 as transformer a pot core transformer is used. Instead of the pot core transformer an E core transformer may also be employed.

In Fig. 4 an embodiment of the antenna 14 is shown which is advantageous in particular when the relatively long antenna must be folded into a handy form. For this purpose the antenna 14 is divided into two parts and can be folded together about a joint 100. In the interior of the antenna tube a tube member 102 is displaceably arranged in such a manner that in the collapsed antenna it is retracted into a tube member and in the assembled antenna 14 projects into the two antenna tube members so that the latter can no longer be pivoted about the joint 100. The tube member 102 is longitudinally displaceable in the antenna tube in the direction of the arrow a and oppositely to said direction via a stirrup member 104 projecting out of a slot provided in the antenna 14.

ing (21) being received in the transmitter and receiver section (12) and a second transformer half having a core (22) and a winding (23) being received in the antenna (14), the two windings (21, 23) being inductively coupled in the connected state of the transmitter and receiver section (12) and the antenna (14), in the transmitter and receiver section (12) an insert region (50) is cut which has a rectangular cross-section and into which a correspondingly shaped insert member (52) of the antenna (14) can be inserted, the first transformer half being disposed in a side wall (54) of the insert region (50) and the second transformer half being disposed in the insert member (52) in such a manner that in the connected state the two transformer halves lie opposite each other, characterized in that the insert member (52) is adapted to be locked in the insert region (50) by snap means (56, 58) provided in the insert region (50).

2. Device according to claim 1, characterized in that said snap means comprise projections (56) provided at the internal walls of the insert region (50) and corresponding recesses (58) provided in the insert member (52).
3. Device according to claim 1 or 2, characterized in that at the wall of the insert member (52) lying opposite the second transformer half, a projection (64) is formed in such a manner that in the detent position it defines an air gap (24).
4. Device according to claim 1, 2 or 3, characterized in that in the detent position between the insert member (52) and the insert region (50) a cavity (60) is formed.
5. Device according to any of claims 1 to 4, characterized in that between the insert member (52) and antenna (14) a hood (62) is disposed.
6. Device according to any of claims 1 to 5, characterized in that the two cores (20, 22) are each formed by an E core.
7. Device according to any of claims 1 to 6, characterized in that the antenna (14) is divided and can be bent and folded up about a joint (100).

Claims

1. Identification device (10) consisting of a transmitter and a receiver section (12) and an antenna (14) connected thereto via an antenna coupling (16) in which a dividable transformer (18) is arranged, a first transformer half having a core (20) and a wind-

Patentansprüche

1. Identifikationsvorrichtung (10) mit einem Sender/Empfängerteil (12) und einer Antenne (14), die mit dem Sender/Empfängerteil über eine Antennenkupplung (16) verbunden ist, in der ein teilbarer Transformator (18) angeordnet ist, wobei eine erste

Transformatorhälfte mit einem Kern (20) und einer Wicklung (21) in dem Sender/Empfängerteil (12) aufgenommen ist und eine zweite Transformatorhälfte mit einem Kern (22) und einer Wicklung (23) in der Antenne (14) aufgenommen ist, die zwei Wicklungen (21, 23) im verbundenen Zustand des Sender/Empfängerteils (12) und der Antenne (14) induktiv gekoppelt sind, in dem Sender/Empfängerteil (12) ein rechteckiger Einschubbereich (50) aufgenommen ist, in den ein dazu passend geformter Einschubteil (52) der Antenne (14) einschiebbar ist, wobei die erste Transformatorhälfte in einer Seitenwand (54) des Einschubbereichs (50) angeordnet ist und die zweite Transformatorhälfte in dem Einschubteil (52) derart angeordnet ist, daß sich beide Transformatorhälften im verbundenen Zustand gegenüberlegen, dadurch gekennzeichnet, daß der Einschubteil (52) in dem Einschubbereich (50) durch Einrastmittel (56, 58) einrastbar ist, die in dem Einschubbereich (50) vorgesehen sind.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Einrastmittel (56, 58) Vorsprünge, die an den Innenwänden des Einschubbereichs (50) vorgesehen sind, und dazu passende Ausnehmungen (58) umfassen, die in dem Einschubteil (52) vorgesehen sind.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß an der der zweiten Transformatorhälfte gegenüberliegenden Wand des Einschubteils (52) ein Vorsprung (64) derart gebildet ist, daß er in der Einraststellung einen Luftspalt (24) festlegt.

4. Vorrichtung nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß in der Einraststellung zwischen dem Einschubteil (52) und dem Einschubbereich (50) ein Hohlraum (60) gebildet ist.

5. Vorrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß zwischen dem Einschubteil (52) und der Antenne (14) eine Haube (62) angeordnet ist.

6. Vorrichtung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die zwei Kerne (20, 22) jeweils von einem E-Kern gebildet sind.

7. Vorrichtung nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die Antenne (14) geteilt ist und um ein Gelenk (100) abknickbar und zusammenklappbar ist.

Revendications

1. Dispositif d'identification (10) constitué par une sec-

tion formant émetteur et récepteur (12) et une antenne (14) qui lui est raccordée par l'intermédiaire d'un couplage d'antenne (16), dans lequel est disposé un transformateur (18) pouvant être divisé, une première moitié du transformateur comportant un noyau (20) et un enroulement (21) logé dans la section formant émetteur et récepteur (12) et un enroulement (21) qui est logé dans la section formant émetteur et récepteur (12) et une seconde moitié du transformateur comportant un noyau (22) et un enroulement (23) qui est logé dans l'antenne (14), les deux enroulements (21,23) étant couplés inductivement lorsque la section formant émetteur et récepteur (12) et l'antenne (14) sont à l'état connecté, et dans la section formant émetteur et récepteur (12) est découpée une région (50) pour un insert, qui possède une section transversale rectangulaire et dans laquelle peut être inséré un élément formant insert de forme correspondante (52) de l'antenne (14), la première moitié du transformateur étant disposée dans une paroi latérale (54) de la région (50) pour l'insert et la seconde moitié du transformateur étant disposée dans l'élément formant insert (52) de telle sorte qu'à l'état connecté, les deux moitiés du transformateur sont situées en vis-à-vis l'une de l'autre, caractérisé en ce que l'élément formant insert (52) est adapté pour être bloqué dans la région (50) pour l'insert par des moyens d'encliquetage (56,58) prévus dans la région (50) pour l'insert.

2. Dispositif selon la revendication 1, caractérisé en ce que lesdits moyens d'encliquetage comprennent des parties saillantes (56) prévues sur les parois intérieures de la région (50) pour l'insert et des renforcements correspondants (58) prévus dans l'élément formant insert (52).

3. Dispositif selon la revendication 1 ou 2, caractérisé en ce qu'une partie saillante (64) est formée sur la paroi de l'élément formant insert (52) située à l'opposé de la seconde moitié du transformateur de telle sorte que, dans sa position de blocage, elle définit un entrefer (24).

4. Dispositif selon les revendications 1, 2 ou 3, caractérisé en ce que, dans la position de blocage, une cavité (60) est formée entre l'élément formant insert (52) et la région (50) pour l'insert.

5. Dispositif selon l'une quelconque des revendications 1 à 4, caractérisé en ce qu'un capot (62) est disposé entre l'élément formant insert (52) et l'antenne (14).

6. Dispositif selon l'une quelconque des revendications 1 à 5, caractérisé en ce que les deux noyaux (20,22) sont formés chacun par un noyau en E.

7. Dispositif selon l'une quelconque des revendications 1 à 6, caractérisé en ce que l'antenne (14) est subdivisée et peut être coudée et repliée autour d'un joint (100).

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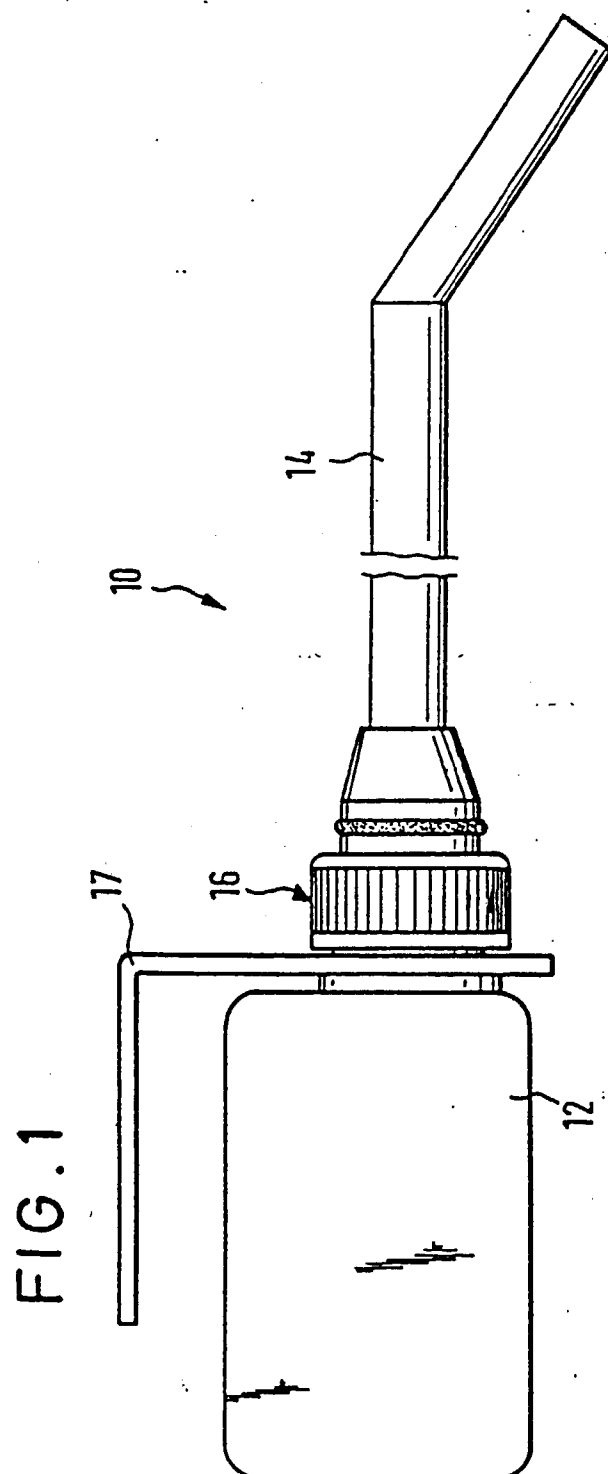
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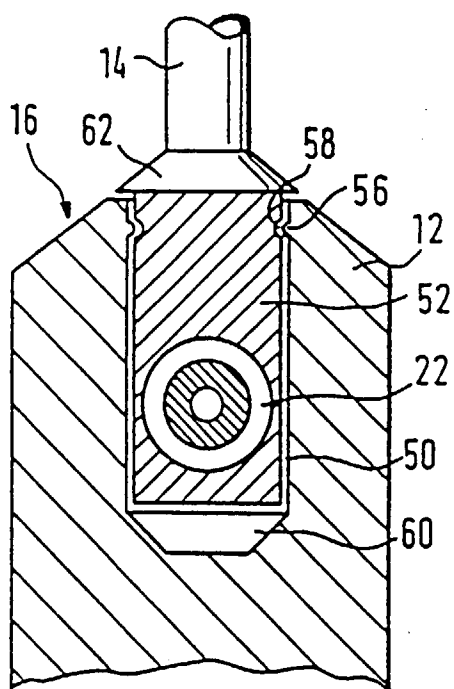


FIG. 2

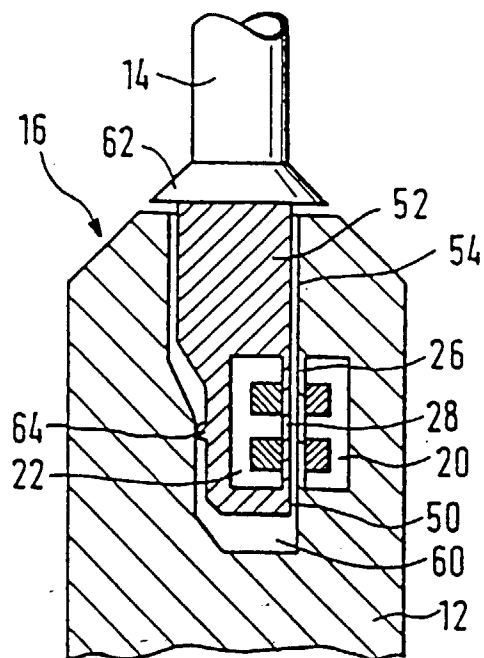


FIG. 3

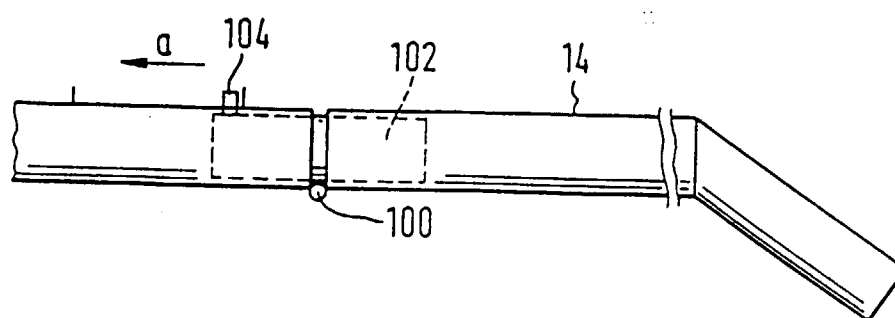


FIG. 4