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(54) **Ignition device for boilers**

(57) The present invention relates to an ignition device for boilers or the like comprising a pair of electrodes (1,2) made of conductive material housed within a covering body (13,23) made of insulating material and connected to high voltage electric pulse generating means.

There are provided supporting means for supporting the pair of electrodes, which are composed of means housing electric pulse generating means.

Moreover the electrodes housed inside the insulating covering body are directly connected by one of their ends (12,22) to the electric pulse generating means, preferably without interruption.

According to a particular embodiment the device of the present invention allows the high voltage circuit to be completely galvanically isolated for triggering the spark between the two electrodes and the low voltage power supply circuit, both the electrodes being connected to the electric pulse generating means.

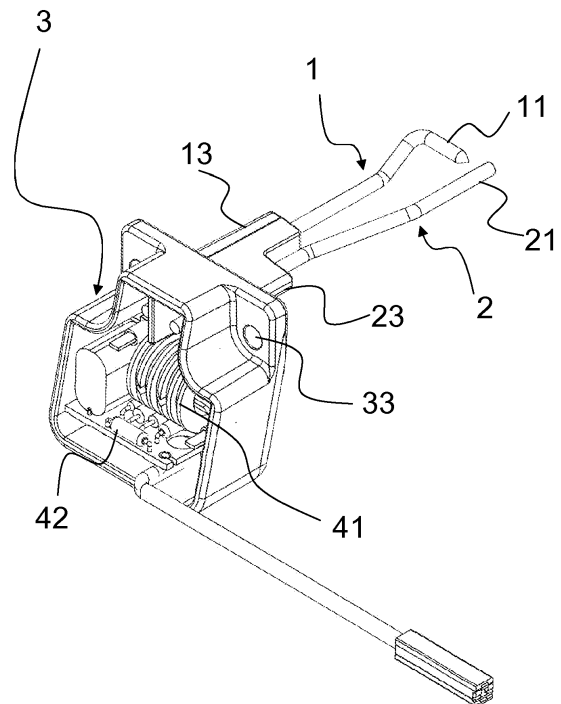


Fig. 2

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Description

[0001] The present invention relates to an ignition device for boilers or the like which is made as described in the preamble of the first claim.

[0002] The configuration described in the preamble of the first claim is the typical configuration of ignition devices for boilers or the like currently on the market. Such devices are composed of a pair of electrodes, made of metal material, covered by a covering body made of insulating material.

[0003] Both the electrodes are generally connected to high-voltage electric current generating means by means of cables. Such generating means produce a high-voltage electric pulse which is transmitted by a cable connection to the electrodes such that a spark is generated between the pair of electrodes igniting the flame inside the combustion chamber of the boiler.

[0004] Boilers currently on the market have also electronic elements, in particular electronic boards, which are used both for safety controls, and for adjusting the boiler operation, such as for example for modifying the temperature or the ignition time of the boiler.

[0005] The high-voltage pulse flowing through the cable connecting the electrode to the current generating means produces electromagnetic fields affecting the operation of the electronic components inside the boiler causing the electronic boards to malfunction and generally to be damaged, preventing them and consequently the boiler from being properly used.

[0006] Moreover inside the cable a current leakage inevitably is generated preventing the yield of the high-voltage pulse used for igniting the flame from being optimized, increasing current consumption in order to create a potential between the two electrodes in order to ignite the boiler.

[0007] Finally due to the reasons described above and due to manufacturing technical problems mainly related to the high temperatures in question, generated by the high-voltage pulse, it is difficult to efficiently integrate all the components of the ignition devices for boilers.

[0008] The operating conditions of the several components do not allow electrodes and their insulating cover, the electronic boards and the high-voltage electric pulse generating means to be provided in a single body without providing various types of connections and/or interfaces.

[0009] The document JP 2001248838 relates to a standard igniting electrode, for gas boilers, wherein a particular system for the electrical connection to the igniter has been provided overcoming the problems related to the electrical connection to the igniter, namely the electrode is directly connected to the igniter.

[0010] The document US 4,222,089 relates to an oil burner providing an integrated system of components having an output for the connection of high-voltage electrodes, but not including the electrodes. Moreover the whole system is not suitable for being used at high temperatures typical of gas boilers since it relates to a oil

burner.

[0011] The document EP 0915298 relates to an ignition electrode composed of a single ceramic body integrating the fastening system, without the ignition part integrated therein, therefore having the advantages described above of the prior art known devices.

[0012] The document US 4,683,518 again relates to a ignition system for oil involving components and temperatures different than ignition devices for boilers.

[0013] The document US 2008/090191 describes an igniter integrated into a monolithic structure, that however is not the structure of the electrode to which it is connected by external connections.

[0014] Therefore, by simple and inexpensive means, the invention aims at providing an ignition device for boilers or the like, which overcomes the drawbacks described above and which does not lead the electronic components to malfunction or to be damaged and at the same time providing the optimization of the yield of the high-voltage pulse sent to the electrode, for generating the ignition spark.

[0015] The invention achieves the above aims by providing an ignition device for boilers or the like of the type described in the preamble of the first claim in combination with the characteristics of the characterizing part of the first claim.

[0016] Therefore the invention relates to an ignition device for boilers or the like, comprising a pair of electrodes composed of a first electrode made of conductive material, which first electrode is housed within an insulating covering body, and of a second electrode also made of conductive material and also housed within a insulating covering body, there being provided means for supporting the pair of electrodes and there being provided high-voltage electric pulse generating means which means are connected to the pair of electrodes.

[0017] The supporting means for the pair of electrodes are further composed of means housing the high-voltage electric pulse generating means, the supporting means being made in the form of a casing on one of whose walls the insulating covering body of the first electrode and the insulating covering body of the second electrode are provided, the covering body of the first electrode and the insulating covering body of the second electrode being made as one piece and/or of the same material of the casing housing the high-voltage electric pulse generating means and the first electrode and the second electrode projecting by one of their ends into a housing casing and the ends of the electrodes being directly connected to electric pulse generating means, preferably without interruption.

[0018] Therefore all the components of the ignition device of the present invention are advantageously fitted into a housing casing that forms a single piece with the electrode supporting means.

[0019] Therefore a single body without interruption and/or without a difference between the electrode part and the part holding electric pulse generating means is

made, reducing the amount of constituent parts.

[0020] The ignition device described above, integrates all the components therein, from the end of the electrodes to the terminal of a possible power supply cable, without any type of connection and/or interface thus making a real single piece.

[0021] Moreover such variant allows the important advantage of forming a completely independent high voltage circuit to be achieved, therefore without the need of connecting the second electrode to a common ground potential avoiding high voltage currents to be taken outside the ignition circuit, such as for example on the metal case of the apparatus using the present device.

[0022] Preferably electric pulse generating means are means for generating a high-voltage electric pulse and are composed of a coil and of an electronic circuit. In this case the ends of both the electrodes are connected directly, and preferably without interruption, to the wire forming the output winding of the coil.

[0023] By the coil comprising at least a primary winding and a secondary winding which are galvanically isolated each other and the low voltage signal being supplied to one of them, while the other one supplies the high voltage signal it is possible to galvanically isolate the high voltage circuit for generating the spark and which comprises at least one of the windings of the coil connected to at least one preferably both the electrodes between which the spark has to be generated.

[0024] When both the electrodes are connected to a winding one of the electrodes is connected to an end and the other one is connected to the opposite end or to an intermediate end of the same winding, generally the so called secondary winding.

[0025] As it is known the coil transforms an input pulse into a high-voltage pulse.

[0026] The very proximity of the electric pulse generating source, preferably with no connection to the ground of the boiler, where electrodes have a different potential one with respect to the other, by the generation of the high-voltage spark, allows leakages generated inside the cable and on the ground of the boiler to be almost completely removed and at the same time electromagnetic fields affecting electronic components are not provided.

[0027] Preferably the device of the present invention is made by generating the high-voltage by a capacitive and low energy system.

[0028] The electrode supporting means are preferably composed of a casing or a case at least the covering body of both the electrodes connected to the electric pulse generating means being fastened or can be fastened to one wall thereof.

[0029] The different configurations described provide several advantages for the device of the present invention. There are advantages concerning the construction and the assembly of the device, in addition to those previously described and mainly concerning the functional point of view. First of all the fact of using a single material for making a housing for the pulse generating means and

for the outer covering body of the electrodes provides a more reliable complete product, since the great amount of components is reduced to a single piece, thus reducing both maintenance costs and purchasing costs. The assembly is simplified too, since only one piece already containing all the system has to be fastened to one wall of the boiler, without providing cables for connecting a component to another one.

[0030] Moreover such configuration allows the metal mounting for fastening the electrode to be removed reducing not only the costs but also considerably increasing the reliability and simplicity as regards the construction and production perspective, by means of a very customized device, that is a single piece that can have several shapes matching user requirements, while keeping a high reliability and low costs.

[0031] Preferably each one of the electrodes of the pair of electrodes extends without interruption from a first end outside the insulating covering body and for a portion outside the insulating covering body, through said body and by the other end it extends inside the case housing the high-voltage electric pulse generating means and it is connected by said end directly to the power supply output of the high-voltage electric pulse generating means.

[0032] Particularly as regards the embodiment where-in current generating means are composed of a high-voltage transformer coil and of an electronic circuit, both the ends of the electrodes inside the housing case are directly connected to the coil, which is inside the housing case too, by means of a through hole provided on a face of the case allowing the electrode end to pass inside the housing case.

[0033] Such configuration, from the functional point of view, has the important advantage of avoiding high-voltage to be carried inside the boiler, moreover avoiding a high-voltage end to be carried on the boiler frame which generally is at the common ground potential.

[0034] The ignition device for boilers or the like of the present invention is particularly suitable for the use with gas boilers, particularly condensing boilers and therefore it is suitable for operating at high temperatures developing among the different components, temperatures that can reach values exceeding 130°C.

[0035] Considering the processing possibilities combined with the insulation properties, the supporting means for the pair of electrodes, or at least a part thereof, are preferably made of a ceramic material.

[0036] Particularly said ceramic material is a high temperature resistant material, having an operating temperature ranging from 1100°C to 1900°C, preferably from 1300°C to 1700°C, particularly 1500°C.

[0037] It has to be specified that such temperatures relate to the temperatures reached inside the combustion chamber of the boiler upon which the device of the present invention is mounted.

[0038] Moreover said ceramic material is composed of alumina that has a firing temperature ranging from

1200°C to 2000°C, preferably from 1400°C to 1800°C, particularly 1600°C.

[0039] According to an improvement of the device of the present invention the housing case constituting the supporting means for the electrodes has fastening means acting for fastening the ignition device according to the present invention to a further user apparatus, such as a boiler or the like.

[0040] Preferably such fastening means are made in the form of at least a through hole provided on the surface of one of the walls of the housing case, or on extensions of one of the faces, for any tightening elements known in the prior art, such as for example a screw passing into the through hole and going into the wall of the user apparatus.

[0041] According to a particular embodiment the housing case is a parallelepiped case having position-holding means therein for at least the coil and/or the electronic circuit and/or the electrodes. In particular the walls of such case, inside it, delimit an housing space that can be closed by closing members.

[0042] Advantageously position-holding means act also for fastening the electrode and the coil within the housing space and preferably are composed of a substance filling the housing space such that both the coil and the electronic circuit and the ends of the electrode are embedded into the substance.

[0043] Such substance advantageously constitutes also the means for closing the housing space of the case.

[0044] A thermosetting polymer is preferably used, in particular an epoxy resin, for filling the housing space and for embedding the components within the space.

[0045] Moreover the inner walls, if made of ceramic material, of the case delimiting the housing space can be provided not to be enameled and to have recesses, or grooves, throughout the surface such to facilitate the bonding/attachment of the resin.

[0046] In addition to the several advantages already described above, this particular solution gives the device of the present invention the further advantage that the electrode does not require to be fastened inside the insulating covering, it being embedded by the epoxy resin.

[0047] The arrangement of the components, the fastening system integrated into the housing case and the power supply made also by means of integrated cables, contribute, also due to their constructional characteristic, to overcome the problems caused by the integration of the high-voltage part with the pair of electrodes, till forming a single system that is monolithic and without interruption from the end of the electrode to the terminal of a possible power supply cable.

[0048] According to an improvement of the present invention the supporting means made as one piece with said covering body are composed of a mixture of insulating materials, among such insulating materials at least one is a ceramic material.

[0049] Advantageously it is possible to provide the supporting means to be composed of different materials,

preferably insulating materials, for example it is possible to provide some walls of the housing case to be made of a specific insulating material, such as ceramic material, and the remaining walls to be made of a different material, which is insulating too. In particular it is possible to provide the covering body of both the electrodes to be made of the same material as the case wall intended for fastening it, while the remaining walls can be made of a different material, such as for example a plastic material, a resin with electric insulation properties or the like.

[0050] An embodiment provides both the covering bodies of both the electrodes and the case wall fastening them to be made of a ceramic material, while the remaining walls of the housing case to be made of a thermosetting material or vice versa. The resin acting for fastening the elements inside the housing space and for closing it in this case acts also for fastening the two different material as a single piece.

[0051] In this case, a particular variant embodiment provides a plate-like base element with two tubular projections extending from a face thereof, said plate-like element and said tubular projections being made of an insulating material, for example a ceramic material. Said tubular projections are the insulating coverings of the two electrodes, while the plate-like element constitutes a wall of the case housing the high-voltage pulse generating means, in particular the coil and the electronic circuit supplying the coil.

[0052] Inside each tubular projection a conducting wire is housed which comes out at the side of the plate-like element opposite to the projections and from the terminal end of said projections opposite to said side. The ends at the side of the plate-like element opposite to the tubular projections are connected to an end respectively of a secondary winding of a coil the power supply electronic circuit being connected to the primary winding thereof, said connections are all direct connections. The remaining part of the case which encloses and covers outwardly the coil, the electronic circuit and the ends of the conducting wires of the two electrodes and in case also the power supply wires of the electric circuit, that is the terminals for connecting said wires to said circuit is composed of a block made of hardening insulating material having such a shape and volume to embed by covering on all the sides said elements by adhering against the side of the plate-like element opposite to the tubular projections. In this case the material can be a thermosetting resin or the like.

[0053] The part of the case made of resin can be easily obtained by casting or molding it into a mold, the plate-like element being one of the wall thereof.

[0054] Again according to a characteristic, the plate-like element can have fastening holes on peripheral extensions.

[0055] Moreover on the face adhering to the block made of hardening material said plate-like element can have attachments for the material of the block which can have different shapes such as for example webs, ribs,

teeth, projection parts with or without enlarged heads or shapes intended to form undercuts wherein the material of the block is engaged once it hardens generating a mutual interlocking mechanical fit.

[0056] In order to increase the safety level of the device of the present invention a variant embodiment provides a thermal breaker between the ends of both the electrodes inside the housing space and the coil.

[0057] Moreover the ignition device for boilers or the like according to the present invention provides a cable for power supplying it which is connected to the electronic board. A portion of said power supply cable is therefore housed into the housing space which is held in place by filling the housing space with the resin. The invention relates also to other characteristics further improving the ignition device for boilers or the like described above and which are the subject of the subclaims.

[0058] These and other characteristics and advantages of the present invention will be more clear from the following description of some embodiments shown in annexed drawings wherein:

Fig.1 is a perspective view of the ignition device of the present invention;

Fig.2 is a perspective view of the ignition device of the present invention;

Fig. 3a is a schematic view taken along a vertical plane of the ignition device of the present invention;

Fig. 3b is a structural view of the arrangement of the several components of the device of the present invention within the housing space;

Figs.4a and 4b are a perspective view of the ignition device of the present invention according to a variant embodiment;

Fig.5 is a section view of the ignition device of the present invention.

[0059] The device according to the invention comprises a pair of electrodes 1 and 2 which are made of conductive material, preferably metal material. Each one of the electrodes 1 and 2 is housed within a covering body 13 and 23 respectively made of insulating material and are connected to high-voltage electric pulse generating means, by which a high potential difference is temporary generated between electrodes 1 and 2. This causes a spark to be generated between the two electrodes 1 and 2 in order to ignite the flame within the boiler.

[0060] Both the electrodes 1 and 2 are supported by supporting means 3.

[0061] Each of the electrodes 1 and 2 extends without interruption from a first end, 11 and 21 respectively, which is outside the covering body, to the insulating covering body, 13 and 23 respectively, while the other end 12 and 22, ends within the supporting means 3.

[0062] Ends 11 and 21 are the two tips between which the spark is generated for turning on the boiler.

[0063] According to the variant embodiment shown in the figures, high-voltage electric pulse generating means

are composed of a high-voltage transformer coil 41 and of an electronic circuit 42 and the ends 12 and 22 of the electrodes 1 and 2 respectively, placed into the supporting means 3, are directly connected to the outputs of the coil 41 preferably without interruption.

[0064] The supporting means 3 for the pair of electrodes 1 and 2 are made such that in addition to support the electrodes they also allow the coil 41 and the electronic circuit 42, namely the high-voltage electric pulse generating means to be housed.

[0065] With a particular reference to figures, the supporting means 3 are made as a parallelepiped case delimiting an housing space within which the coil 41 and the electronic circuit 42 are housed.

[0066] A particular embodiment provides only the coil 41 to be housed within the housing space, and provides it to be connected to the electronic circuit by connection cables, the circuit being not arranged into the housing space.

[0067] The case constituting the supporting means 3 for the pair of electrodes 1 and 2, has two wider faces 31 and 32, whose face 31 is open and allows the high-voltage coil 41 and the electronic circuit 42 to be introduced therein.

[0068] Both the electrode 2 and the electrode 1 are provided secured to the face 32 parallel to the face 31, by means of their insulating covering body 13 and 23, that according to the variant embodiment shown in the figures is made as one piece and/or of the same material as at least one of the walls of the case constituting the supporting means for the pair of electrodes 1 and 2.

[0069] Moreover the face 32 is provided with two through holes allowing the electrode 1 and the electrode 2 to pass through and allowing the ends 11 and 22 thereof to be inserted within the housing space delimited by the case. In particular the ends 12 and 22 of the electrodes 1 and 2 are provided inside the housing space for being directly connected to the coil 41, preferably without interruption.

[0070] According to a variant embodiment the housing case constituting the supporting means 3 for the electrodes 1 and 2, has means for being fastened to a further user apparatus, such as a boiler of the like.

[0071] With a particular reference to figures, such fastening means are composed of 2 through holes 33 obtained by means of two extensions of the face 32, which extensions are preferably as one piece with the face 32 and consequently with all the supporting means 3 and/or also with the insulating covering body 13 and 23 of the electrodes 1 and 2, when it is made as one piece with the case such as in the shown embodiment.

[0072] Again with a particular reference to figures, within the housing space there are provided position-holding means for the coil 41 and for the electronic circuit 42 and the case within which the housing space is provided can be closed by closing members, such as a removable cap or the like or by means of the substance bulk wherein elements housed within said case are em-

bedded.

[0073] Advantageously position-holding means act also for fastening the ends 12 and 22 of the electrodes 1 and 2 in contact with the coil 41 within the housing space and are composed of a substance 5 filling the housing space such that both the coil 41 and the electronic circuit 42 and the ends 12 and 22 of electrodes 1 and 2 are embedded within said substance 5.

[0074] By the above arrangement, the electrodes 1 and 2 with the coil 41 are kept in their relative positions and a loss of electrical connection for example due to repeated relative movements is avoided.

[0075] A thermosetting polymer is preferably used, particularly an epoxy resin, for filling the housing space and for embedding the elements inside the space.

[0076] The substance 5 constitutes also means for closing the housing space, since the inside of the case, once elements are inserted therein is filled with epoxy resin till reaching the height of the perpendicular walls of the faces 31 and 32 and with such an amount that the open face 32 of the case is completely covered by the substance 5.

[0077] Particularly figure 3a schematically shows, from a functional perspective, the coil 42 directly connected to the ends 12 and 22 of the electrodes 1 and 2, while figure 3b shows how the several elements of the ignition device are housed within the housing space within the supporting means 3, particularly the electronic circuit 42, the coil 41, the thermal breaker 43, the connection between ends 12 and 22 of the electrodes 1 and 2 and the coil 42 being omitted, which are shown in figure 3a.

[0078] Moreover the case with the housing space provided therein provides the inner walls, made of ceramic material, not to be enameled and to have recesses, or grooves throughout the surface such to facilitate the attachment of the resin.

[0079] A variant embodiment provides the supporting means 3 to be composed of different materials, preferably insulating materials, for example it is possible to provide some walls of the housing case to be made of a specific insulating material, such as ceramic material, and the remaining walls to be made of a different material, which is insulating too. In particular in figures 4a and 4b the covering body 13 and 23 of both the electrodes 1 and 2 is made of the same material as the face 32 of the case, which is intended for fastening it, while the remaining walls of the case, constituting the housing space, are made of a different material, in particular of a thermosetting resin. The embodiment shown in figures 4a and 4b provides both the covering body 13 and 23 of both the electrodes 1 and 2 and the face 32 to be made of a ceramic material, while the remaining walls of the housing case to be made of a thermosetting resin or vice versa. The thermosetting resin acting for fastening the elements inside the housing space and for closing it in this case acts also for fastening the two different materials as a single piece.

[0080] In this case the face 32 is composed of a plate-

like base element 34 with two tubular projections extending from a face thereof, said plate-like element 34 and said tubular projections being made of the same material, for example a ceramic material. Said tubular projections are the insulating coverings 13 and 23 of the two electrodes, while the plate-like element 34 constitutes a wall of the case housing the high-voltage pulse generating means, in particular the coil 41 and the electronic circuit 42 supplying the coil.

[0081] Inside each tubular projection a conducting wire is housed which comes out at the side of the plate-like element 34 opposite to the projections and from the terminal end of said projections opposite to said side. The ends at the side of the plate-like element 34 opposite to the tubular projections are connected to an end respectively of a secondary winding of the coil 41 the power supply electronic circuit 42 being connected to the primary winding thereof, said connections are all direct connections.

[0082] Moreover the plate-like element 34 has the fastening holes 33 on the peripheral extensions.

[0083] The plate-like element 34 has a first portion of removable interlocking means 35, cooperating with a corresponding second portion 36, provided on the remaining case part 37 composed of the thermosetting resin. Such first portion of removable interlocking means 35 can be composed of webs, ribs, teeth, projecting parts with or without enlarged heads or shapes intended for forming undercuts wherein the corresponding second portion of the removable interlocking means provided on the remaining case part 37 are complementarily engaged.

[0084] As an alternative the housing space can be closed by a cover composed of the same material as the supporting means 3 or of any material that is or can be directly fastened to the case walls, or that can be fastened when assembling the ignition device of the present invention having two locking holes corresponding to the holes 33 of the face 31, and by means of the same screw contemporaneously engaging the hole 33 for fastening the device to a further user apparatus.

Claims

1. Ignition device for boilers or the like, comprising a pair of electrodes composed of a first electrode (1) made of conductive material, which first electrode (1) is housed within an insulating covering body (13), and of a second electrode (2) made of conductive material too, and housed also within an insulating covering body (23), supporting means (3) being provided for said pair of electrodes, and high-voltage electric pulse generating means being provided which means are connected to at least said pair of electrodes (1, 2),
characterized in that:

said supporting means (3) for said pair of elec-

- trodes (1, 2) are composed of means housing said high-voltage electric pulse generating means, said supporting means being made in the form of a casing on one of whose walls at least the insulating covering body (13) of the first electrode (1) and the insulating covering body (23) of the second electrode (2) are provided, the covering body (13) of the first electrode (1) and the insulating covering body (23) of the second electrode (2) being made as one piece and/or of the same material of said casing housing the high-voltage electric pulse generating means, said first electrode (1) and said second electrode (2) projecting by one of their ends (12, 22) into said housing casing and the ends (12, 22) of said electrodes (1, 2) being directly connected to said electric pulse generating means, preferably without interruption.
2. Ignition device for boilers or the like according to claim 1, wherein said electric pulse generating means are composed of a coil (41) and of an electronic circuit (42), said ends (12 and 22) of said first electrode (1) and of said second electrode (2) being directly connected to the wire forming the output winding of said coil (41), preferably without interruption and said housing casing (32) being provided with a through hole for each of the electrodes (1, 2) such that said ends (12, 22) of said first electrode (1) and of said second electrode (2) pass into said housing space.
 3. Ignition device according claims 1 or 2, **characterized in that** each one of the two electrodes (1, 2) extends without interruption from a first end (11, 12) outside the insulating covering body (13, 23) and for a portion outside the insulating covering body, through said insulating covering body and by the other end (12, 22) it extends inside the case housing the high voltage electric pulse generating means and said other end (12, 22) is directly connected to the power supply output of said high voltage electric pulse generating means.
 4. Ignition device according to one or more of the preceding claims, wherein said supporting means (3) and said covering body (13, 23) of the first (1) and second (2) electrode are made as one piece and are composed of a ceramic material.
 5. Ignition device according to one or more of the preceding claims, wherein said ceramic material is a high temperature resistant material, having an operating temperature ranging from 1100°C to 1900°C, preferably from 1300°C to 1700°C, particularly 1500°C.
 6. Ignition device according to one or more of the preceding claims, wherein said ceramic material is composed of alumina that has a firing temperature ranging from 1200°C to 2000°C, preferably from 1400°C to 1800°C, particularly 1600°C.
 7. Ignition device according to one or more of the preceding claims, wherein said case of said supporting means (3) has fastening means (33), for fastening said ignition device to a user apparatus.
 8. Ignition device according to one or more of the preceding claims, wherein said fastening means (33) are composed of at least a through hole for tightening members.
 9. Ignition device according to one or more of the preceding claims, wherein said case is a parallelepiped case, like a box having movable or fixed position-holding means for said coil (41) and said electronic circuit (42).
 10. Ignition device according to one or more of the preceding claims, wherein said box has an aperture for entering into a housing space provided therein and movable closing members for said access aperture.
 11. Ignition device according to one or more of the preceding claims, wherein said movable position-holding means and said closing members are composed of a substance (5) wherein said high voltage electric pulse generating means are embedded, by filling the housing space.
 12. Ignition device according to one or more of the preceding claims, wherein said movable position-holding means act for fastening the ends (12, 22) of said first (1) and second (2) electrode within the housing space.
 13. Device according to one or more of the preceding claims, wherein a thermal breaker is provided between said ends (12, 22) of said first (1) and said second (2) electrode and the input of said coil (41).
 14. Device according to one or more of the preceding claims, wherein said housing space is provided with inner walls that are not enameled and having recesses, such to facilitate the attachment of the resin.
 15. Ignition device according to one or more of the preceding claims, wherein a power supply cable of said device is provided which is connected to said electronic board (42), at least a portion of said power supply cable being housed within said housing space,

and said power supply cable being held in position
by said substance (5).

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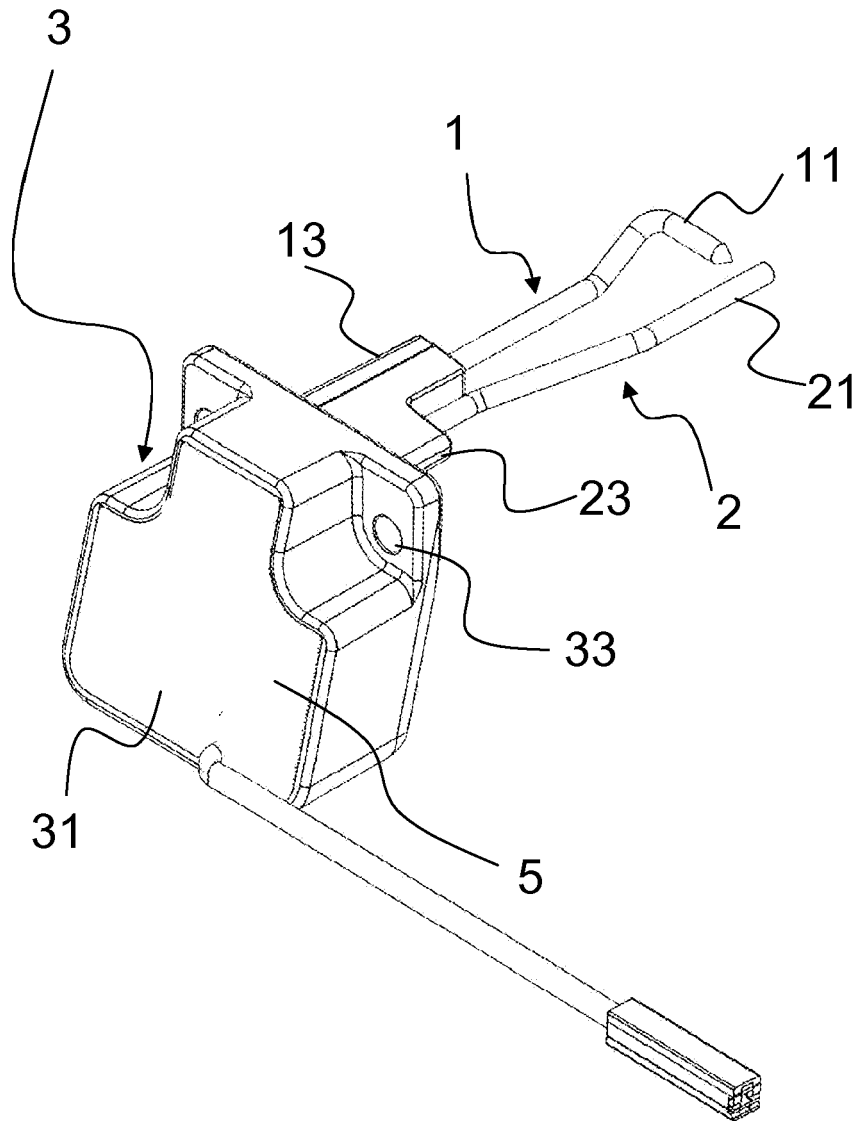


Fig. 1

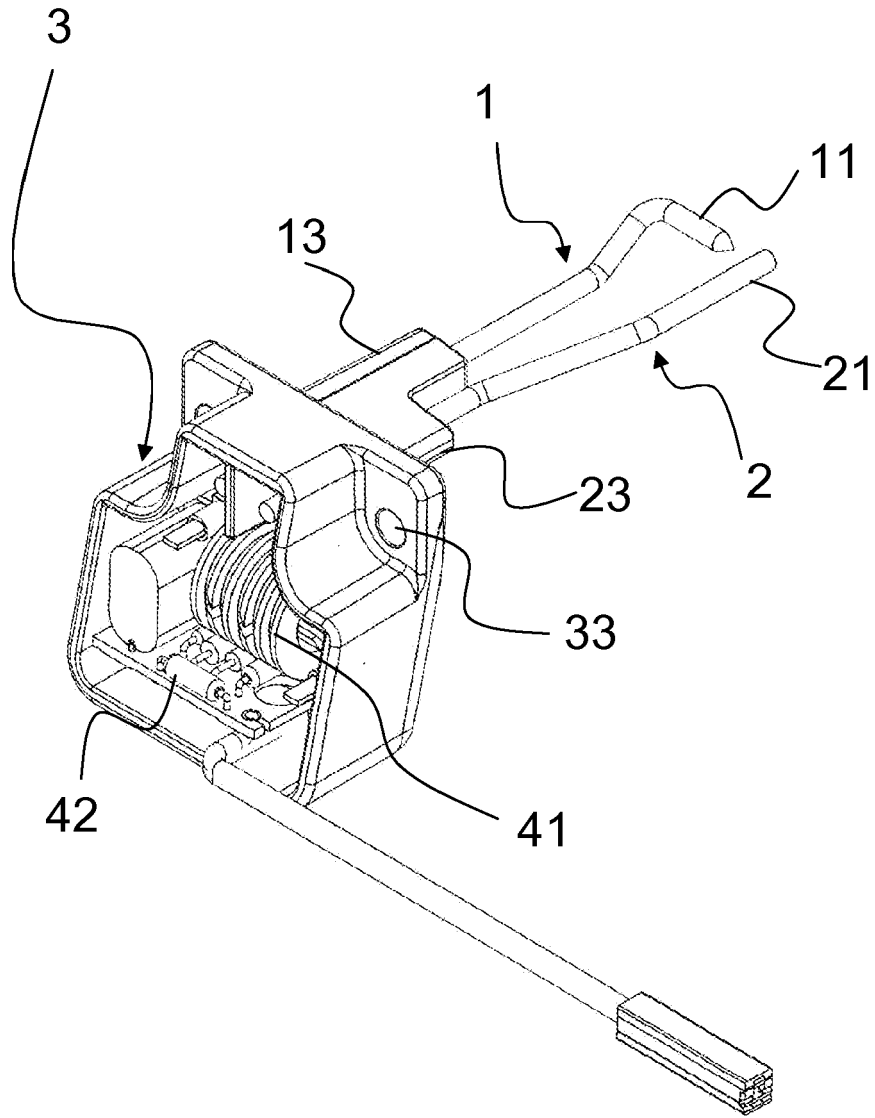


Fig. 2

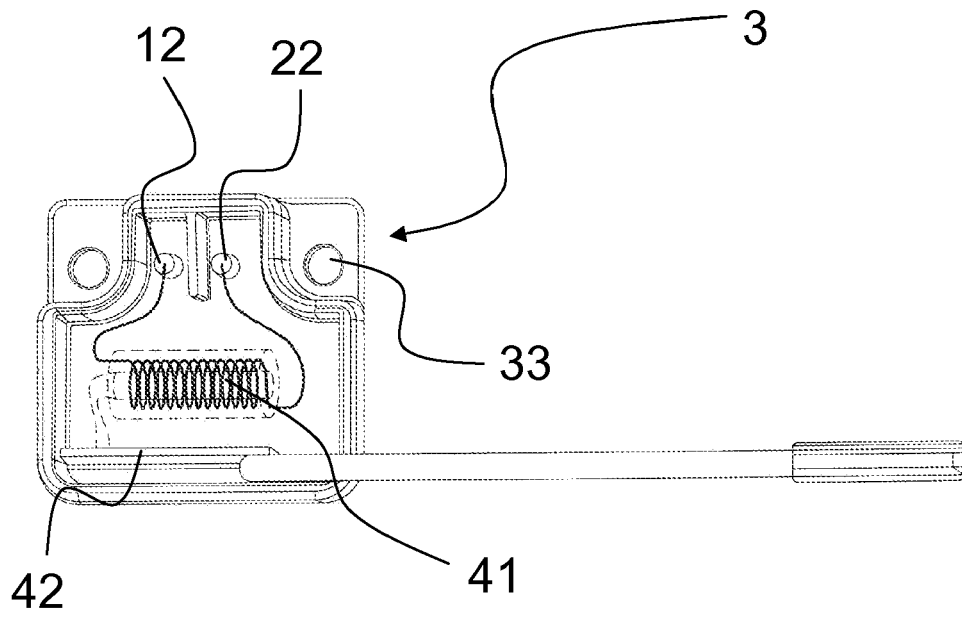


Fig. 3a

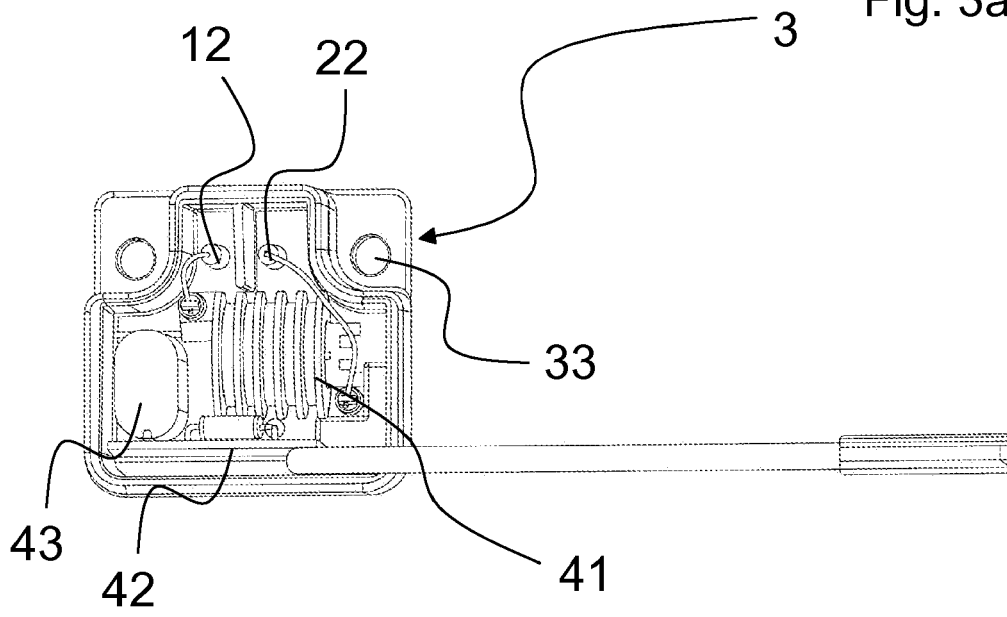


Fig. 3b

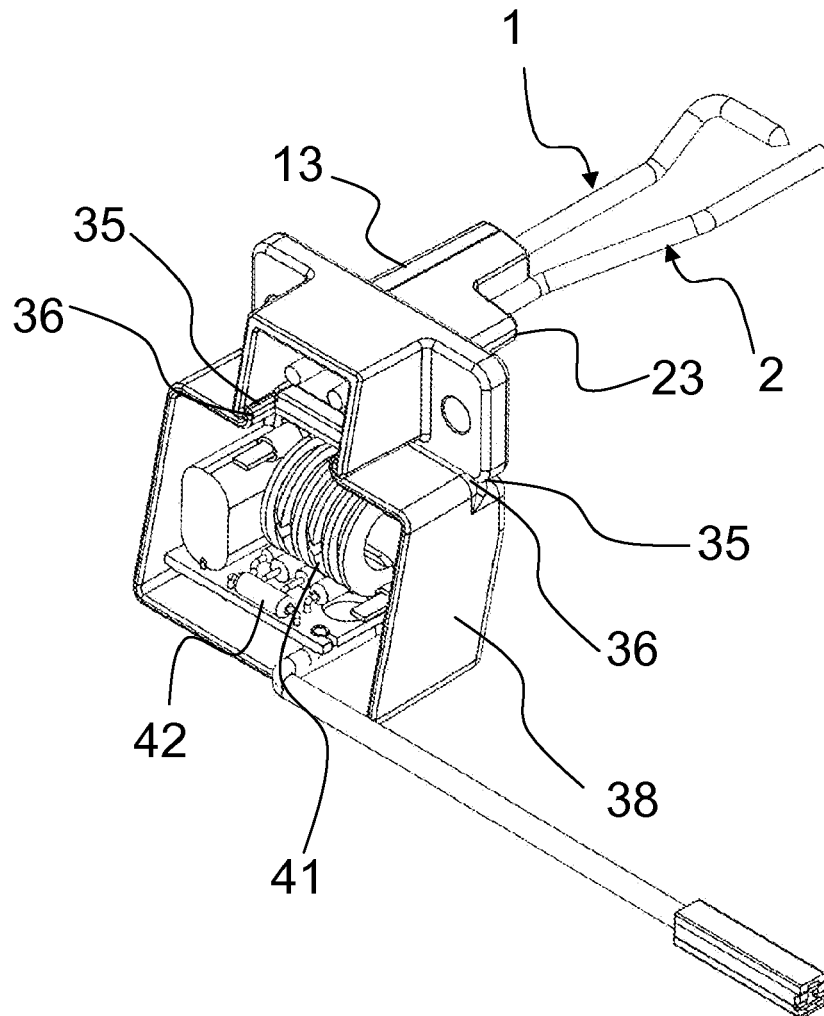


Fig. 4a

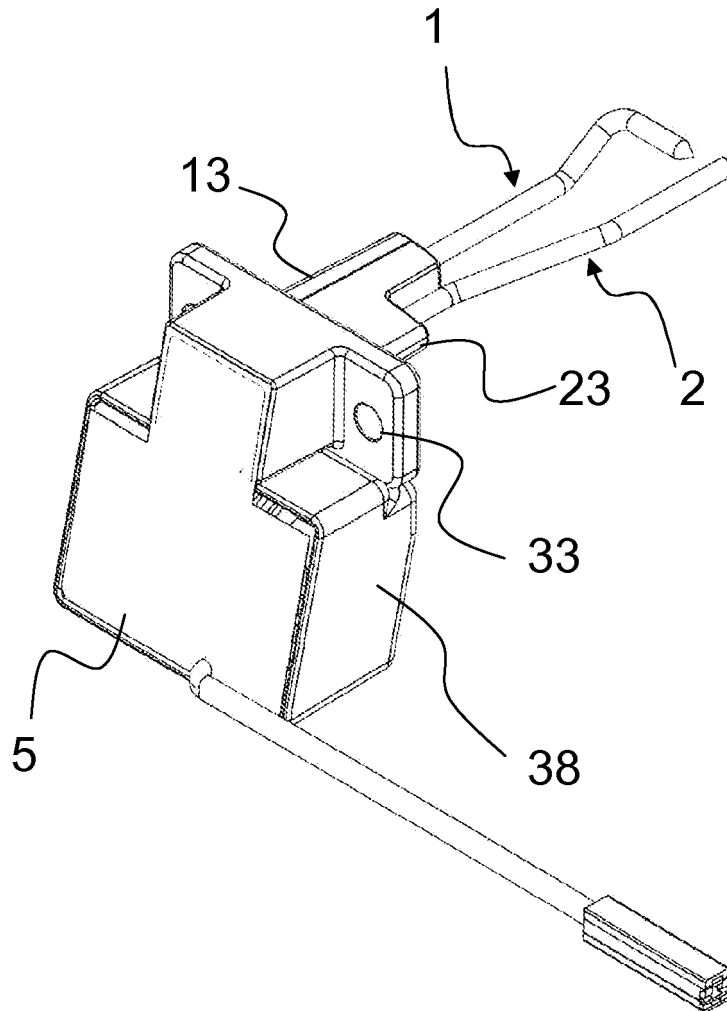


Fig. 4b

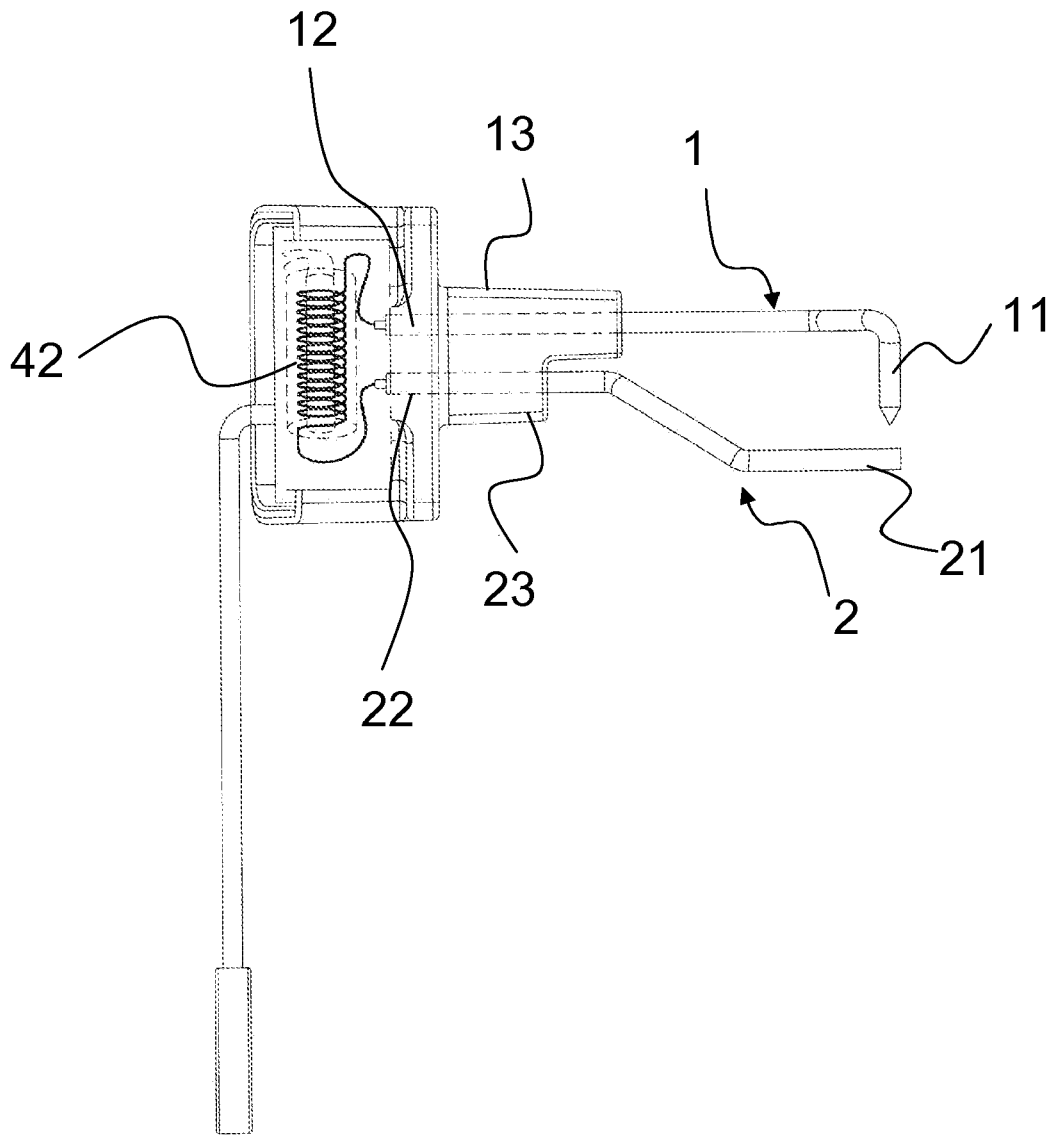


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 11 17 2763

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