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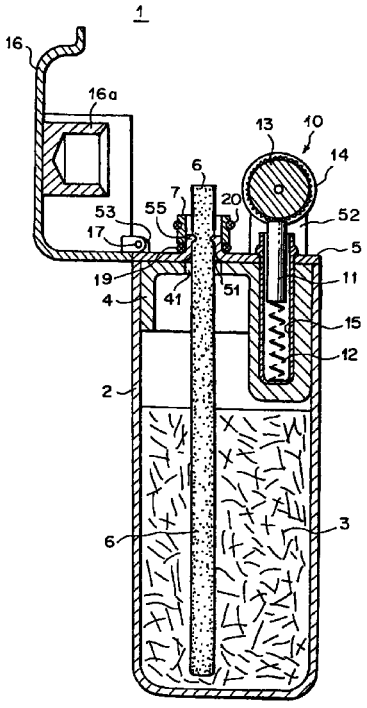
(54) LIQUID FUEL COMBUSTING DEVICE

(57) In attaching a tank upper lid (4) to an upper end of a fuel tank (6) containing liquid fuel inside thereof, and installing a combustion wick (6) for sucking up the liquid fuel and combusting the liquid fuel at a projected front end combustion portion thereof and an igniting member (10), an upper lid cover (5) comprising a metal sheet is installed at an upper portion of the tank upper lid (4) and the upper lid cover (5) is installed with a support portion (52) of the igniting member (10) and inserted and held with the combustion wick (6) to thereby enable promotion of heat resistance and assembling performance of the combustion wick (6) and the igniting member (10).

FIG. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a liquid fuel combustion instrument such as a lighter for smoking, an igniter or the like using liquid fuel mainly of alcohol, sucking up liquid fuel stored in a fuel tank by a combustion wick by utilizing the capillary phenomenon and combusting the fuel, particularly to a structure in which a combustion wick and an igniting member are installed at an upper portion of the fuel tank.

BACKGROUND OF THE INVENTION

[0002] Generally, as fuel in a combustion instrument such as a lighter for smoking, an igniter, a torch, an illuminator, a heater or the like, there is utilized alcoholic fuel such as ethyl alcohol or the like, benzine fuel such as petroleum benzine-species including gasoline or liquefied gas fuel such as propane gas or the like.

[0003] Further, function, way of use and design structure of respective combustion instruments differ in accordance with the kind of fuel used and are provided with respective features.

[0004] For example, in the case of benzine fuel constituted by a mixture of hydrocarbon compounds of petroleum benzine-species, the fuel is a mixture of compounds respectively having different boiling points, at an initial stage of use in which a combustion instrument is ignited, a benzine component having a low boiling temperature is volatilized, the volatile component is shifted successively to hydrocarbon having a higher boiling point and accordingly, the composition of fuel remaining in the combustion instrument is changed in accordance with combustion time and accordingly, a change in a flame length is produced and the same goes for gasoline. Further, benzine and gasoline are provided with high volatility and according to a combustion instrument using these fuels, there is needed a hermetically sealed structure for reducing volatilization from a fuel storing portion as well as a portion of a combustion wick and when the hermetical sealing is insufficient, the fuel is volatilized and lost, a frequency of replenishing the fuel is high and the operation is troublesome. Further, the benzine and gasoline may not be preferable since they have an particular odor.

[0005] In the case of liquefied gas fuel, the gas pressure is high in a temperature range of using the combustion instrument and a container for storing the fuel needs a pressure resistant structure. Further, the flame length is varied in accordance with a variation in the gas pressure, particularly, the gas pressure changes substantially logarithmically in correspondence with temperature and there is a problem in that the flame length is changed significantly in correspondence with temperature. In order to reduce the change of the flame length, there is required a special design measure of carrying out temperature compensation in a fuel supply mechanism of the combustion instrument, and the structure becomes complicated which is disadvantageous in view of the cost.

[0006] Meanwhile, in the case of alcoholic fuel, liquid fuel mainly of alcohol such as low grade monovalent alcohol or the like such as ethyl alcohol, methyl alcohol, propyl alcohol or the like, the vapor pressure is comparatively low, a pressure resistant container is dispensed with for a fuel storing unit, a hermetically sealed structure to the extent of not volatilizing alcohol may be constructed for a fuel tank, and a combustion wick, which is advantageous in simplifying the structure of the combustion instrument and in view of the cost.

[0007] Further, according to a combustion instrument using liquid fuel other than liquefied gas fuel, as means for supplying liquid fuel from the fuel tank to a combustion unit, generally, by utilizing the surface tension of the liquid fuel, there is used a combustion wick for sucking up the liquid fuel through a continuous slender hole or small clearances produced by bundling slender fibers by the capillary phenomenon and combusting the liquid fuel at a tip thereof. The liquid fuel is ignited by throwing sparks to a front combustion portion of the combustion wick by using an igniter flint or a filing wheel or by an igniting member for carrying out discharge by using a piezoelectric element.

[0008] Further, as a fuel tank of such a liquid fuel combustion instrument, a container comprising plastic or the like is molded in a shape according to the purpose of use, and a combustion wick and an igniting member are attached directly to a tank upper lid for enclosing the upper portion of the fuel tank.

[0009] Further, according to the above-described liquid fuel combustion instrument, there is a danger of causing a failure in holding the igniting member due to temperature rise of the igniting member when combustion is carried out by igniting the combustion wick.

[0010] That is, when the igniting member is arranged far away from the combustion wick, for example, a distance the spark must travel is lengthened which results in a deterioration in the ignitability, hence, the igniting member needs to be arranged close to the combustion wick to thereby ensure the ignitability. However, as a result of this, the igniting member such as a filing wheel or the like becomes close to the flame and temperature thereof is increased. Further, for example, when the filing wheel is heated, there is a danger that the heat will be conducted to a support portion of the tank upper lid formed of plastic, the support portion will be melted, the filing wheel will be broken off so that it cannot be used by the force of pressing the igniter flint against the filing wheel and there is a need to improve heat resistance of the support portion and heat resistance of a portion for holding the combustion wick.

[0011] Further, in integrating the liquid fuel combustion instrument, a lower end of the combustion wick is inserted into a fuel tank, an upper end portion thereof is

installed to project by inserting through the tank upper lid of the fuel tank, and in that case the combustion wick and cotton wool contained in the fuel tank as necessary are soft and flexible and accordingly, it is preferable to insert the combustion wick into the fuel tank along with the cotton wool before fixedly attaching the tank upper lid to the fuel tank. At that time, an insertion hole larger than the outer shape of the combustion wick is provided at the tank upper lid and the tank upper lid is integrated by inserting the combustion wick therethrough, and at that time, the combustion wick needs to be fixed simply and with excellent operational performance by a pertinent method.

[0012] In view of the above-described situation, the invention intends to provide a liquid fuel combustion instrument in which heat resistance and integrating performance are promoted in arranging a combustion wick and an igniting member at a tank upper lid of a fuel tank.

DISCLOSURE OF THE INVENTION

[0013] According to an aspect of the invention resolving the above-described problem, there is provided a liquid fuel combustion instrument characterized in that in a liquid fuel combustion instrument having a fuel tank fixedly attached with a tank upper lid at an upper end thereof and containing a liquid fuel inside, a combustion wick for sucking up the liquid fuel at the inside of the fuel tank and combusting the liquid fuel at a front end combustion portion thereof projected from the tank upper lid and an igniting member for igniting the front end combustion portion of the combustion wick, an upper lid cover comprising a metal sheet is provided at an upper portion of the tank upper lid and a support portion of the igniting member is provided on the upper lid cover and the combustion wick is inserted into and held by the upper lid cover.

[0014] Further, it is preferable that there is further provided a wick fixing member surrounding an outer peripheral portion of the combustion wick projected to insert through the upper lid cover and the combustion wick is fixed by being mounted in the wick fixing member.

[0015] For example, there is further provided locking portions capable of locking side faces of the combustion wick at vicinities of a portion of the upper lid cover for inserting the combustion wick and the locking portions are deformed to thereby fixedly lock the combustion wick as a result of mounting the wick fixing member. In that case, there may be provided such a structure that the wick fixing member is fitted to outer faces of the locking portions of the upper lid cover to thereby attach the wick fixing member, and the locking portions are deformed to thereby fixedly lock the combustion wick. Further, there may be provided a structure in which the outer faces of the locking portions of the upper lid cover are provided with screws, an inner face of the wick fixing member is provided with screws in mesh with the screws and the locking portions are deformed to thereby fixedly lock the combustion wick when the wick fixing member is fastened.

[0016] Further, there may be provided a structure in which the liquid fuel combustion instrument is further comprising locking portions capable of locking side faces of the combustion wick at the wick fixing member and the locking portions are deformed to thereby fixedly lock the combustion wick by fixedly attaching the wick fixing member to the upper lid cover. In that case, there may be proveded a structure in which the combustion wick is fixedly locked by the locking portions of the wick fixing member and the wick fixing member is attached to the upper lid cover or the tank upper lid by the locking portions.

[0017] Further, there may be provided a structure in which locking portions capable of locking side faces of the combustion wick at vicinities of a portion of the tank upper lid for inserting the combustion wick and the locking portions are deformed to thereby fixedly lock the combustion wick by mounting the wick fixing member.

[0018] Further, there may be provided a structure in which locking members constituted by separate members capable of locking side faces of the combustion wick are arranged in the vicinity of a portion of the upper lid cover or the tank upper lid for inserting the combustion wick and the locking members are deformed to thereby fixedly lock the combustion wick by mounting the wick fixing member.

[0019] Further, it is possible that hook-like engaging claws are provided in the wick fixing member and the engaging claws are engaged with the upper lid cover or the tank upper lid to thereby attach the wick fixing member. Further, it is preferable that the liquid fuel combustion instrument further comprises a seal member interposed between the wick fixing member and the upper lid cover.

[0020] Further, it is preferable that side edges of the upper lid cover are bent downwardly, projected portions are formed at lower end portions thereof and the projected portions are engaged with engaging grooves formed at side walls of the tank upper lid or the fuel tank to thereby attach the upper lid cover.

[0021] Further, there may be provided a structure in which the igniting member is constituted by a filing wheel, an igniter flint and a flint pressing spring and whereas the filing wheel is held by a support portion erected at the upper lid cover, the igniter flint and the flint pressing spring are contained in a cylindrical member and the cylindrical member is inserted through the upper lid cover disposed below the filing wheel and held by the tank upper lid.

[0022] Meanwhile, according to another aspect of the invention, there is provided a liquid fuel combustion instrument characterized in a liquid fuel combustion instrument having a fuel tank fixedly attached with a tank upper lid at an upper end thereof and containing cotton wool for absorbing and storing a liquid fuel inside,

a combustion wick for sucking up the liquid fuel at the inside of the fuel tank and combusting the liquid fuel at a front end combustion portion thereof projected from the tank upper lid and an igniting member for igniting a front end combustion portion of the combustion wick wherein in a state in which a lower portion of the combustion wick is brought into contact with the cotton wool in the fuel tank and an upper portion thereof is arranged to project upwardly from the fuel tank, the tank upper lid is fixedly attached to an opening portion of an upper end of the fuel tank by inserting the combustion wick into an insertion hole thereof and wherein an upper lid cover comprising a metal sheet is provided to an upper portion of the tank upper lid by inserting the combustion wick into an insertion hole thereof, the igniting member is held by a support portion provided at the upper lid cover and the wick fixing member above the upper lid cover is mounted from above to an outer peripheral portion of the projected combustion wick to thereby fix the combustion wick.

[0023] As the liquid fuel, for example, there is used a liquid fuel having a main component of low grade monovalent alcohol such as methyl alcohol, ethyl alcohol or propyl alcohol and mixed with a saturated hydrocarbon such as hexane, heptane or the like for coloring the flame.

[0024] According to the liquid fuel combustion instrument as in the invention, by installing the upper lid cover comprising the metal sheet at the upper portion of the tank upper lid of the fuel tank, holding the igniting member at the support portion installed at the upper lid cover and inserting the combustion wick through the upper lid cover and holding the combustion wick by the upper lid cover, even when the igniting member or the like is heated by combustion accompanied by igniting the combustion wick, the support portion of the igniting member is installed at the upper lid cover comprising the metal sheet and accordingly, the heat resistance is high and even when a mold body of plastic or the like is used for the tank upper lid, the igniting member can be prevented from dropping or the like.

[0025] Further, according to the structure in which the combustion wick is fixed by mounting the wick fixing member surrounding the outer peripheral portion of the front end of the combustion wick, the combustion wick is previously inserted into the fuel tank, the tank upper lid and the upper lid cover are fixedly attached in the state in which the combustion wick is inserted therethrough and the wick fixing member is mounted thereto and the combustion wick is fixed to thereby enable simple assembling and achieve increased productivity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Fig. 1 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a first embodiment of the invention;

Fig. 2 is a disassembled perspective view of principal portions of Fig. 1;

Fig. 3 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a second embodiment;

Fig. 4 is a disassembled perspective view of principal portions of Fig. 3;

Fig. 5 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a third embodiment;

Fig. 6 is a disassembled perspective view of principal portions of Fig. 5;

Fig. 7 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a fourth embodiment;

Fig. 8 is a disassembled perspective view of principal portions of Fig. 7;

Fig. 9 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a fifth embodiment;

Fig. 10 is a disassembled perspective view of principal portions of Fig. 9;

Fig. 11 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a sixth embodiment;

Fig. 12 is a disassembled perspective view of principal portions of Fig. 11;

Fig. 13 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a seventh embodiment;

Fig. 14 is a disassembled perspective view of principal portions of Fig. 13;

Fig. 15 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to an eighth embodiment;

Fig. 16 is a disassembled perspective view of principal portions of Fig. 15;

Fig. 17A is a sectional view of essential portions showing a state before inserting a wick fixing member of Fig. 15;

Fig. 17B is a sectional view of the essential portions showing a state after inserting the wick fixing member of Fig. 17A;

Fig. 18A is a sectional view of essential portions showing a state before inserting a wick fixing member according to a modified mode of Fig. 17A;

Fig. 18B is a sectional view of the essential portions showing a state after inserting the wick fixing member of Fig. 18A;

Fig. 19 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a ninth embodiment;

Fig. 20 is a disassembled perspective view of principal portions of Fig. 19;

Fig. 21 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to a tenth embodiment;

Fig. 22 is an outline sectional view of a lighter as an example of a liquid fuel combustion instrument according to an eleventh embodiment;

Fig. 23 is a disassembled perspective view of principal portions of Fig. 22; and

Fig. 24 is a perspective view of essential portions showing another embodiment of a combustion wick.

BEST MODE FOR CARRYING OUT THE INVENTION

[0027] An explanation will be given of respective embodiments of a liquid fuel combustion instrument according to the invention, with reference to the drawings as follows.

〈First Embodiment〉

[0028] Fig. 1 shows an outline sectional structure of a lighter as a liquid fuel combustion instrument according to the example and Fig. 2 shows a disassembled view of principal portions thereof.

[0029] A lighter 1 is provided with a fuel tank 2 molded in the shape of a bottomed cylinder using polycarbonate plastic or the like. The inside of the fuel tank 2 contains cotton wool 3 constituting a liquid absorbing fiber member for being impregnated with and holding liquid fuel, and an inner side of an upper end opening portion of the fuel tank 2 is fixedly attached to a tank upper lid 4 similarly molded using carbonate plastic or the like. The above-described cotton wool 3 is arranged at the bottom of the fuel tank 2 and a space is formed at an upper portion thereof.

[0030] The tank upper lid 4 is perforated with an insertion hole 41 and has a combustion wick 6 arranged in the shape of a square rod such that a lower portion thereof is brought into contact with the cotton wool 3, an upper portion thereof is inserted through the insertion hole 41 and a front end combustion portion thereof is projected upward from the tank upper lid 4. An opening shape of the insertion hole 41 is formed to be larger than an outer shape of the combustion wick 6 and is inserted with the combustion wick 6 with a clearance therebetween. Further, the cotton wool 3 and the combustion wick 6 are contained inside the fuel tank 2 before attaching the tank upper lid 4 to the fuel tank 2.

[0031] Further, an upper lid cover 5 formed by a metal sheet is attached to an upper portion of the tank upper lid 4 has. The upper lid cover 5 is perforated with an insertion hole 51 for inserting the combustion wick 6 and a shape thereof is formed to be larger than the outer shape of the combustion wick 6. A support portion 52 for rotatably holding a filing wheel 13 of an igniting member 10, mentioned later, in a forward and rearward direction, is bent and erected at one end portion of the upper lid cover 5 and an axially supporting portion 53 for axially supporting an enclosing cap 16, mentioned later, is bent and erected at other end portion thereof.

[0032] Attachment pieces 54 extended downwardly are provided continuous to side edges in the forward and rearward direction of the upper lid cover 5 and projected portions 54a projected inwardly are formed to bend at lower end portions thereof and fixed by being inserted into and engaged with engaging grooves 21 recessed at side faces of the fuel tank 2.

[0033] At the inner periphery of the insertion hole 51 of the upper lid cover 5, lock portions 55 are erected to extend upwardly at four locations in the forward and rearward direction and in the left and right direction and lock claws 55a bent in the central direction are provided continuous to upper end portions of the lock portions 55. The lock portion 55 can be elastically deformed inwardly and in deforming the lock portion 55, front ends of the lock claws 55a can be locked to side faces of the combustion wick 6.

[0034] A wick fixing member 7 in a cylindrical shape is inserted from above into the front end combustion portion of the combustion wick 6 to surround an outer periphery thereof and an inner face at a lower end portion thereof can be fitted to outer sides of the lock portions 55 of the upper lid cover 5. An opening shape of the lower end portion of the wick fixing member 7 is formed such that the lower end portion is brought into contact with outer faces of the lock portions 55 of the upper lid cover 5 to thereby press and deform the lock portions 55 in the central direction and to fixedly lock the lock claws 55a by bringing the lock claws 55a into press contact with the combustion wick 6.

[0035] A seal member 19 comprising an O ring is interposed between a lower end face of the wick fixing member 7 and an upper face of the upper lid cover 5 at the outer peripheries of the lock portions 55, and a seal member 20 comprising an O ring is attached to a groove 71 at the outer periphery of the wick fixing member 7.

[0036] The igniting member 10 for igniting the combustion wick 6 has a structure in which the filing wheel 13 having a horizontal wheel 14 attached at its side portion is rotatably supported by the support portion 52 of the upper lid cover 5, an igniter flint 11 and a flint pressing spring 12 are contained in a cylindrical member 15, the cylindrical member 15 is inserted through the upper lid cover 5 on the lower side of the filing wheel 13 and inserted into and held by a containing hole 42 of the tank upper lid 4 and a front end of the igniter flint 11 is pressed to a peripheral file of the filing wheel 13 by urging force of the flint pressing spring 12 and is constructed such that sparks are thrown toward the combustion wick 6 by rotating the horizontal wheel 14.

[0037] Further, the upper lid cover 5 is openably and closably provided with an enclosing cap 16 for preventing evaporation. One end portion of the enclosing cap 16 is axially supported by the axially supporting portion 53 of the upper lid cover 5 so as to pivot around a pin 17, and an inner cap 16a for hermetically sealing and surrounding an outer peripheral portion of the wick fixing member 7 is provided at an inner face of the

enclosing cap 16. Further, the seal member 20 attached to the outer periphery of the wick fixing member 7 is brought into press contact with an inner peripheral face of the inner cap 16 to thereby promote hermetic sealing performance.

[0038] Further, as a fiber material of the cotton wool 3, there is used, for example, soft wood pulp or polypropylene fiber. The cotton wool 3 is charged into the fuel tank 2 in a state in which the cotton wool 3 is integrated with the combustion wick 6. The cotton wool 3 is stored with liquid fuel mixed with, for example, 95 wt% of ethyl alcohol having purity of 99.5 % and 5 wt% of n-hexane by injecting and impregnating the liquid fuel thereinto.

[0039] The combustion wick 6 is formed by ceramic fiber in which, for example, a small amount of an organic binder is added to the ceramic fiber having a thickness of 2.8 μm which is made into fiber from a raw material mainly of alumina and silica to form into a plate-like shape, and formed in a rod-like shape having a square section by cutting the plate, and the wick 6 is fixed so that the front end combustion portion of the wick 6 projects from the upper end face of the wick fixing member 7 by a predetermined amount (for example, 3 mm). Further, an outer peripheral face of the front end combustion portion of the combustion wick 6 is covered with an outer skin layer which is porous and is provided with a permeability of liquid fuel lower than that of an inner material and is provided such that the shape of the flame becomes slender.

[0040] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6. The tank upper lid 4 is then attached to the upper portion of the fuel tank 2 by inserting the upper portion of the combustion wick 6 into the insertion hole 41, and the upper lid cover 5 is attached onto the tank upper lid 4 by engaging the projected portions 54a at the lower end portion of the attachment piece 54 with the engaging grooves 21 of the fuel tank 2. After that, the wick fixing member 7 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 projected upwardly by inserting through the insertion hole 51 of the upper lid cover 5 via the seal member 19, the inner peripheral portion of the lower portion of the wick fixing member 7 is fitted to outer sides of the lock portions 55 of the upper lid cover 5, the wick fixing member 7 is attached to the upper lid cover 5, and the lock portions 55 are pressed to deform in the central direction and locked by bringing the lock claws 55a into press contact with the combustion wick 6 to thereby bite the combustion wick 6. Further, in a state in which the igniter flint 11 and the flint pressing spring 12 are contained in the cylindrical member 15 contained, and the cylindrical member 15 is inserted through the upper lid cover 5 into the containing hole 42 relative to the support portion 52 of the upper lid cover 5, the filing wheel 13 is engaged with and held by the support portion 52 while pushing the lighter flint 11.

[0041] A change over time was observed when the lighter 1 installed with the upper lid cover 5 as described above was used and the combustion wick 6 was ignited by the igniting member 10 and was continuously combusted. No abnormality was caused at respective portions during a time period of about 10 minutes after injecting 4.5 g of liquid fuel into the fuel tank 2 and until the liquid fuel was completely combusted. In contrast thereto, when a similar combustion test was carried out on a lighter integrally provided with a filing wheel supporting portion at the tank upper lid 4 molded by polycarbonate without installing the above-described upper lid cover 5, two minutes after continuing combustion after ignition, the filing wheel supporting portion of the tank upper lid 4 was softened by elevation of temperature caused by heat conduction, since the filing wheel 13 was under stress as a result of pushing the igniter flint 11 being pushed against the filing wheel 13 from below by the spring 12 and accordingly, by deforming to soften the support portion, the filing wheel 13 was detached therefrom and flew about along with the igniter flint 11 and the lighter could be used.

〈Second Embodiment〉

[0042] Fig. 3 shows the overall structure of a lighter according to the example and Fig. 4 shows a disassembled view of principal portions.

[0043] The tank upper lid 4 attached to the upper end opening portion of the fuel tank 2 is formed to extend upwardly continuous to the side faces of the fuel tank 2, the upper face is perforated with the insertion hole 41 and is formed with the containing hole 42 of the igniting member 10, and the side faces are formed with the engaging grooves 43 for attaching the upper lid cover 5.

[0044] Further, the upper lid cover 5 comprising a metal sheet is continuously provided with lock portions 56 which can be brought into contact with the side faces of the combustion wick when they are deformed at the inner periphery of the insertion hole 51 into which the combustion wick 6 is inserted with the clearance therebetween. The lock portions 56 are provided to extend from four locations of the inner peripheral edge in the forward and rearward directions and in the left and right directions of the insertion hole 51 inwardly toward the center and also skewed upwardly. Further, a plurality of erected pieces 52a are projected upwardly at the surrounding of the opening for inserting the igniting flint 11 and the flint pressing spring 12 at the central lower portion of the support portion 52 for holding the filing wheel 13 of the igniting member 10.

[0045] Meanwhile, the wick fixing member 7 is provided in a cylindrical shape, engaging claws 72 in a hook-like shape extended downwardly are provided at an inner periphery of a lower end portion thereof and front end hook portions thereof are provided engageably with a lower face edge portion of the insertion hole

41 of the tank upper lid 4. The remainder of the constitution is similar to that of the first embodiment.

[0046] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, thereafter, the tank upper lid 4 is attached above the fuel tank 2 by inserting the upper portion of the combustion wick 6 into the insertion hole 41, and the upper lid cover 5 is then attached onto the tank upper lid 4 by engaging the projected portions 54a of the lower end portions of the attachment pieces 54 with the engaging grooves 43 of the tank upper lid 4. Further, the wick fixing member 7 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly via the seal member 19, the wick fixing member 7 is locked by pressing to deform the lock portions 56 downwardly by the lower end portion and moving the front end portions to the central side to thereby bring the front end portion into press contact with the combustion wick 6 to thereby bite the combustion wick 6, and the wick fixing member 7 is attached to the upper lid cover 5 by inserting the engaging claws 72 at the lower portion of the wick fixing member 7 through the insertion holes 51 and 41 and engaging the lower engaging claws 72 with the edge portion of the lower face of the insertion hole 41 of the tank upper lid 4. Further, in the state in which the igniter flint 11 and the flint pressing spring 12 are inserted from an inner hole constituted by erected pieces 52a into the containing hole 42 of the tank upper lid 4, the filing wheel 13 is engaged with and held by the support portion 52 while pushing the igniter flint 11.

〈Third Embodiment〉

[0047] Fig. 5 shows the overall structure of a lighter according to the example and Fig. 6 shows a disassembled view of principal portions. The structure of supporting the igniting member 10 is similar to that in the first embodiment.

[0048] According to the tank upper lid 4 attached to the upper end opening portion of the fuel tank 2, the insertion hole 41 is formed at the upper face so as to be larger than those in the previous examples. Further, according to the upper lid cover 5 comprising a metal sheet, pressing portions 57 are formed to bend at the inner periphery of the insertion hole 51 into which the combustion wick 6 is inserted with a clearance. The pressing portions 57 are formed with inner peripheral faces to bend in a curved face downwardly from four locations of the inner peripheral edge of the insertion hole 51 in the forward and rearward direction and in the left and right direction.

[0049] Meanwhile, the wick fixing member 7 is provided in a cylindrical shape, the inner periphery at the lower end portion is provided with lock portions 73 extended downwardly, the lock portions 73 can be deformed in the central direction by being brought into contact with the pressing portions 57 of the upper lid cover 5 and front end portions thereof can be locked to the side faces of the combustion wick 6 when they are deformed. The remaining constitution is the same as that in the first embodiment.

[0050] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, the tank upper lid 4 is fitted to the upper portion by inserting the upper portion of the combustion wick 6 into the insertion hole 41, and the upper lid cover 5 is attached onto the tank upper lid 4 by engaging the projected portions 54a at the lower end portions of the attachment pieces 54 with the engaging grooves 21 of the fuel tank 2. Further, the fixing member 7 is inserted into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly, the lower end lock portions 73 are inserted into the insertion hole 51 of the upper lid cover 5, the lock portions 73 are bought into contact with the pressing portions 57 to thereby deform in the central direction, the front end portions are locked to the side faces of the combustion wick 6 to thereby bite the side faces and fix the combustion wick 6, and the lock portions 73 are interposed between the pressing portions 57 and the combustion wick to thereby attach the wick fixing member 7.

〈Fourth Embodiment〉

[0051] Fig. 7 shows the overall structure of a lighter according to the example and Fig. 8 shows a disassembled view of principal portions.

[0052] The tank upper lid 4 attached to the upper end opening portion of the fuel tank 2 is attached so as to extend on the upper side of the fuel tank 2 similar to the second embodiment, and a cylindrical portion 44 is provided so as to project on the upper side of the containing hole 42. An opening is provided in the upper lid cover 5 in correspondence with the cylindrical portion 44.

[0053] Further, according to the upper lid cover 5 comprising a metal sheet, lock portions 58 formed with male screws at outer faces thereof are erected to extend upwardly at four locations in the forward and rearward direction and in the left and right direction at the inner periphery of the insertion hole 51 into which the combustion wick 6 is inserted with a clearance and lock claws 58a projected so as to bend in the central direction are provided continuous to the upper end portions of the lock portions 58. The lock portions 58 can be elastically deformed inwardly and front ends of the lock claws 58a can be locked to the side faces of the combustion wick 6 when they are deformed.

[0054] Meanwhile, the wick fixing member 7 is provided in a cylindrical shape, the inner periphery at the lower end portion is formed with female screws screwed

to the male screws at the outer peripheries of the lock portions 58, and in screwing them, the lock portions 58 are pressed to deform in the central direction and the lock claws 58a are brought into press contact with the combustion wick 6 to thereby engage therewith. The remaining constitution is similar to that in the second embodiment.

[0055] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, the tank upper lid 4 is engaged to the upper portion by inserting the upper portion of the combustion wick 6 into the insertion hole 41, and the upper lid cover 5 is attached onto the tank upper lid 4 by engaging the projected portions 54a of the attachment pieces 54 with the engaging grooves 43 of the tank upper lid 4. Further, the wick fixing member 7 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly, the female screws at the inner periphery of the lower portion of the wick fixing member 7 are screwed to the male screws on the outer sides of the lock portions 58 of the upper lid cover 5 to thereby attach the wick fixing member 7 to the upper lid cover 5, and the lock portions 58 are deformed in the central direction and is locked by bringing the lock claws 58a into press contact with the combustion wick 6 to bite the combustion wick 6. Further, in the state in which the igniter flint 11 and the flint pressing spring 12 are inserted into the containing hole 42 from the cylindrical portion 44 of the tank upper lid 4 relative to the support portion 52 of the upper lid cover 5, the filing wheel 13 is engaged with and held by the support portion 52 while pushing the igniter flint 11.

〈Fifth Embodiment〉

[0056] Fig. 9 shows the overall structure of a lighter according to the example and Fig. 10 shows a disassembled view of principal portions. The structure of supporting the igniting member 10 is similar to that in the first embodiment.

[0057] The upper lid cover 5, comprising a metal sheet which is attached to the upper portion of the tank upper lid 3 attached to the upper end opening portion of the fuel tank 2, is formed with a pressing portion 59 in a cylindrical shape extended upwardly to bend at the inner peripheral edge of the insertion hole 51 into which the combustion wick 6 is inserted with a clearance.

[0058] Meanwhile, the wick fixing member 7 is provided in a cylindrical shape, the middle portion of the outer periphery is formed with a stepped portion 74, the lower end portion is provided with the lock portions 73 extended downwardly, the lock portions 73 can be deformed in the central direction by being brought into contact with the inner peripheral face of the pressing portion 59 of the upper lid cover 5, and the front end portion can be locked to the side faces of the combustion wick 6 when they are deformed. The remaining constitution is the same as that in the first embodiment.

[0059] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, and then, the tank upper lid 4 is fitted to the upper portion by inserting the upper portion of the combustion wick 6 into the through hole 41, and the upper lid cover 5 is attached onto the tank upper lid 4 by engaging the projected portions 54a of the lower end portions of the attachment pieces 54 with the engaging grooves 21 of the fuel tank 2. Further, the wick fixing member 7 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly by interposing the seal member 19 between the stepped portion 74 and the upper end of the pressing portion 59. The lock portions 73 at the lower end thereof are inserted into the insertion hole 51 of the upper lid cover 5. The lock portions 73 are deformed inwardly by being brought into contact with the inner peripheral face of the pressing portion 59, the front end portion is locked to the side faces of the combustion wick 6 to bite the side faces to thereby fix the combustion wick 6, and the lock portions 73 are interposed between the pressing portion 59 and the combustion wick 6 to thereby attach the wick fixing member 7.

〈Sixth Embodiment〉

[0060] Fig. 11 shows the overall structure of a lighter according to the embodiment and Fig. 12 shows a disassembled view of principal portions. The constitution is similar to that in the fifth embodiment except that a mode of the wick fixing member 7 is different.

[0061] The wick fixing member 7 is provided in a cylindrical shape and is formed such that the upper portion is removed from the groove 71 of the wick fixing member 7 according to the fifth embodiment and the height is lowered. The lock portions 73 extended downwardly are provided on the lower side of the stepped portion 74 and the lock portions 73 can be deformed in the central direction by being brought into contact with the inner peripheral face of the pressing portion 59 of the upper lid cover 5 and the front end portions can be locked to the side faces of the combustion wick 6 when they are deformed. Further, the seal member 19 interposed between the stepped portion 74 of the wick fixing member 7 and the upper end of the pressing portion 59 of the upper lid cover 5, serves also as a seal member for an intermediary component with respect to the inner peripheral face of the inner cap 16a of the enclosing cap 16.

[0062] In assembling the lighter according to the embodiment, similarly to the fifth embodiment, the tank upper lid 4 is fitted to the upper portion of the fuel tank 2 inserted with the cotton wool 3 and the combustion wick

6, and then the upper lid cover 5 is attached, the wick fixing member 7 is inserted into the front end combustion portion of the combustion wick 6 via the seal member 19, the lock portions 73 are deformed to thereby fix the combustion wick 6 and the wick fixing member 7 is attached thereto.

〈Seventh Embodiment〉

[0063] Fig. 13 shows the overall structure of a lighter of this example and Fig. 14 shows a disassembled view of principal portions. The structure of supporting the igniting member 10 is similar to that in the first embodiment.

[0064] The tank upper lid 4 attached to the upper end opening portion of the fuel tank 2, is attached to the fuel tank to extend upwardly similar to the second embodiment. The insertion hole 41 into which the combustion wick 6 is inserted is formed to be large, and lock portions 45, front ends of which can be brought into contact with the side faces of the combustion wick 6, are provided continuous to the inner periphery of the insertion hole 41 by integral molding. The lock portions 45 are provided to extend in the central direction toward skewed upward from four locations of the inner peripheral edge at the lower portion of the insertion hole 41 in the forward and rearward direction and in the left and right direction. Further, when the lock portion 45 is thin and considerably flexible, the lock portion 45 may be molded horizontally to bend upwardly when the combustion wick 6 is inserted.

[0065] Further, the insertion hole 51 is formed simply in a circular shape in the upper lid cover 5 comprising a metal sheet. Meanwhile, the wick fixing member 7 is provided in a cylindrical shape, engaging claws 72 in a hook-like shape extended downwardly are provided at the inner periphery of the lower end portion, front end hook portions thereof can be engaged with the edge portion at the lower face of the insertion hole 51 of the upper lid cover 5 and a front end portion thereof can be brought into contact with the above-described lock portions 45 of the tank upper lid 4. The remainder of the constitution is similar to that in the first embodiment.

[0066] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, thereafter, the tank upper lid 4 is fitted to the upper portion by inserting the upper portion of the combustion wick 6 through the insertion hole 41, and the upper lid cover 5 is attached onto the tank upper lid 4 by engaging the projected portions 54a of the lower end portions of the attachment pieces 54 with the engaging grooves 43 of the tank upper lid 4. Further, the wick fixing member 7 is inserted into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly via the seal member 19, the wick fixing member 7 is locked by pressing to deform the lock portions 45 downwardly by the lower end portions of the engaging claws 72 and moving the front end portions to the central side to thereby bring the front end portions into press contact with the combustion wick 6 to bite the combustion wick 6, and the engaging claws 72 are engaged with the edge portion of the lower face of the insertion hole 51 of the upper lid cover 5 to thereby fixedly attach the wick fixing member 7 thereto.

〈Eighth Embodiment〉

[0067] Fig. 15 shows a total structure of a lighter according to the example, Fig. 16 shows a disassembled view of principal portions and Fig. 17A and Fig. 17B show sectional views of essential portions. The structure of supporting the igniting member 10 is similar to that in the first embodiment.

[0068] The tank upper lid 4 attached to the upper end opening portion of the fuel tank 2 is similar to that in the second embodiment and guide portions 46 extended downwardly are formed at the lower portion of the inner periphery of the insertion hole 41. Further, the upper lid cover 5 comprising a metal sheet is formed similar to that in the seventh embodiment.

[0069] According to the insertion holes 41 and 51 of the tank upper lid 4 and the upper lid cover 5, the wick fixing member 7 is inserted into the outer periphery of the combustion wick 6 via a lock member 8 comprising a separate part. An upper portion of the lock member 8 formed in a ring-like shape can be brought into contact with the upper portion of the outer periphery of the insertion hole 51 of the upper lid cover 5, lock portions 81 extended downwardly are provided at two locations of a lower portion thereof, lower end bent portions 81a (refer to Fig. 17A) of the lock portions 81 are formed to bend to an upper inner side and in deforming the lower end bent portions 81a, front end portions thereof can be brought into contact with the side faces of the combustion wick 6.

[0070] Meanwhile, the wick fixing member 7 is formed in a cylindrical shape, a flange portion 75 is provided at a lower end portion thereof, pressing pieces 76 and the engaging claws 72 which are extended downwardly are provided at the inner periphery of the flange portion 75, lower end portions of the pressing pieces 76 are formed in a tapered shape and can be inserted along the inner sides of the lock portions 81 of the lock member 8, and front end hook portions of the engaging claws 72 can be engaged with the edge portion of the lower face of the insertion hole 51 of the upper lid cover 5. The remaining constitution is similar to that in the first embodiment.

[0071] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the fuel tank 2 along with the combustion wick 6, thereafter, the tank upper lid 4 is fitted to the upper portion by inserting the upper portion of the combustion wick 6 through the insertion hole 41 and the upper lid cover 5 is attached

onto the tank upper lid 4 by engaging the projected portions 54a of the lower end portions of the attachment pieces 54 with the engaging grooves 43 of the tank upper lid 4. Further, the lock member 8 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly by moving the engaging portions 81 along inner faces of the guide portions 46.

[0072] Further, as shown by Fig. 17A, when the wick fixing member 7 is inserted via the seal member 19, as shown by Fig. 17B, the lower end bent portion 81a of the lock portion 81 of the lock member 8 is pressed to deform inwardly by the lower end portion of the pressing piece 76 to thereby move the front end portion to the central side and bring the front end portion into press contact with the combustion wick 6 to bite the combustion wick 6 and lock the combustion wick 6, and the engaging claws 72 are engaged with the edge portion of the lower face of the insertion hole 51 of the upper lid cover 5 to thereby attach the wick fixing member 7 thereto.

[0073] Fig. 18A and Fig. 18B show a modified mode in which the upper face portion of the upper periphery of the insertion hole 41 of the tank upper lid 4 is formed in a recessed shape, along which the outer peripheral portion of the insertion hole 51 of the upper lid cover 5 is formed to bend downwardly, the upper ring of the lock member 8 is locked with a recessed portion of the upper lid cover 5 and the seal member 19 is arranged therein and the wick fixing member 7 is inserted from above as shown by Fig. 18A and Fig. 18B to thereby deform the bent portions 81a of the lock portions 81 and fix the combustion wick 6.

〈Ninth Embodiment〉

[0074] Fig. 19 shows the overall structure of a lighter according to the example and Fig. 20 shows a disassembled view of principal portions. According to the example, the fuel tank is made of paper and the tank upper lid 4 is made of metal.

[0075] The fuel tank 2 is constituted by bonding divided parts, each fabricated by pressing a material comprising a paper board having a thickness of 0.4 mm, both surfaces of which are coated by low density polyethylene, into a shape in which side walls and a bottom portion of a shape of a fuel tank are separated into two divisions. The above-described divided parts are provided with flanges 2a at outer peripheral portions thereof and the fuel tank 2 substantially in a shape of an elliptic cylinder is formed by subjecting the low density polyethylene films on inner faces of the flanges 2a to ultrasonic welding while bringing the films into press contact with each other. Recessed portions are notched on a front side and on a rear side of an upper end of the paper-made fuel tank 2 and side portions of the tank upper lid formed with engaging grooves 43, mentioned later, can be inserted thereinto.

[0076] Further, the tank upper lid 4 is formed by die casting of aluminum, side faces are formed with the engaging grooves 43 capable of locking the attachment pieces 54 of the upper lid cover 5 and an upper end portion of the fuel tank 2 is bonded to a left side and a right side of the outer periphery of the upper portion using an adhering agent.

[0077] Meanwhile, the upper lid cover 5 comprising a metal sheet and the wick fixing member 7 which are attached to the upper portion of the tank upper lid 4, are constituted similar to those in the first embodiment. Further, the structure of holding the igniting member 10 is such that an upper end portion of the containing hole 42 of the tank upper lid 4 is formed into a stepped portion having a large diameter and an O ring 16 inserted into the containing hole 42, the cylindrical member 15 containing the igniter flint 11 and the flint pressing spring 12 is also inserted into the containing hole 42 and an outer peripheral flange portion thereof is brought into press contact with the O ring 16, and the upper portion of the cylindrical member penetrates an opening of the upper lid cover 5 to project upwardly. The remaining constitution is similar to that in the first embodiment.

[0078] In assembling the lighter 1 according to the embodiment, the cotton wool 3 is inserted into the inside of the paper-made fuel tank 2 along with the combustion wick 6 before or after ultrasonic welding, the tank upper lid 4 made of a metal is fitted to the upper portion by inserting the upper portion of the combustion wick 6 into the insertion hole 41 and the two members are bonded together using an adhesive agent. In a state in which the cylindrical member 15 is inserted into the containing hole 42 of the tank upper lid 4 via the O ring 16, the upper lid cover 5 is attached from above by engaging the projected portions 54a of the lower end portions of the attachment pieces 54 with the engaging grooves 43 of the upper lid cover 4. Further, the wick fixing member 7 is inserted from above into the outer peripheral portion of the front end combustion portion of the combustion wick 6 inserted through the insertion hole 51 of the upper lid cover 5 and projected upwardly to thereby fix the combustion wick 6 and attach the wick fixing member 7. Thereafter, the flint pressing spring 12 and the igniter flint 11 are inserted into the cylindrical portion 15 and the filing wheel 13 is attached to the support portion 52 while pushing the igniter print 11.

〈Tenth Embodiment〉

[0079] Fig. 21 shows the overall structure of a lighter according to the example. According to the example, the tank upper lid 4 according to the ninth embodiment is formed by a metal sheet.

[0080] The fuel tank 2 is constituted by laminating a metal foil (aluminum foil) on one face of a paper board having a thickness of 0.4 mm, a surface thereof is coated by low density polyethylene and the other face

thereof is coated with low density polyethylene to thereby form laminated paper, pressing the laminated paper into two divided parts similar to the previous example and bonding the parts together by ultrasonic welding.

[0081] The tank upper lid 4 bonded to the upper portion of the fuel tank 2 is formed by pressing a metal sheet (iron sheet) and the cylindrical portion 15 contained with the igniter flint 11 and the flint pressing spring 12 of the igniting member 10 penetrates through the tank upper lid 4 made of the metal and inserted into and supported by the inside of the fuel tank 2 and is sealed by the O ring 16. The tank upper lid 4 is bonded and integrated with the upper portion of the paper-made fuel tank 2 using an adhering agent. The remaining structure and assembling operation are similar to those in the ninth embodiment.

〈Eleventh Embodiment〉

[0082] Fig. 22 shows the overall structure of a lighter according to the example and Fig. 23 shows a disassembled view of principal portions. According to the example, the fuel tank 2 is also made of paper and the tank upper lid 4 is also made of metal.

[0083] The fuel tank 2 is formed using a paper tube 2b produced by winding paperstrip in a cylindrical shape, coating an inner face of the paper tube 2b with low density polyethylene, forming a section thereof into a predetermined shape, such as an elliptic shape or the like, and removing an outer periphery of an upper end portion thereof. Further, a bottom lid 2c formed by pressing paper board, both faces of which are coated with low density polyethylene, is fitted to an opened bottom portion of the above-described paper tube 2b, and an outer peripheral portion thereof and the paper tube 2b are bonded by ultrasonic welding.

[0084] The tank upper lid 4 is provided by pressing a metal sheet similar to the tenth embodiment and the side wall portion is inserted into the outer periphery of the upper end portion of the paper tube 2b of the fuel tank 2 and is bonded thereto by an adhering agent. The remaining constitution is the same as that in the tenth embodiment.

[0085] Further, Fig. 24 shows another embodiment of the combustion wick 6 in which the combustion wick 6 is formed in the shape of a circular cylinder and can be used in place of the combustion wick 6 in the shape of a square cylinder according to the above-described various embodiments.

Claims

1. A liquid fuel combustion instrument characterized in that in a liquid fuel combustion instrument having a fuel tank with a tank upper lid attached at an upper end thereof and containing a liquid fuel inside, a combustion wick for sucking up the liquid fuel at the inside of the fuel tank and combusting the liquid fuel at a front end combustion portion thereof projected from the tank upper lid and an igniting member for igniting the front end combustion portion of the combustion wick:

   an upper lid cover comprising a metal sheet is provided at an upper portion of the tank upper lid and a support portion of the igniting member is provided in the upper lid cover, and the combustion wick is inserted into and held by the upper lid cover.

2. The liquid fuel combustion instrument according to Claim 1, characterized in further comprising a wick fixing member surrounding an outer peripheral portion of the combustion wick projected to insert through the upper lid cover and the combustion wick is fixed by mounting the wick fixing member.

3. The liquid fuel combustion instrument according to Claim 2, characterized in further comprising locking portions capable of locking side faces of the combustion wick at vicinities of a portion of the upper lid cover for inserting the combustion wick and the locking portions are deformed to thereby lock the combustion wick when mounting the wick fixing member.

4. The liquid fuel combustion instrument according to Claim 3, characterized in that the wick fixing member is fitted to outer faces of the locking portions of the upper lid cover to thereby attach the wick fixing member, and the locking portions are deformed to thereby lock the combustion wick.

5. The liquid fuel combustion instrument according to Claim 3, characterized in that outer faces of the locking portions of the upper lid cover are provided with screws, an inner face of the wick fixing member is provided with threaded portions in mesh with the screws, and the locking portions are deformed to thereby lock the combustion wick when fastening the wick fixing member.

6. The liquid fuel combustion instrument according to Claim 2, characterized in further comprising locking portions capable of locking side faces of the combustion wick at the wick fixing member and the locking portions are deformed to thereby lock the combustion wick when attaching the wick fixing member to the upper lid cover.

7. The liquid fuel combustion instrument according to Claim 6, characterized in that the combustion wick is locked by the locking portions of the wick fixing member and the wick fixing member is attached to the upper lid cover or the tank upper lid by the lock-

ing portions.

8. The liquid fuel combustion instrument according to Claim 2, characterized in further comprising locking portions capable of locking side faces of the combustion wick in the vicinity of a portion of the tank upper lid for inserting the combustion wick, and the locking portions are deformed to thereby lock the combustion wick when mounting the wick fixing member.

9. The liquid fuel combustion instrument according to Claim 2, further comprising a locking member constituted by a separate member capable of locking side faces of the combustion wick in the vicinity of a portion of the upper lid cover or the tank upper lid for inserting the combustion wick, and the locking members are deformed to thereby lock the combustion wick when mounting the wick fixing member.

10. The liquid fuel combustion instrument according to Claim 2, characterized in further comprising hook-like engaging claws in the wick fixing member and the engaging claws are engaged with the upper lid cover or the tank upper lid to thereby attach the wick fixing member.

11. The liquid fuel combustion instrument according to any one of Claims 2 through 10, characterized by further comprising a seal member interposed between the wick fixing member and the upper lid cover.

12. The liquid fuel combustion instrument according to Claim 1, characterized in that side edges of the upper lid cover are bent downwardly, projected portions are formed at lower end portions thereof and the projected portions are engaged with engaging grooves formed at side walls of the tank upper lid or the fuel tank to thereby attach the upper lid cover.

13. The liquid fuel combustion instrument according to Claim 1, characterized in that the igniting member is constituted by a filing wheel, an igniter flint and a flint pressing spring, and whereas the filing wheel is held by a support portion erected at the upper lid cover, the igniter flint and the flint pressing spring are contained in a cylindrical member and the cylindrical member is inserted through the upper lid cover disposed below the filing wheel and held by the tank upper lid.

14. A liquid fuel combustion instrument characterized in a liquid fuel combustion instrument having a fuel tank with a tank upper lid attached at an upper end thereof and containing cotton wool for absorbing and storing a liquid fuel inside thereof, a combustion wick for sucking up the liquid fuel at the inside of the fuel tank and combusting the liquid fuel at a front end combustion portion thereof projected from the tank upper lid and an igniting member for igniting a front end combustion portion of the combustion wick:

wherein in a state in which a lower portion of the combustion wick is brought into contact with the cotton wool in the fuel tank and an upper portion thereof is arranged to project upwardly from the fuel tank, the tank upper lid is attached to an opening portion of an upper end of the fuel tank by inserting the combustion wick into an insertion hole in the fuel tank; and

wherein an upper lid cover comprising a metal sheet is provided on an upper portion of the tank upper lid by inserting the combustion wick into an insertion hole of the tank upper lid, the igniting member is held by a support portion provided at the upper lid cover and the wick fixing member above the upper lid cover is mounted from above to an outer peripheral portion of the projected combustion wick to thereby fix the combustion wick.

FIG. 1

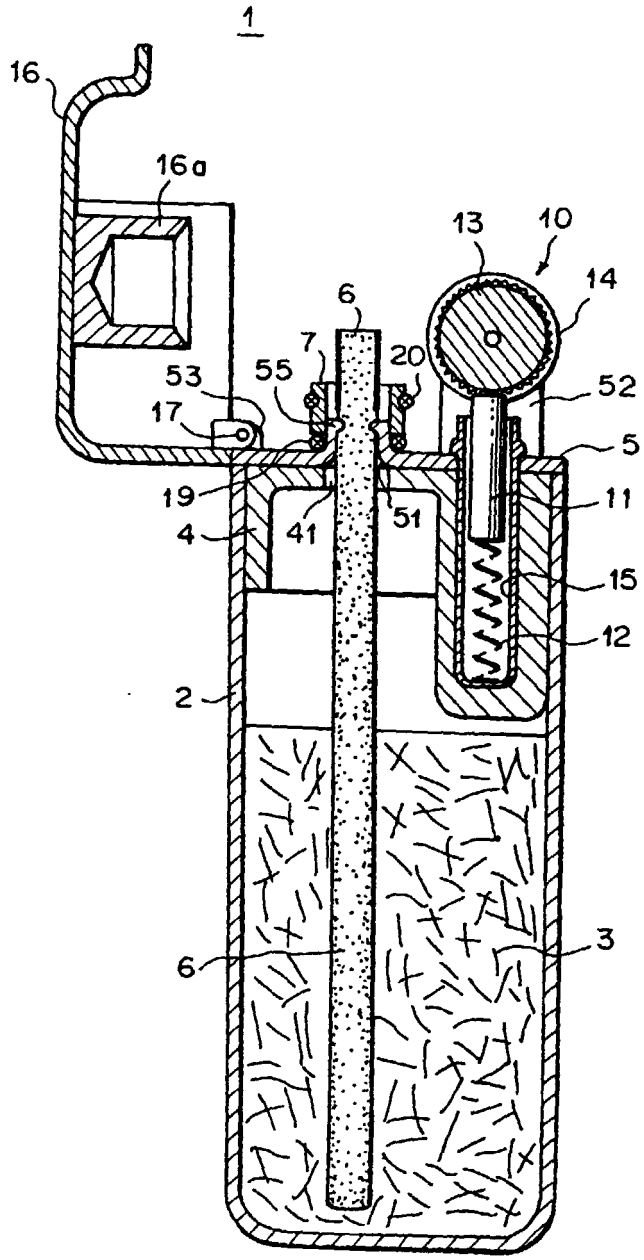


FIG.2

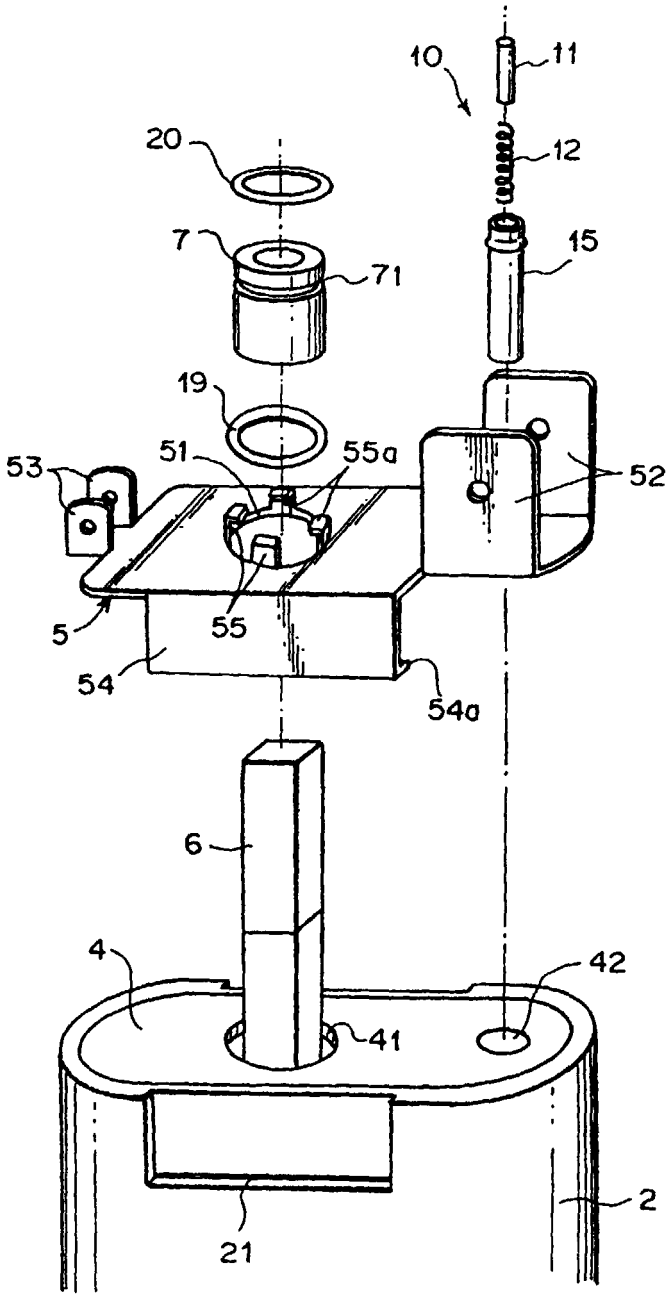


FIG.3

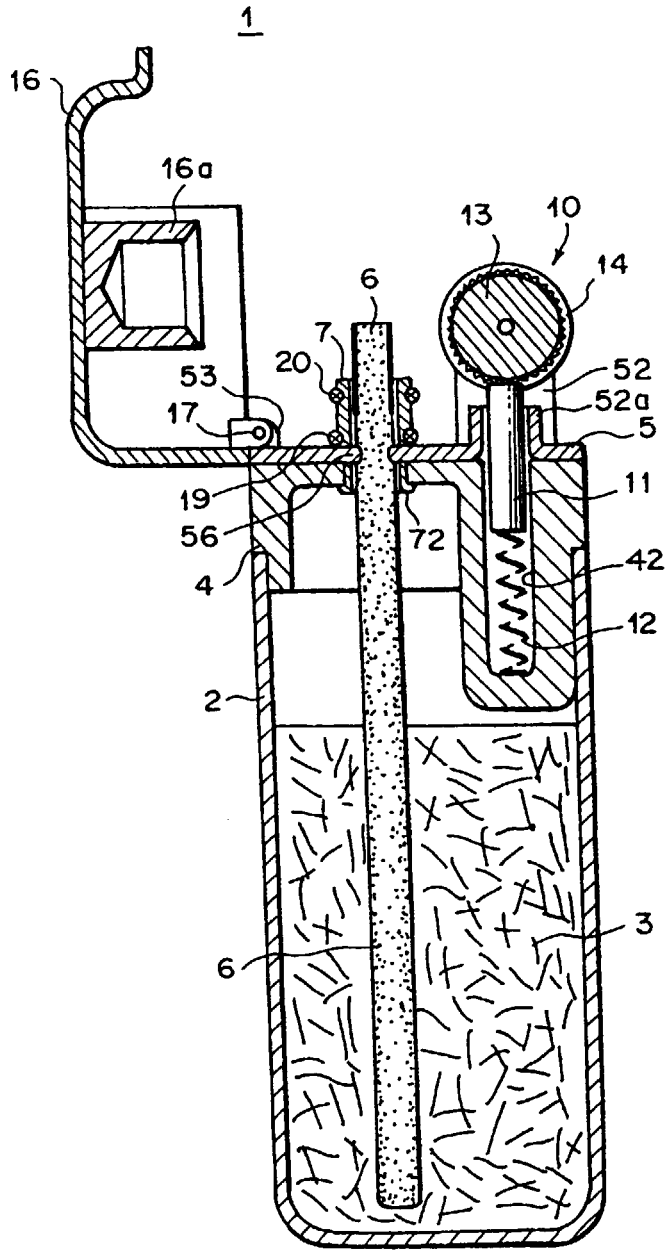


FIG.4

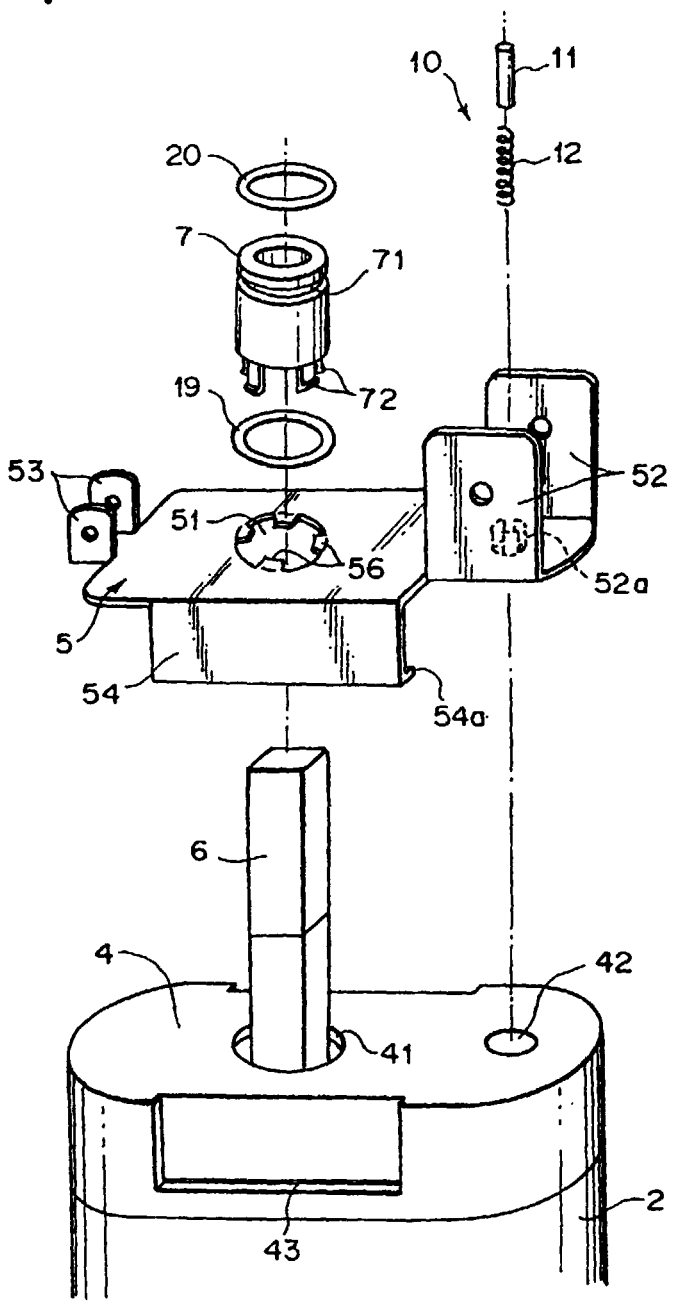


FIG.5

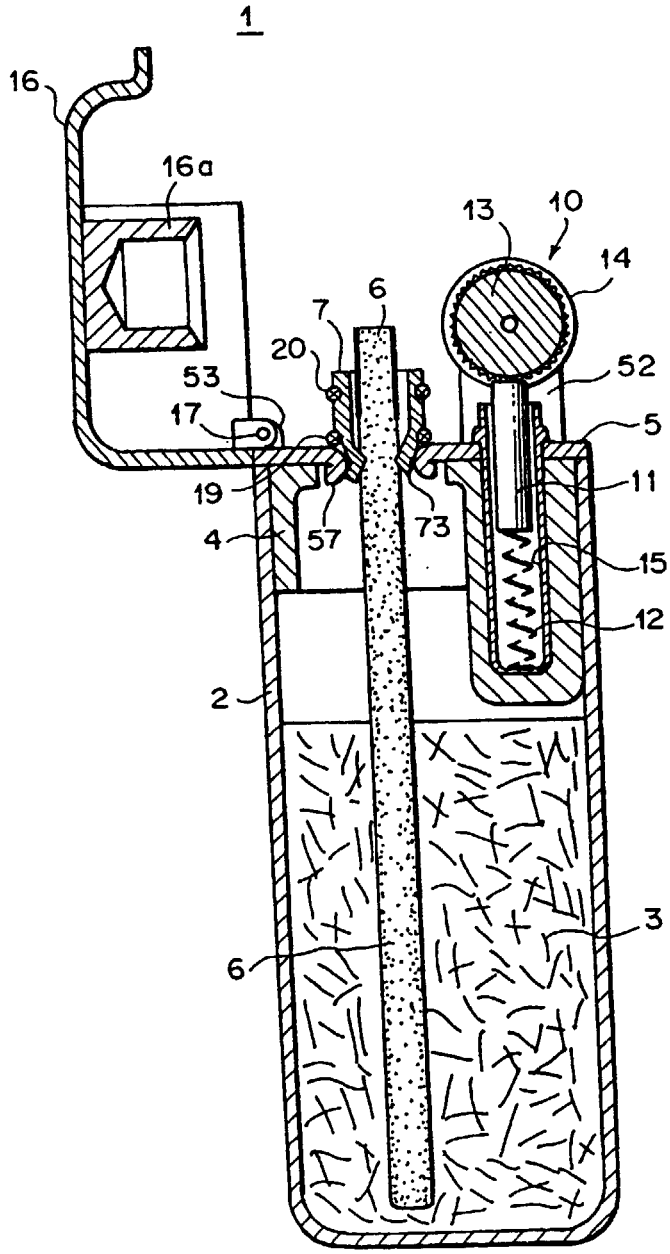


FIG.6

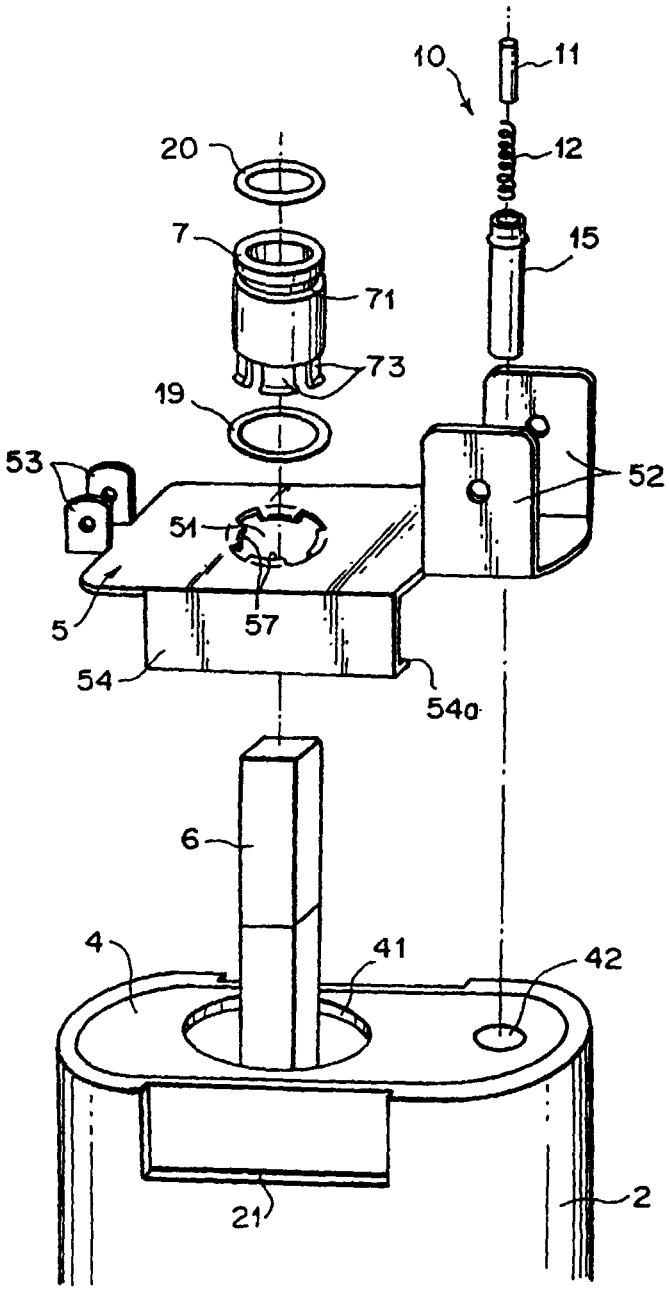


FIG.7

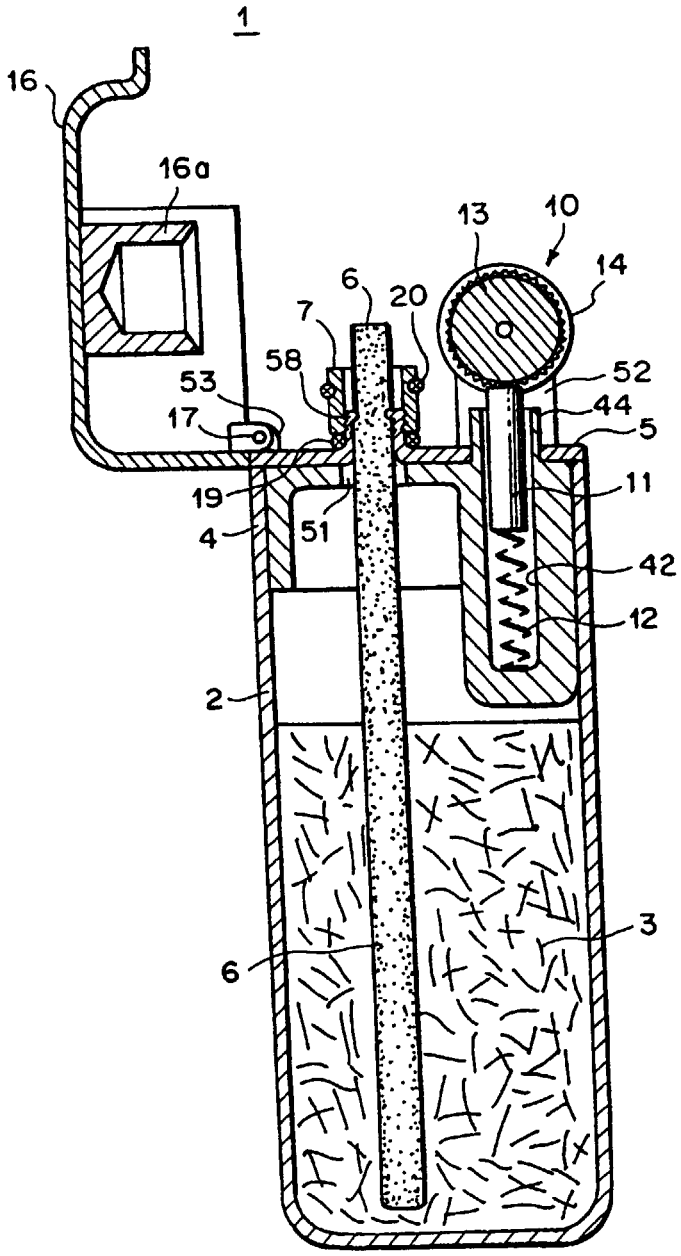


FIG.8

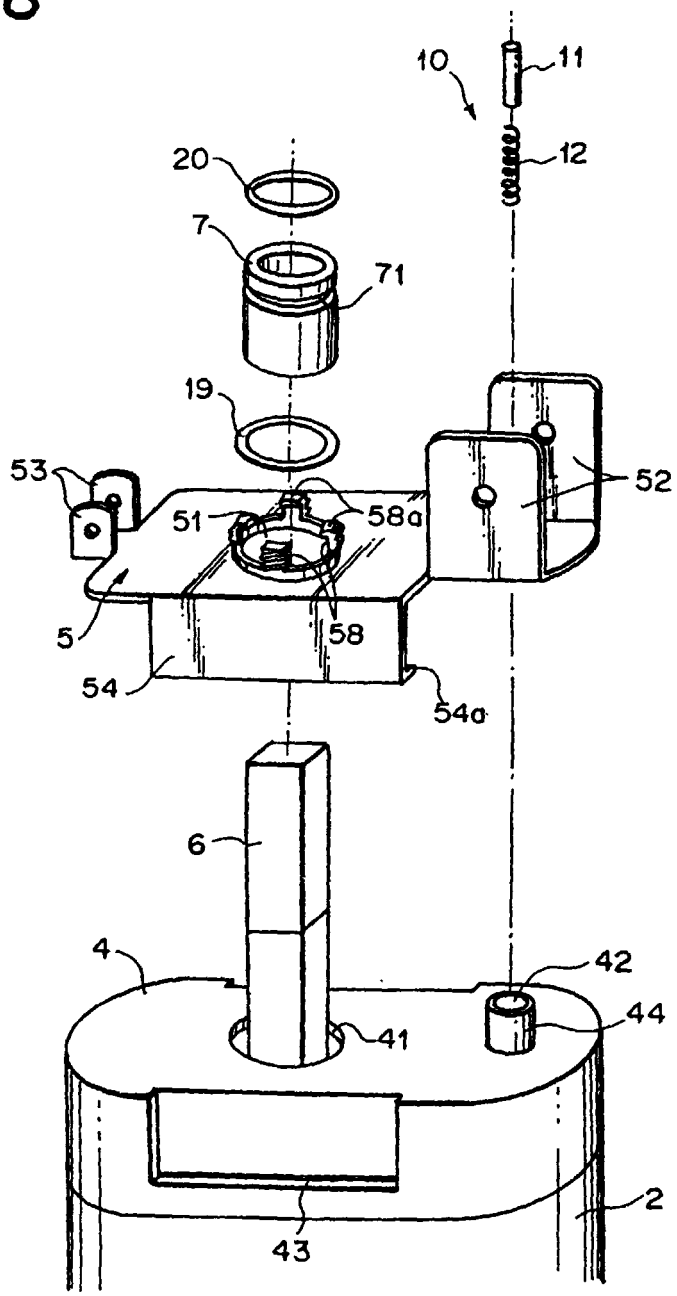


FIG. 9

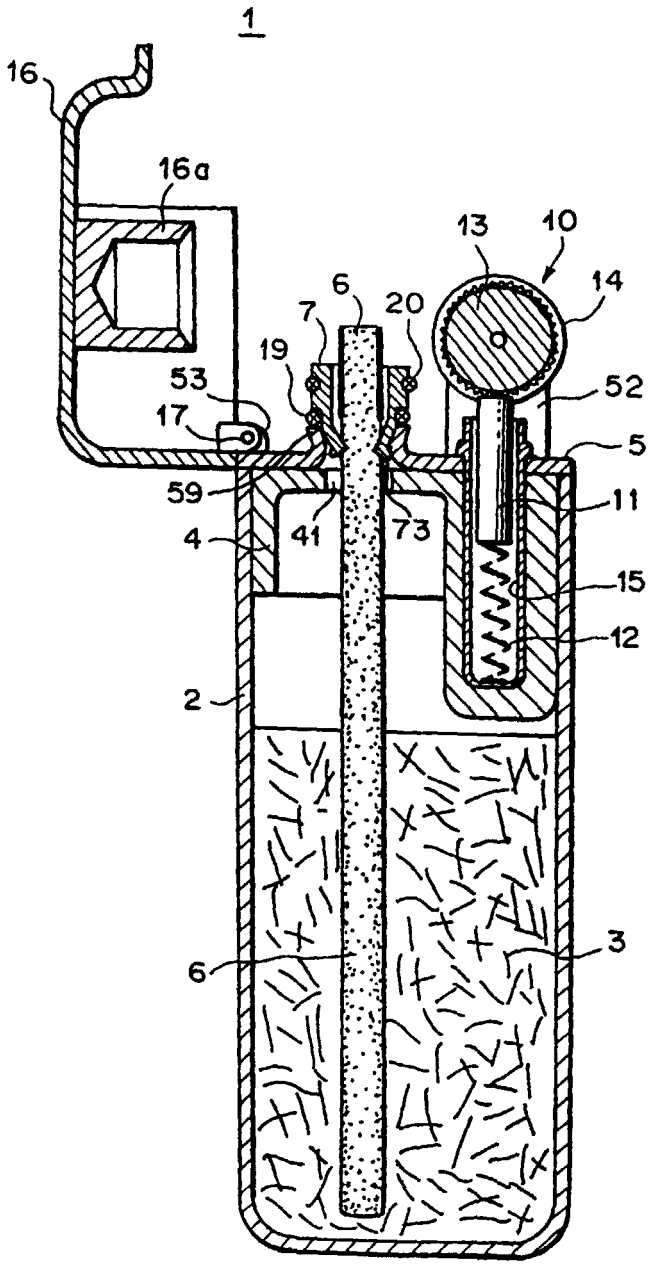


FIG.10

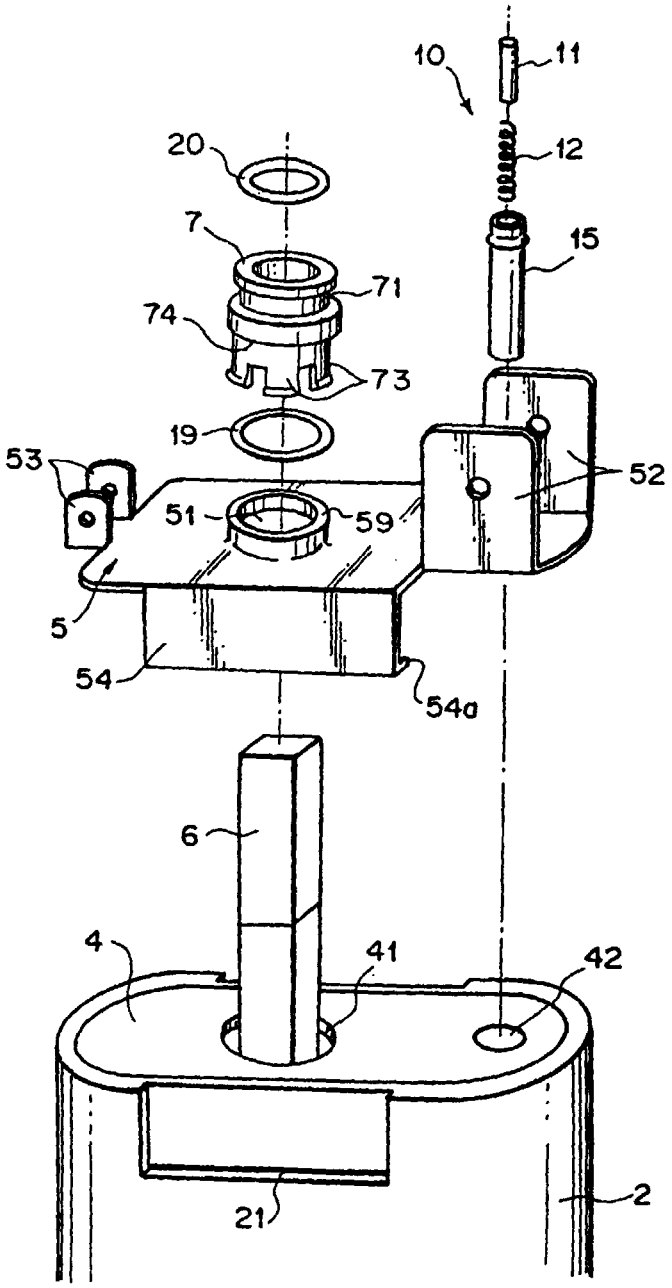


FIG.11

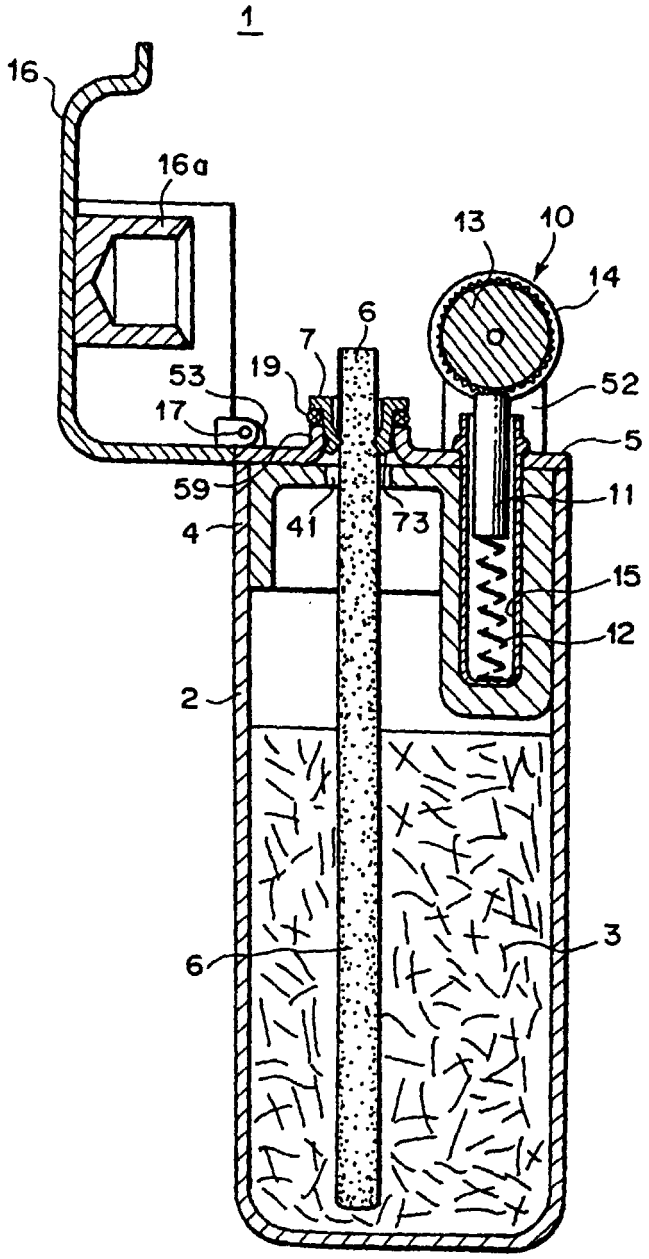


FIG.12

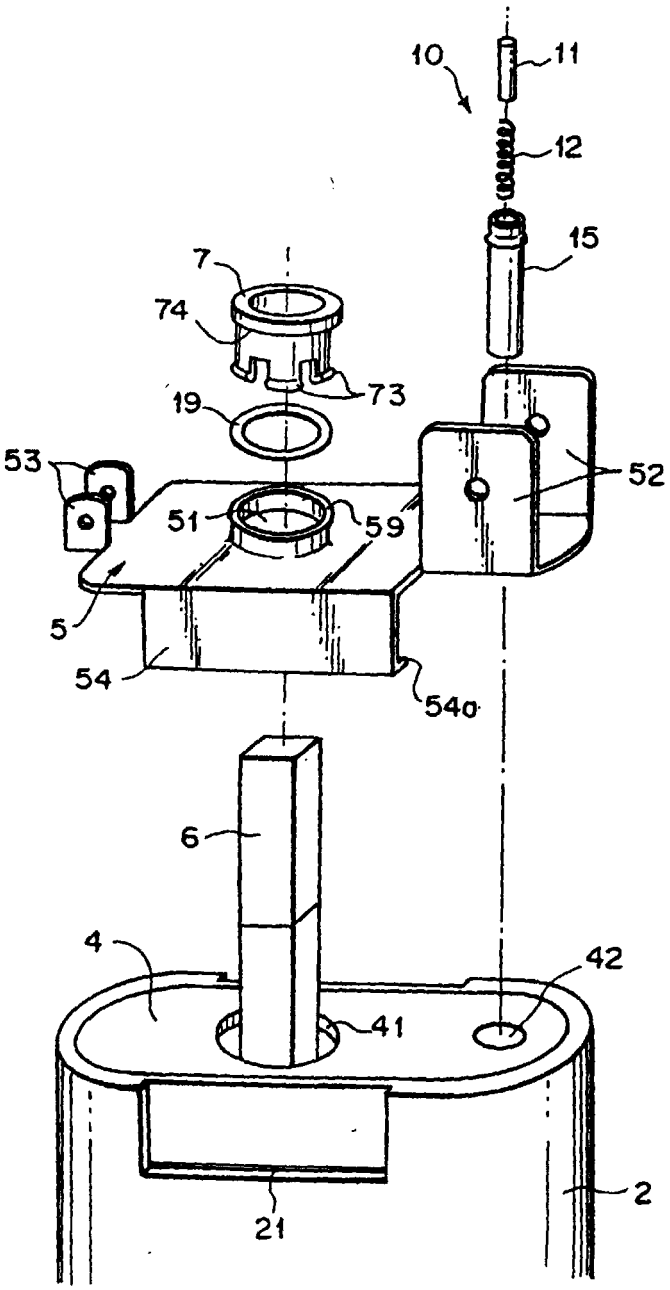


FIG.13

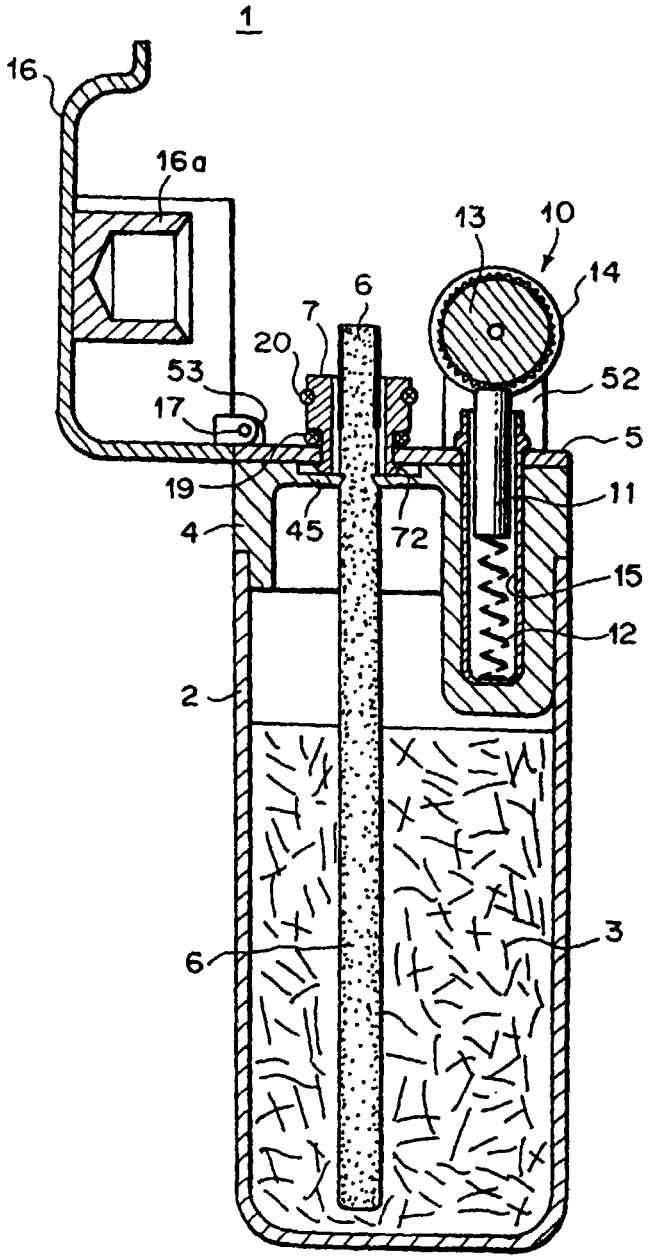


FIG.14

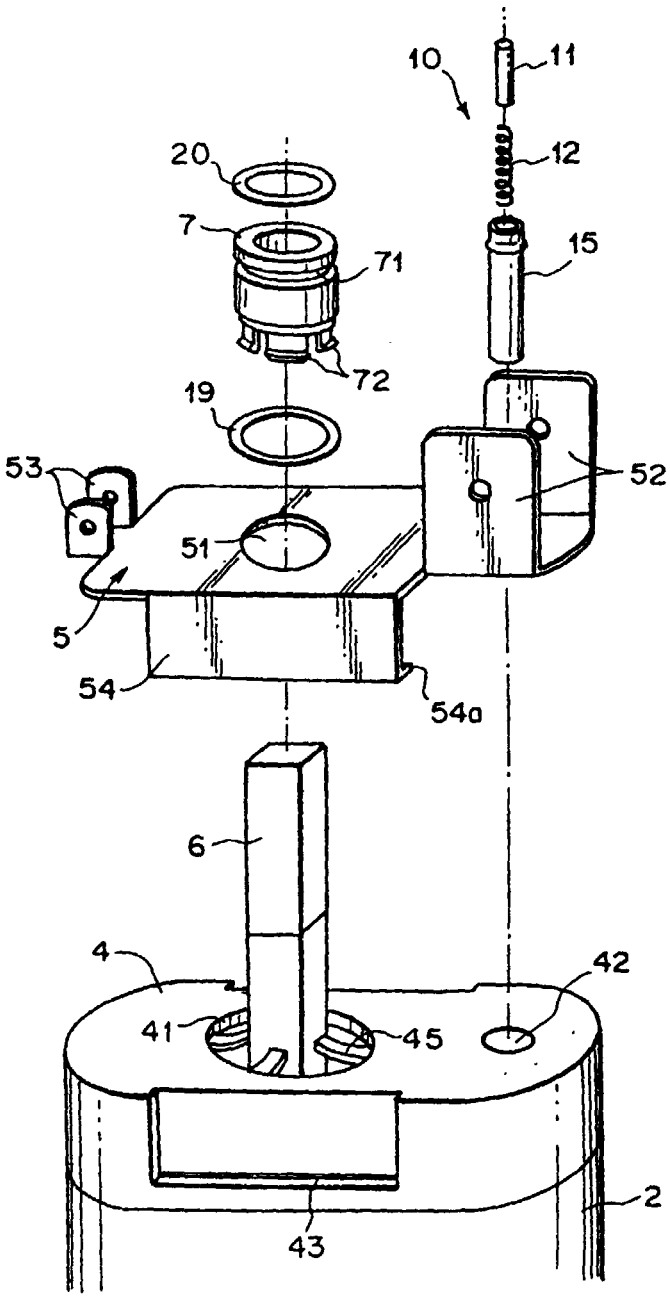


FIG.15

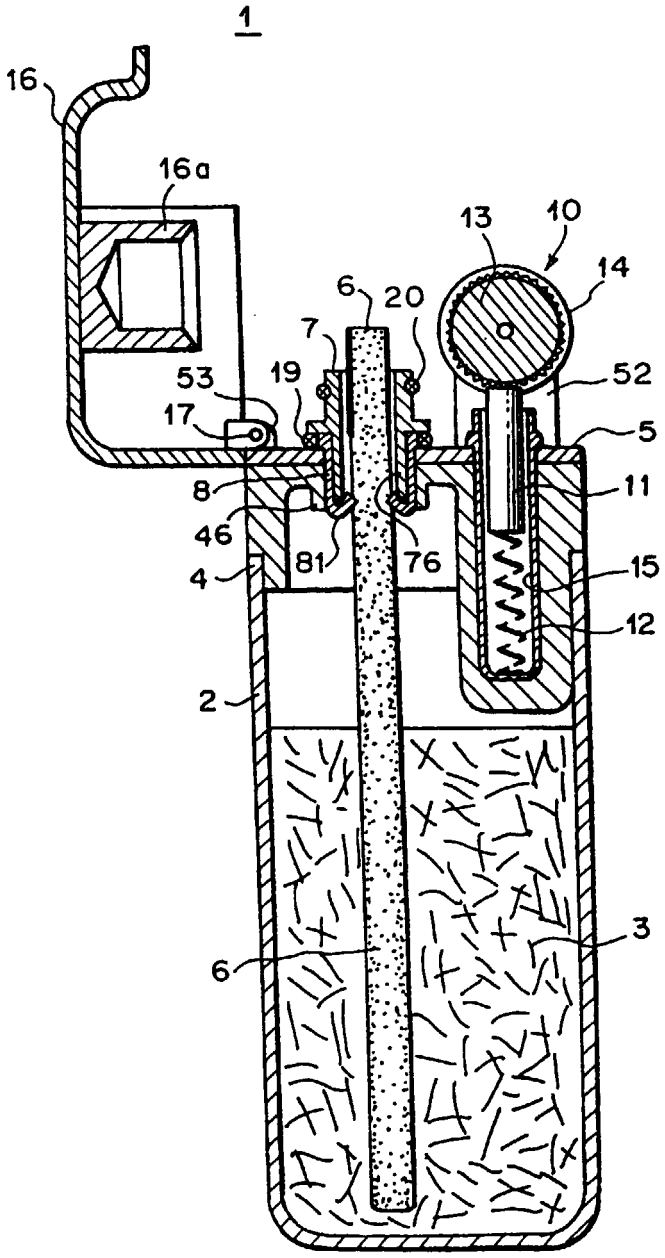
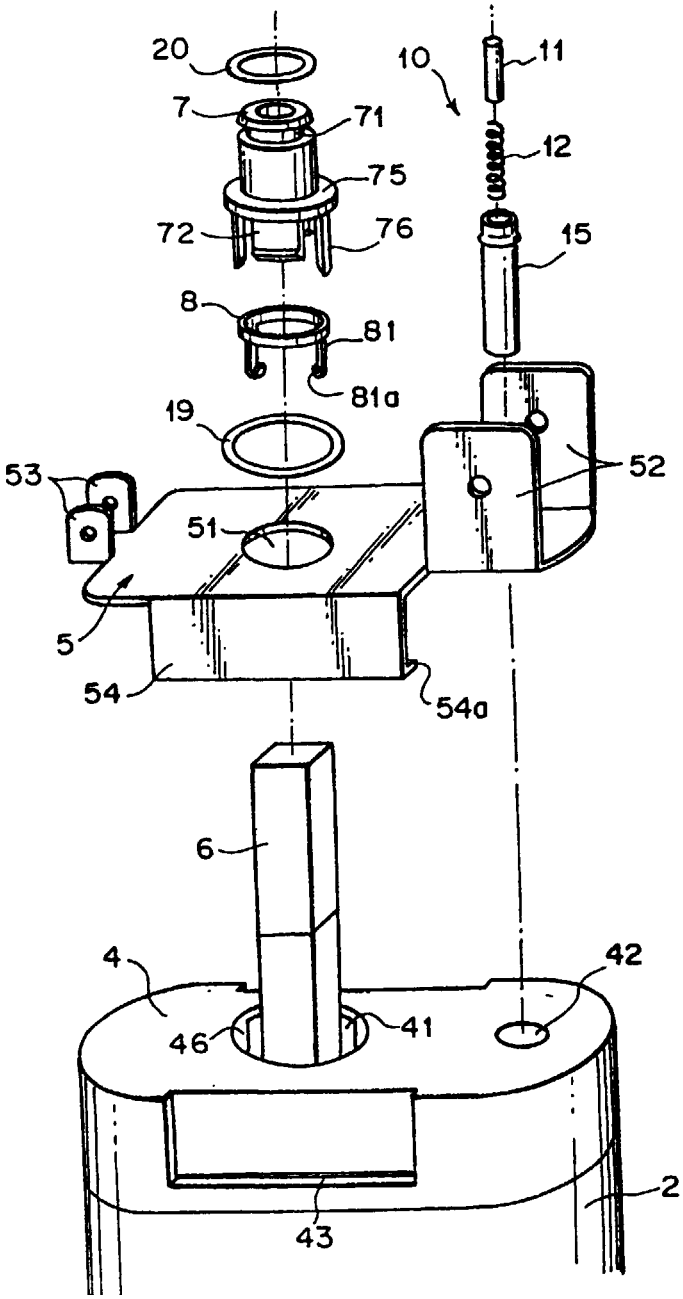


FIG.16


20
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46
41
2
43

FIG.17A

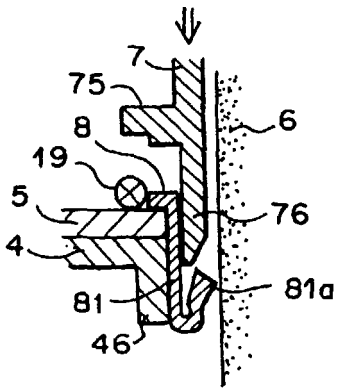


FIG.17B

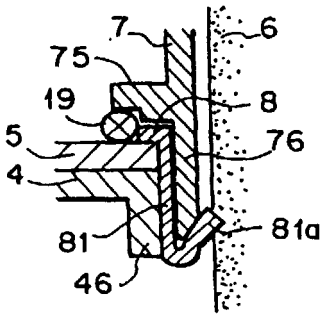


FIG.18A

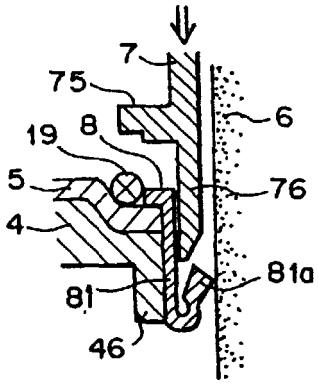


FIG.18B

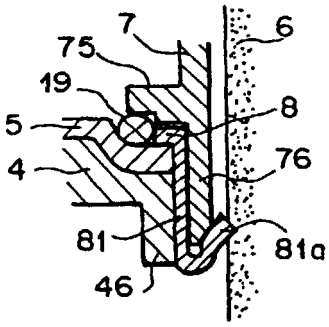


FIG.19

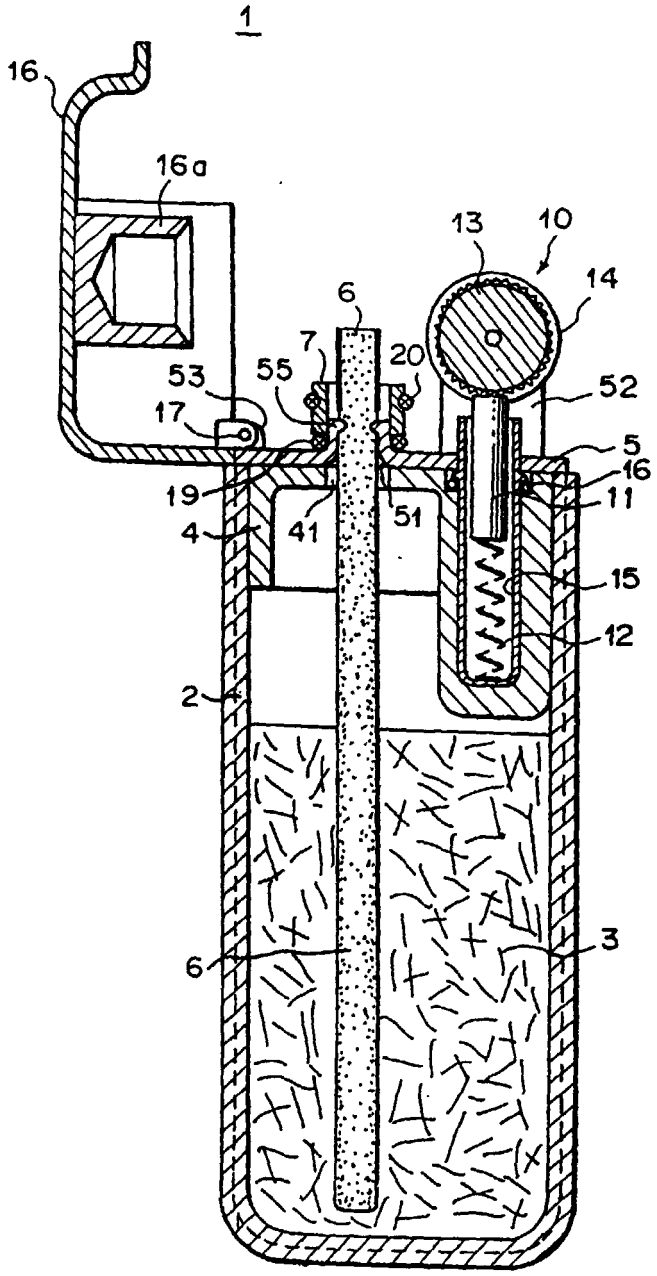


FIG.20

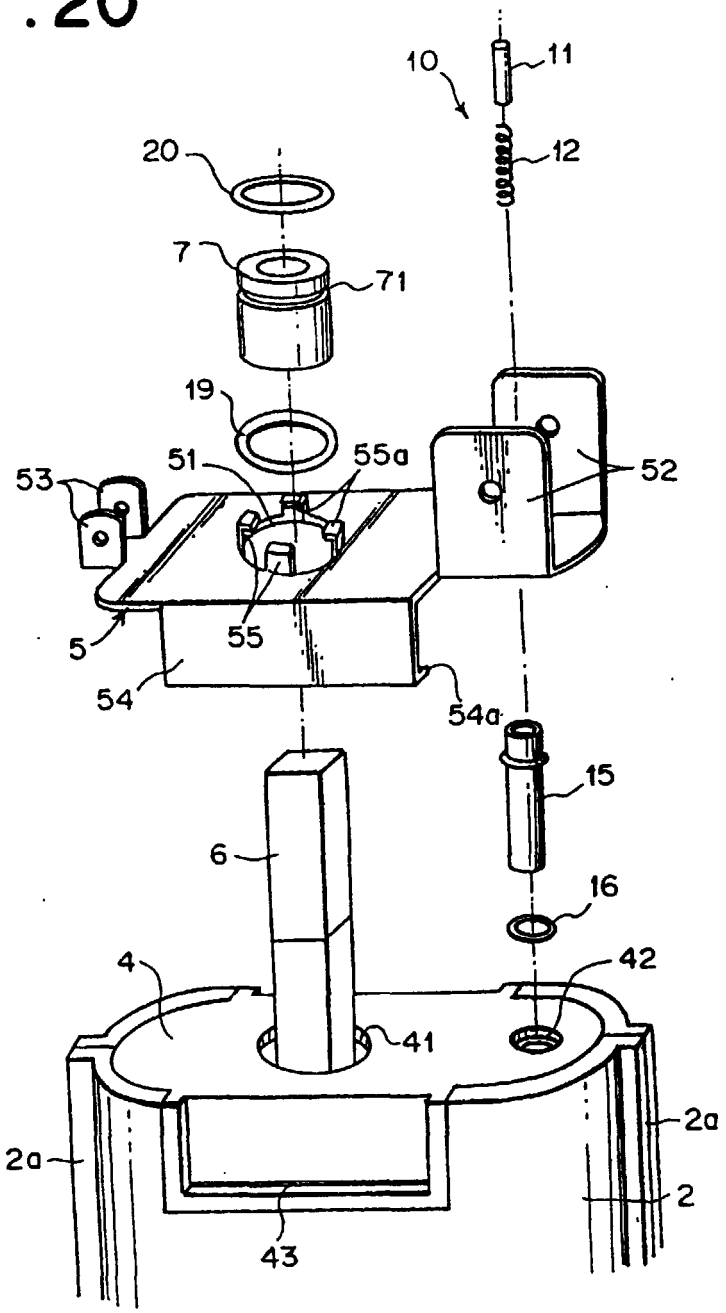


FIG.21

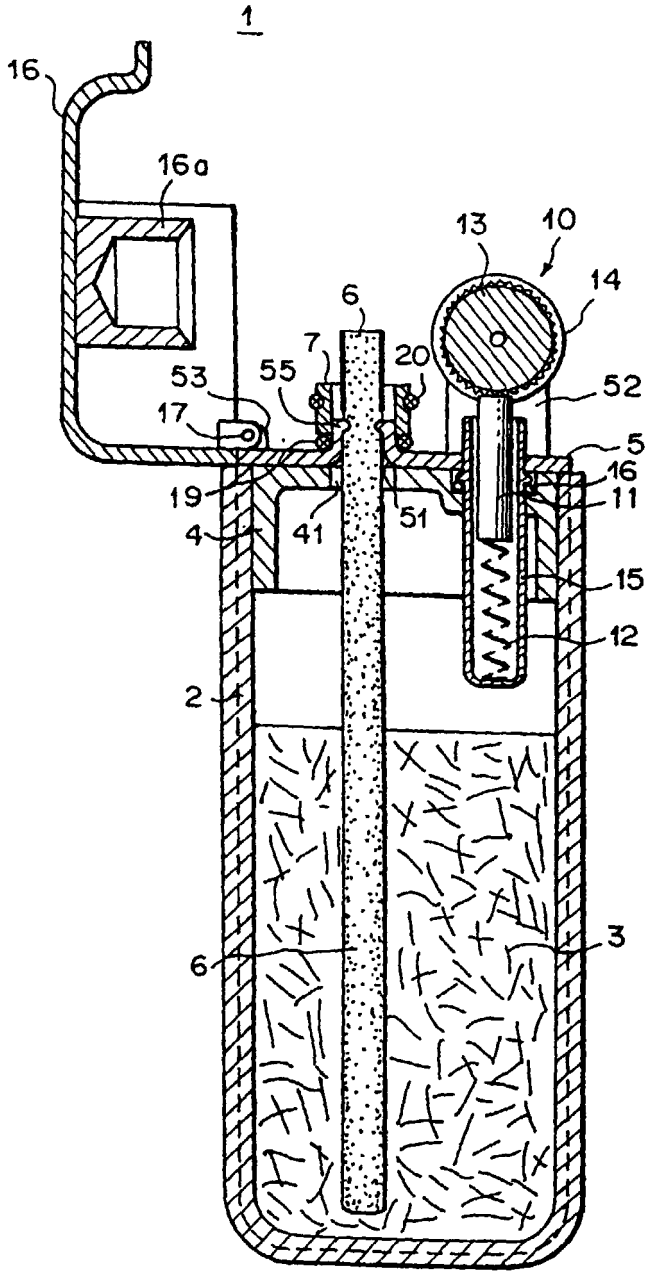


FIG.22

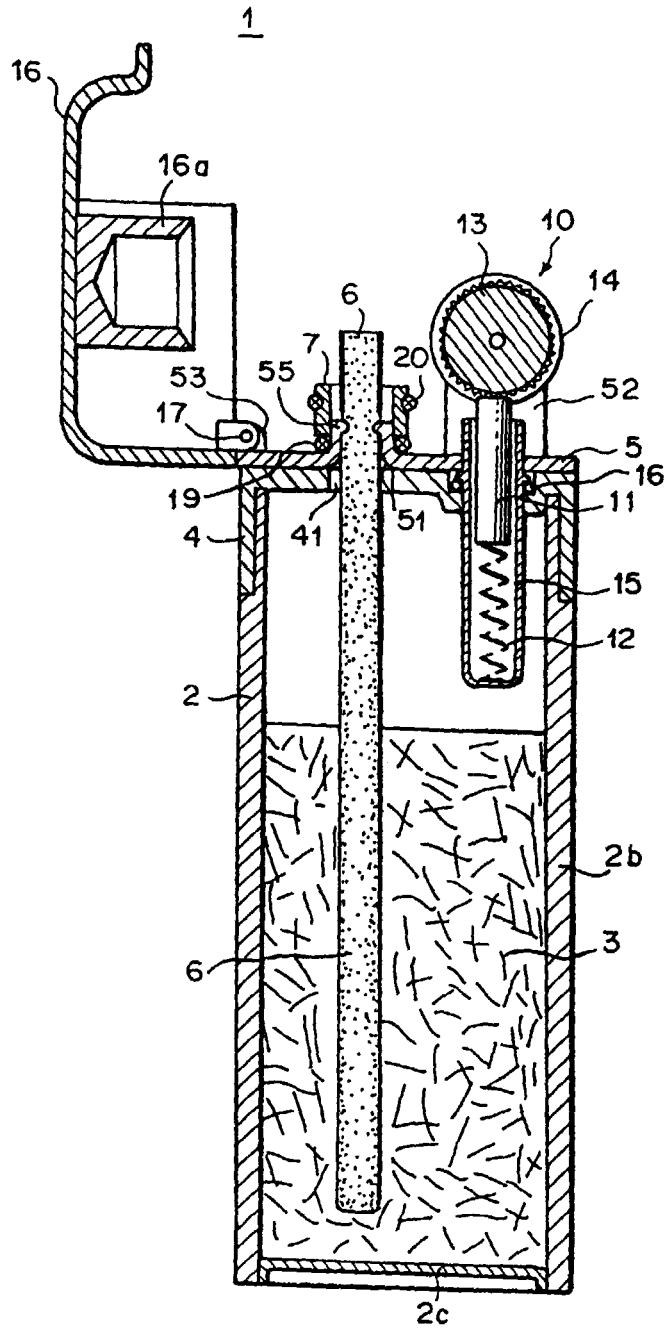


FIG. 23

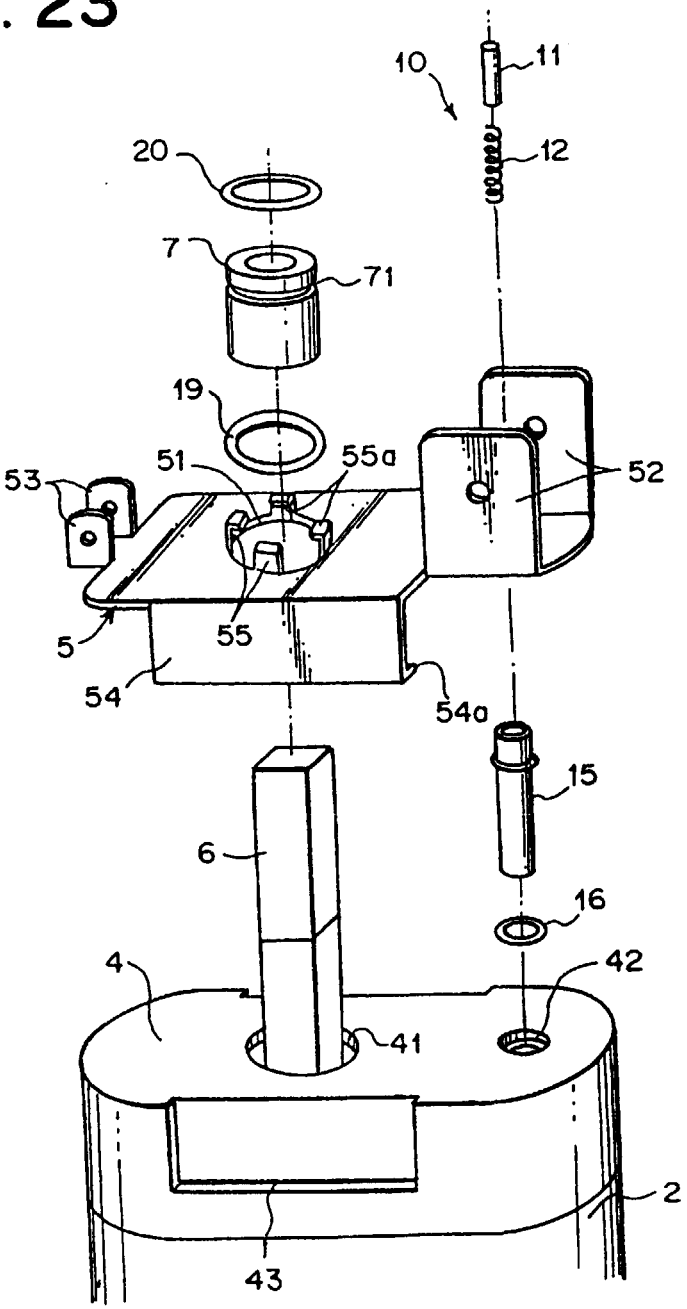
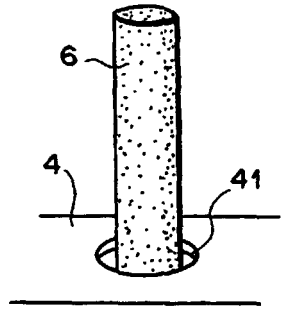


FIG. 24



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP99/03248

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[6] F23Q2/44

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[6] F23Q2/44, F23Q2/46

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1940-1996 Toroku Jitsuyo Shinan Koho 1994-1999
Kokai Jitsuyo Shinan Koho 1971-1999 Jitsuyo Shinan Toroku Koho 1996-1999

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 10-102072, A (Tokai Corp.), 21 April, 1998 (21. 04. 98), Full text ; Figs. 1 to 4 & EP, 884374, A	1-14
A	JP, 10-132275, A (Tokai Corp.), 22 May, 1998 (22. 05. 98), Full text ; Figs. 1 to 7 & EP, 870984, A	1-14
A	JP, 10-132276, A (Tokai Corp.), 22 May, 1998 (22. 05. 98), Full text ; Figs. 1 to 3 (Family: none)	1-14

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 September, 1999 (14. 09. 99)	28 September, 1999 (28. 09. 99)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)