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(54) **Apparatus for cutting polymer films**

Vorrichtung zum Schneiden von Polymerfolien

Appareil de découpe de films polymères

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US-A- 3 792 770 US-A- 4 156 382**

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Description

Field of the Invention

[0001] The present invention relates to an apparatus for cutting polymer film, in particular cling film. Cling films are used in a number of applications, but especially in households for covering food items and the like.

Background of the Invention

[0002] In the art the cling film is traditionally delivered wound on a roll which roll is packaged in a cardboard box. In some instances the cardboard box is provided with a cutting edge with a saw-like structure in order to assist the user in separating the cling film (polymer film) in the appropriate length. Due to the nature of these types of polymer film, i.e. cling film, they will have a tendency to cling together should they be exposed to folding or crumbling such that a not absolutely plain and usable film is the result from manually tearing the film across the cutter on the cardboard box.

[0003] In order to alleviate this, a foil cutter having an electrical heatable filament as disclosed in Danish utility model BA 2003 00178. In this apparatus a hollow polymer tube is provided with a longitudinal slit where the slit has length corresponding to the width of the polymer film. A handle is furthermore provided in extension of said slit such that a user may hold the apparatus on the handle, place the roll of cling film inside the hollow tube and having the end of the cling foil extend out through the slit. On the outside of the hollow tube a filament is arranged parallel to the slit and substantially having the same lengthwise extent as the slit such that as the cling film is pulled out from the interior of the hollow tube through the slit and the filament is heated, for example by pressing a switch on the handle which activates a battery thereby passing a current through the filament which then heats, the film will be melted and thereby separated in a cut-like manner along the filament.

[0004] This apparatus is proved to use the battery source quite quickly in that excessive heating was provided and furthermore due to the exposure of the filament it was difficult to store and handle the apparatus without damaging the apparatus as such.

[0005] WO 95/10475 A describes an apparatus for cutting polymer film, in particular cling-film. The apparatus comprise a housing for holding a roll of polymer film. The housing is provided with an elongate opening in a front wall thereof A cover portion is pivotally mounted to the housing. The cover includes a front skirt and an elongate contact skirt each extending downwardly there from. An electrically operated severing means extend across the opening. The severing means is located between the front skirt and the contact skirt. The cover is operated by pulling the polymer film upwards until it contacts the elongate contact skirt. By further pulling the film upwards the cover pivots upwards and the severing means is exposed

to cut the film. When the cover is open it extends outside the external limits of the housing and are therefore susceptible to damage.

[0006] US-A-3 792 770 describes a plastic bag fabricating, dispensing and sealing unit. The unit comprise a housing for holding a roll of double layered plastic film. The housing is closed by a hinged lid. A wire is mounted on the housing and extends along a lid mounted insulation strip that covers the wire. The double layered plastic film is pulled from the housing across the wire and the lid is pressed against the housing, such that the insulation strip presses the double layered plastic film against the wire. An electric circuit energises the wire that will heat up and thereby severing and sealing the layers of plastic film to form a bag. When the lid is open it extends outside the housing and are therefore susceptible to damage.

Object of the Invention

[0007] It is therefore a purpose of the present invention to provide an improved apparatus which has a longer useful service time and is not as fragile and exposed to damage when being used, stored or handled.

Description of the Invention

[0008] The present invention addresses this by providing an apparatus for cutting polymer films, in particular cling-film, wherein the apparatus comprises a housing, which housing has at least four elements: two end-plates, a pivotable door and an outer housing wall, where the door is arranged as part of the outer housing wall, such that two openings are defined in either end of the housing, and the end-plates when mounted in the openings in either end of the housing enclose a volume inside said housing, where the door is arranged for pivotable movement relative to the housing wall, along a substantial part of the distance between the two end-plates, and that means are arranged inside the housing for holding a roll of polymer film, and where a first slit is provided between the door and the housing opposite to where the door is pivotably mounted to the housing, and that a second slit is arranged in the door substantially parallel to the first slit, and a heatable filament is arranged superposed the second slit, where said filament when the door is flush with the housing does not project outside the housing, and which filament is connected to means for heating the filament characterised in that that the door pivots inwards relative to the housing's outer surface, the filament is exposed and projecting from the second slit.

[0009] By hiding the filament and only exposing it when the apparatus is in use, the risk of damaging the filament is substantially reduced. Furthermore, as the exposure of the filament by pivoting the door activates the heating mechanism, heating and thereby energy is only used when the cutting means are being activated.

[0010] In use one of the end-plates is removed in order to place the roll of cling film inside the apparatus and

having the free end of the cling film extend outside the housing through the first slit. As the cling film is pulled out to the desired length, the roll of cling film will rotate inside the housing such that only the free end of the cling film will be extendable out through the first slit. When the desired length of cling film has been pulled out of the housing, a movement of the cling film pushing down on the pivotable door will expose the heatable filament. The heatable filament is exposed due to the pivotable door being moved from a position flush with the housing to a position inside the housing. This movement will trigger the heating source, for example in the shape of a battery, thereby heating the filament which will then melt and cut the cling film in the desired position.

[0011] In a further advantageous embodiment of the invention the means for heating the filament are electrical, and a trigger mechanism for activating said heating means are arranged adjacent the door, whereby pivoting of the door causes the trigger mechanism to activate the heating means, where the trigger mechanism optionally provides a tactile feedback. This arrangement will provide the advantages as discussed above.

[0012] In a still further advantageous embodiment the door pivots inwards relative to the housing's outer surface, the filament is exposed and projecting from the second slit. Alternatively, in the embodiments above, the door could pivot outwardly thereby exposing the filament in order to be able to pass the cling film across the filament thereby cutting it. In a still further advantageous embodiment of the apparatus a mechanism is provided such that when the door pivots inwardly relative to the housing's outer surface, the door engages levers adjacent the end-plates, which forces the filament to be exposed through the second slit.

[0013] The levers will force the filament out through the second slit thereby exposing it on the outside of the housing whereby it becomes possible to cut the cling film. In both these embodiments, i.e. where the door pivots inward or where the filament is forced out through the second slit due to the action of levers, the filament will in the situation when the apparatus is not used, and when the apparatus is stored, be hidden inside the second slit thereby not exposed to any outside damage. This is an important aspect in that kitchen utensils tend to be stored in drawers or cupboards together with other items which accidentally could get into contact thereby damaging the fragile filament, which will render the apparatus useless.

[0014] In a still further advantageous embodiment of the invention the filament has a diameter of approximately 0.3 mm, where the filament is connected to an electronic circuitry comprising two sections: a first section comprising a charging circuit and a second section comprising a discharging section, where the discharging section initially induces a relatively powerful burst, followed by a series of minor bursts, where the overall cycle time is from 0.75 to 2 seconds preferably approx. 1 second, and where power control means are provided such that the effect in the filament is always the same.

[0015] In order to save power and thereby prolong the effective service life without having to charge the batteries or replace the batteries, extensive testing indicated that using a very thin filament and exposing it to a series of pulses, a very minimal power consumption was necessary in order to reach a satisfactory cutting cycle. Among other things it was found that an initial powerful burst followed by for example five minor bursts would cut all brands of cling film on the market in less than one second.

[0016] In a practical embodiment of the invention the electronic circuitry is designed such that the power is cut off after approximately one second such that renewed activation of the triggering means, i.e. pivoting of the door, is necessary in order to reheat the filament. In this manner a very low power consumption used very effectively provides for an apparatus having an extremely long service life.

[0017] In a still further advantageous embodiment of the invention, the charging circuit is connected to a rechargeable battery where the charging circuitry comprises means for not overloading the battery, controlling the current levels and optionally indicating and controlling the recharging cycle. This embodiment is particularly useful when the apparatus is provided together with a recharging bracket which may also be used to store the apparatus. By arranging the bracket in a convenient place the apparatus may be charged whenever present in the bracket such that a usable apparatus is always at hand.

[0018] In an advantageous embodiment of the invention the housing and door is made from extruded aluminium profiles and the end-plates are made from plastics. It is possible to select for example APS plastic which fulfils the hygienic requirements and which is tough enough to withstand the detergents and cleaning liquids used in kitchen environments. Also, aluminium has proven to be very durable in such an environment, and furthermore it is possible to provide aluminium with substantially any desired colour such that an apparatus according to the present invention may be manufactured in an aesthetically pleasing design.

Description of the Drawing

[0019] The invention will now be explained with reference to the accompanying drawing wherein

Fig. 1 illustrates an assembled apparatus according to the present invention, and

Fig. 2 illustrates an exploded view of an apparatus.

[0020] In fig. 1 the apparatus 1 is manufactured from extruded aluminium profiles where the end-plates 2, 3 are made from plastics. In this embodiment the cross sectional shape of the apparatus is oval, such that there is room inside the housing 4 to accommodate a roll of cling film and the necessary mechanisms and circuitry in

order to provide the cutting action. A pivotable door member 5 is provided creating a slit 6 between the housing 4 and the door 5 opposite the hinge 7 provided in order for the door 5 to be pivotable relative to the housing 4. In the door 5 is furthermore provided a second slit 8 which has a length in the longitudinal direction of the apparatus corresponding to the width of a cling film. Inside the second slit is accommodated a filament 10 which is illustrated with reference to figure 2.

[0021] As the door 5 pivots relative to the housing 4, the filament 10 will be exposed in the second slit 8 and at the same time energized such that the filament becomes hot enough to cut any cling film being in contact with the filament.

[0022] In figure 2 is created an exploded view of a device according to one embodiment of the invention. As may be seen from figure 2, the end-plates 2, 3 are provided with means 12, 13 for rotatingly holding a roll of cling film 14 inside the housing 4. The filament 10 will be maintained in a fixed position relative to the housing 4 by means of the holders 11 and 15. Furthermore, a hinge is integrated in the housing indicated by 15 for pivotly fastening of the door 5 such that as the door 5 pivots in the hinge 15 the filament 10 will be exposed to the second slit 8.

[0023] Above one particular embodiment of the invention has been explained with reference to the accompanying drawing, but the scope of protection shall only be limited by the appended claims.

Claims

1. Apparatus (1) for cutting polymer film, in particular cling-film, wherein the apparatus (1) comprises a housing (4), which housing (4) has at least four elements: two end-plates (2,3), a pivotable door (5) and an outer housing wall, where the door (5) is arranged as part of the outer housing wall, such that two openings are defined in either end of the housing (4), and the end-plates (2,3) when mounted in the openings in either end of the housing (4) enclose a volume inside said housing (4), where the door (5) is arranged for pivotable movement relative to the housing wall, along a substantial part of the distance between the two end-plates (2,3), and that means (12,13) are arranged inside the housing (4) for holding a roll of polymer film, and where a first slit (6) is provided between the door (5) and the housing (4) opposite to where the door (5) is pivotably mounted to the housing (4), and that a second slit (8) is arranged in the door (5) substantially parallel to the first slit (6), and a heatable filament (10) is arranged superposed the second slit (8), where said heatable filament (10) when the door (5) is flush with the housing (4) does not project outside the housing (4), and which heatable filament (10) is connected to means for heating the heatable filament (10) **characterised**

in that when the door (5) pivots inwards relative to the housing's outer surface, the filament (10) is exposed and projecting from the second slit (8).

2. Apparatus (1) according to claim 1, wherein the means for heating the filament (10) are electrical, and where a trigger mechanism for activating said heating means are arranged adjacent the door (5), whereby pivoting of the door (5) causes the trigger mechanism to activate the heating means, where the trigger mechanism optionally provides a tactile feedback.
3. Apparatus (1) according to claim 1 or 2 wherein when the door (5) pivots inwardly relative to the housing's outer surface, the door (5) engages levers adjacent the end-plates (2,3), which forces the filament (10) to be exposed through the second slit (8).
4. Apparatus (1) according to any preceding claim wherein the filament (10) has a diameter of approx. 0.3 mm, where the filament (10) is connected to an electronic circuitry comprising two sections: a first section comprising a charging circuit and a second section comprising a discharging section, where the discharging section initially induces a relatively powerful burst, followed by a series of minor bursts, where the overall cyclus time is from 0.75 to 2 seconds preferably approx. 1 second, and where power control means are provided such that the effect in the filament (10) always is the same.
5. Apparatus (1) according to claim 4 wherein the charging circuit is connected to a rechargeable battery, and where the charging circuitry comprises means for not overloading the battery, controlling the current levels and optionally indicating and controlling the recharging cycle.
6. Apparatus (1) according to any preceding claim, wherein the housing (4) and the door (5) is made from extruded aluminium profiles and the end-plates (2,3) are made from plastics.

Patentansprüche

1. Gerät zum Schneiden von Polymerfolie, insbesondere Frischhaltefolie, wobei das Gerät (1) ein Gehäuse (4) mit wenigstens vier Elementen umfaßt: zwei Stimplatten (2, 3), eine drehbare Tür (5) und eine äußere Gehäusewand, wobei die Tür (5) einen Teil der äußeren Gehäusewand bildet, so daß eine Öffnung in jedem Ende des Gehäuses (4) definiert ist, und die Stimplatten (2, 3), wenn sie in den Öffnungen in den Enden des Gehäuses (4) angeordnet sind, einen Raum innerhalb des Gehäuses (4) einschließen, wobei die Tür (5) zur Drehbewegung re-

- lativ zur Gehäusewand entlang einem wesentlichen Teil des Abstandes zwischen den zwei Stimplatten (2, 3) angeordnet ist, und daß Mittel (12, 13) zum Halten einer Polymerfolienrolle im Gehäuse (4) angeordnet sind, und wobei ein erster Schlitz (6) zwischen der Tür (5) und dem Gehäuse (4) der Stelle gegenüber, wo die Tür am Gehäuse (4) drehbar angeordnet ist, vorgesehen ist, und daß ein zweiter Schlitz (8) in der Tür (5) im wesentlichen parallel zum ersten Schlitz (6) angeordnet ist, und ein aufwärmbarer Draht (10) den zweiten Schlitz (8) überlagert, wobei der aufwärmbare Draht (10), wenn die Tür (5) bündig mit dem Gehäuse (4) verläuft, nicht vom Gehäuse (4) hervorragt, und der aufwärmbare Draht (10) mit Mittel zum Aufwärmen des aufwärmbaren Drahtes (10) verbunden ist, **dadurch gekennzeichnet, daß** der Draht (10), wenn die Tür (5) relativ zur Außenfläche des Gehäuses nach Innen dreht, freigelegt wird und von dem zweiten Schlitz (8) hervorragt.
2. Gerät (1) nach Anspruch 1, wobei die Mittel zum Aufwärmen des Drahtes (10) elektrisch sind, und wobei eine Auslösemechanik zum Betätigen der Aufwärmmittel der Tür (5) benachbart angeordnet ist, wobei das Drehen der Tür (5) die Auslösemechanik dazu anregt, die Aufwärmmittel zu betätigen, wobei die Auslösemechanik wahlfrei ein taktiles Feedback vorsieht.
 3. Gerät (1) nach Anspruch 1 oder 2, wobei die Tür (5), wenn sie relativ zur Außenseite des Gehäuses nach Innen dreht, mit den Stimplatten (2, 3) benachbarten Hebeln eingreift, wobei durch den zweiten Schlitz (8) hindurch die Freilegung des Drahtes (10) hervorgezwungen wird.
 4. Gerät (1) nach irgendeinem der vorhergehenden Ansprüche, wobei der Draht (10) einen Durchmesser von etwa 0,3 mm aufweist und mit einer aus zwei Sektionen bestehenden elektronischen Schaltung verbunden ist: eine einen Ladekreislauf umfassende erste Sektion und eine eine Entladesektion umfassende zweite Sektion, wobei die Entladesektion anfangs einen verhältnismäßig kräftigen Stoß induziert, gefolgt von einer Reihe von kleineren Stößen, wobei die gesamte Zykluszeit von 0,75 bis 2 Sekunden, vorzugsweise etwa 1 Sekunde, beträgt, und wobei Energiesteuerungsmittel vorgesehen sind, so daß der Effekt im Draht (10) unverändert bleibt.
 5. Gerät (1) nach Anspruch 4, wobei der Ladekreislauf mit einer wiederaufladbaren Batterie verbunden ist, und wobei die Ladeschaltung Mittel zum Nichtüberladen der Batterie, Steuern der Stromlagen und wahlfrei zum Anzeigen und Steuern des Wiederaufladungszyklusses aufweist.

6. Gerät (1) nach irgendeinem der vorhergehenden Ansprüche, wobei das Gehäuse (4) und die Tür (5) aus extrudierten Aluminiumprofilen und die Stimplatten (2, 3) aus Kunststoff hergestellt sind.

Revendications

1. Appareil (1) de découpe de films polymères, en particulier les films plastiques, dans lequel l'appareil (1) comprend un boîtier (4), lequel boîtier (4) présente au moins quatre éléments: deux plaques d'extrémité (2,3), une porte pivotante (5) et une paroi de boîtier extérieure, où la porte (5) est disposée en tant que partie de la paroi extérieure du boîtier, tels que deux ouvertures sont définies dans l'une ou l'autre extrémité du boîtier (4), et les plaques d'extrémités (2,3) une fois montées dans les ouvertures dans l'une ou l'autre extrémité du boîtier (4) entourent un volume à l'intérieur dudit boîtier (4), où la porte (5) est disposée pour pouvoir pivoter par rapport à la paroi de boîtier, le long d'une partie substantielle de la distance entre les deux plaques d'extrémité (2,3), et que des moyens (12,13) sont disposés à l'intérieur du boîtier (4) pour maintenir un rouleau de film polymère, et où une première fente (6) est disposée entre la porte (5) et le boîtier (4) opposée à l'endroit où la porte (5) est montée de manière pivotante sur le boîtier (4), et qu'une deuxième fente (8) est arrangée dans la porte (5) sensiblement parallèle à la première fente (6), et un filament à chauffer (10) est disposé superposé à la deuxième fente (8), où ledit filament à chauffer (10) lorsque la porte (5) est de niveau avec le boîtier (4) ne fait pas saillie à l'extérieur du boîtier (4), et lequel filament à chauffer (10) est relié à des moyens de chauffage du filament à chauffer (10) **caractérisé en ce que** la porte (5) pivote vers l'intérieur par rapport à la surface extérieure du boîtier, le filament (10) est exposé et fait saillie à partir de la deuxième fente (8).
2. Appareil (1) selon la revendication 1, dans lequel les moyens de chauffage du filament (10) sont électriques, et où un mécanisme de déclenchement pour activer lesdits moyens de chauffage est disposé à proximité de la porte (5), le pivotement de la porte (5) provoque le mécanisme de déclenchement à activer le moyen de chauffage, où le mécanisme de déclenchement éventuellement fournit une rétroaction tactile.
3. Appareil (1) selon la revendication 1 ou 2 dans lequel la porte (5) pivote vers l'intérieur par rapport à la surface extérieure du boîtier, la porte (5) engage des leviers adjacents les plaques d'extrémité (2,3), qui force le filament (10) à être exposée à travers la seconde fente (8).

4. Appareil (1) selon l'une quelconque des revendications précédentes, dans lequel le filament (10) a un diamètre d'environ 0,3 mm, où le filament (10) est relié à un ensemble de circuits électroniques comprenant deux sections: une première section comprenant un circuit de charge et une seconde section comprenant une section de décharge, où la section de décharge initialement produit une rafale relativement puissante, suivie d'une séries de rafales mineures, où le temps de cycle globale est de 0,75 à 2 secondes, de préférence environ 1 seconde, et où des moyens de commande de puissance sont prévus de telle sorte que l'effet dans le filament (10) toujours reste le même.
5. Appareil (1) selon la revendication 4 dans lequel le circuit de charge est connecté à une batterie rechargeable, et où le circuit de chargement comprend des moyens permettant de ne pas surcharger la batterie, commandant les niveaux de courant et éventuellement indiquant et commandant le cycle de recharge.
6. Appareil (1) selon l'une quelconque des revendications précédentes, dans lequel le boîtier (4) et la porte (5) est fabriqué à partir de profilés extrudés en aluminium et les plaques d'extrémité (2,3) sont fabriquées en matière plastique.

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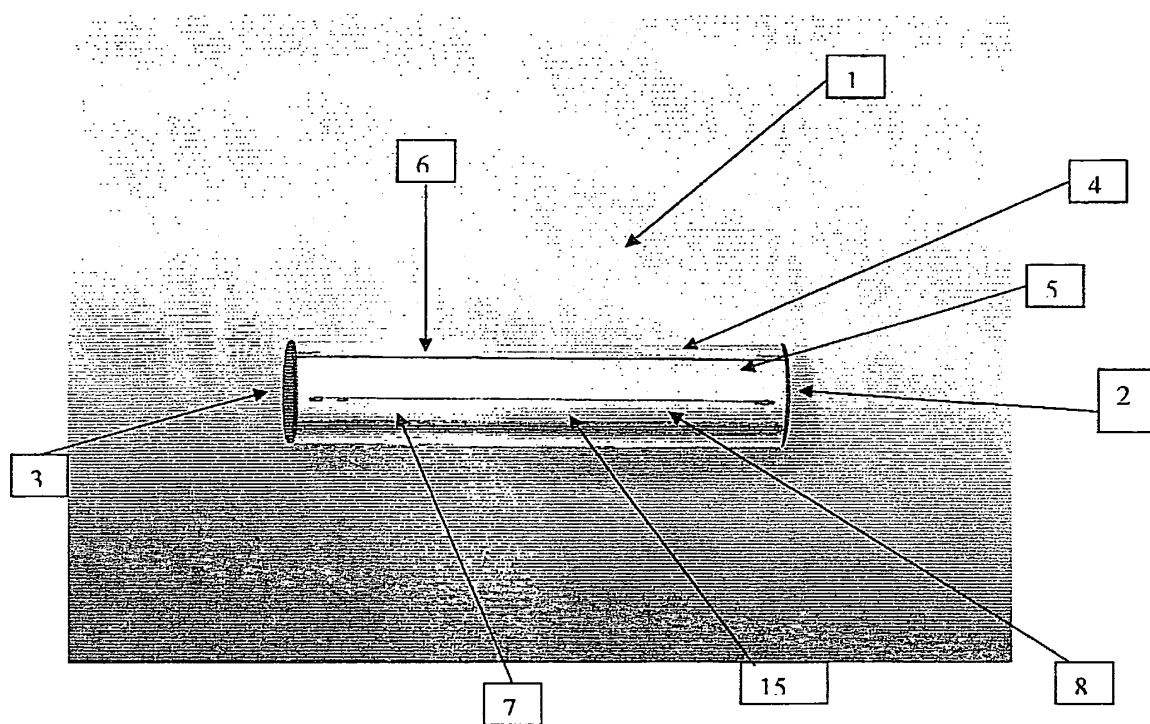
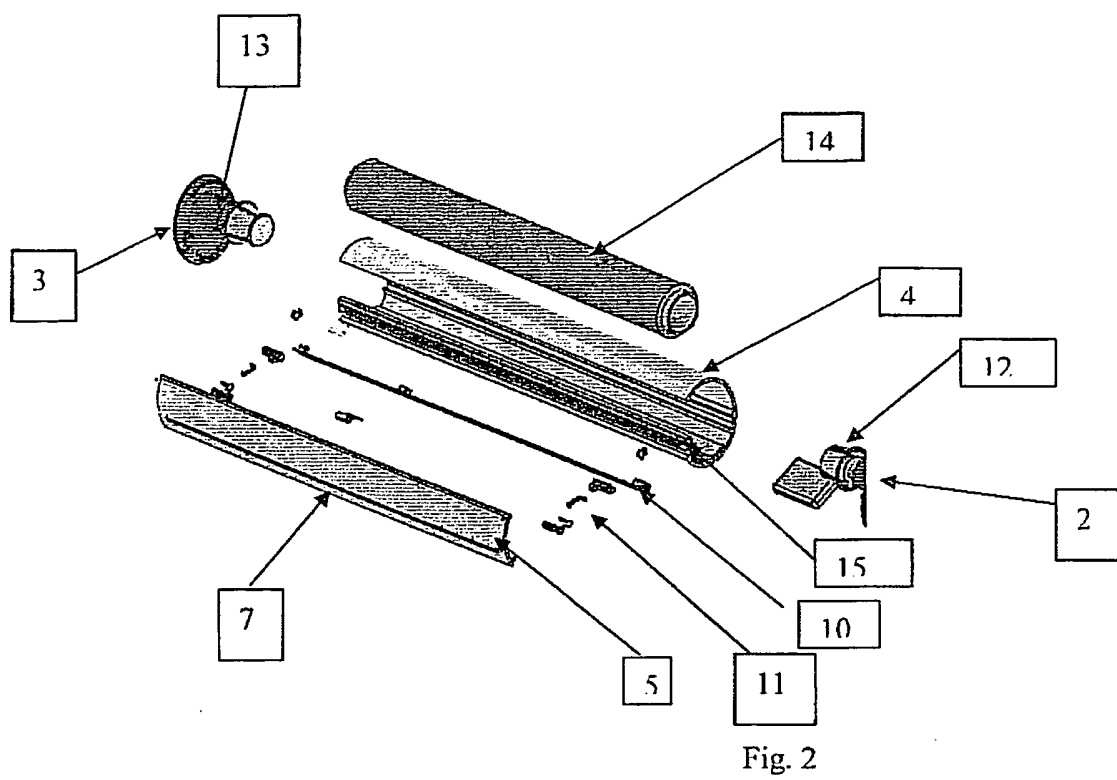


Fig. 1



REFERENCES CITED IN THE DESCRIPTION

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